"Last August, monetary policy was probably as tight as it could get without risking financial disorder." Economic report of the President January 1967 p. 60.
An Alternative Interpretation of Keynesian Economics

Hyman Minsky

The question before us is: "What are the special characteristics of Keynesian Economics, if such an animal exists?" Our primary interest is not in the intellectual history of the participants in this session, of Keynes or even of the discipline. Our real interest is in the positive and policy aspects of Economics. Thus, if there is a Keynesian Economics, it consists of a set of propositions about system behavior which are true in the Keynesian and not true in the Classical, or whatever label you want to pin upon the non-Keynesian, system.

Upon occasion I have to give the first formal lecture in Economic Theory to an entering class of graduate students. In this introduction I tend to give the mystery of our discipline away. I inform these students that almost all of economic theory revolves around the conditions under which two propositions are or are not valid and how these propositions need to be qualified as different assumptions are introduced.

The first proposition is the current phrasing of Smith's invisible hand. It states that there is a one to one correspondence between competitive equilibrium and Pareto optimality. The second thematic proposition of economic theory is that there is one and only one equilibrium for the system as a whole, and this is at full employment.

The special Keynesian view relates to the second proposition; the Keynesian version is that less than full employment equilibrium is possible. To get such a radically different result it
is necessary to start from different assumptions. This the Keynesians do by introducing uncertainty as a fundamental aspect of the model. It is asserted that a world with uncertainty cannot be effectively analyzed by using a model that first assumes that uncertainty does not exist and then corrects the result to allow for the existence of uncertainty. It also is clear that the uncertainty of Keynes does not relate to those aspects of the economy for which a well defined stable frequency distribution exists. All decisions are made under conditions of uncertainty, but to Keynes the special impact of uncertainty is on decisions concerning wealth.

The Keynesian perspective with respect to uncertainty also throws light upon the validity of the Pareto optimality theorem. Thus when uncertainty is introduced into price theory— as is done by Galbraith and Arrow— it becomes clear that competitive markets do not in general lend to a Pareto optimum.

John Maynard Keynes of the General Theory of Employment, Interest, and Money was also the author of A Treatise of Probability. Keynes' views of the nature and central role of uncertainty in his general theory are perhaps most clearly stated in his rebuttal to Professor


Viner's review of The General Theory, which appeared in the February 1937 Q.J.E. The title of Keynes' rebuttal was The General Theory of Employment. I wish I had time to read a fair portion of this comments.

The significance of Keynes' piece is not that it throws light upon The General Theory, but that it leads to valid and important propositions about system behavior. Incidentally both Professor Wright and Professor Copeland touched upon some aspects of Keynesian economics that follow from this Q.J.E. piece. Professor Copeland did this when he commented that the demand for long-lived capital is inherently speculative, Professor Wright when he turned into Cassandra and warned of the "impending financial crisis-."

I believe I might surprise Professor Wright and new some things that he might find quite congenial. The Keynesian economics entombed in text books such as Ackley's does not do justice to either Keynes or the economy. Keynesian economics is very much the economics of capitalism. Unlike price theory, which is at least as relevant to a Socialist as to an enterprise economy, Keynesian economics is relevant only to a system in which private portfolio management is a major

I find that G.L.S. Shackle also considers this rebuttal by Keynes as an essential, major ingredient in the Keynesian "canon". For Shackle's view see "Recent Themes Concerning the Nature and Role of Interest" in Surveys of Economic Theory, American Economic Association and Royal Economic Society.

I. Genesis of New Monetarism

1. Interest in financial stability and an impact of financial restrictions upon monetary characteristics: the views from 1935 to July 1967

2. The cause of lost income: The Structural Change of 1966

3. Dissatisfaction with the Keynesianism in the uncontrived Keynesian system, but for example, Ackley’s Macro-Economics is not Keynesian

4. Does money matter if to know: if so, what is the definition of money

Cite: Keynes vs. Keynesianism: A suggested Interpretation by Alex Leijonhufvud. As remarked joint sense are this since he in his May Meetings at the S. E. B.

Also: Selected Recent Themes Concerning the Notion Role of Money. Survey En Ching Vol II (3).

Ackless Text on Keynesian Text.

Emphasis on F. M. - Money and Liquidity preference
It is the fundamentally speculative nature of the demand for investment and the inherent instability of decisions based upon uncertainty that indicates that a speculative boom will necessarily follow a prolonged period in which the enterprise system functions well. As the world is not born de nova each morning; as yesterday's enthusiasms are embodied in today's liabilities so the portfolios willingly accepted during such a boom period become back-breaking burdens during a period in which either calmer or pessimistic views of the future guide portfolio desires.

To summarize: Keynesian economics is different because it integrates the uncertainty inherent in a decentralized capitalist economy, where each household and firm makes portfolio as well as income decisions, into a model of system behavior. One result of this model is that the relative prices of capital goods (the stock) and current output (the flow) can change markedly and rapidly. This can lead to a large enough initial unemployment of labor so that the wage, price and interest rate movements set up by unemployment and excess supply are not efficient ways of returning the system to full employment.

This is something quite different from both classical economics and textbook versions of the Keynesian system. But much more significantly, it is indeed a very good framework for analyzing the behavior of our intensely financial enterprise economy.
Does money even matter if you have to what is the definition of money

Rev’d by 2097 P.E. Feb 26
determinant of the demand for investment output. Therefore the core of the system is the investment function, not the consumption function. And the investment function cannot be defined independently of the portfolio preferences of ultimate wealth holders and the existing system of financial intermediation. As is true of almost all of monetary economics, Keynesian economics is a form of "analytical institutionalism".

Portfolio preferences are the content of Liquidity Preference. Keynes' view of the demand for money as an asset was stated when he asked "Why should anyone outside a lunatic asylum wish to use money as a store of wealth" (Q.J.E. Feb. 1937, p. 216). Obviously sane men hold money as a store of wealth—and they do so because they are trying to behave rationally in the face of the fundamental irrationality of uncertainty. Men must hold the entire inventory of physical capital and money. The protection against contingencies, of the kind that cannot be summed up by "---a good Benthamite calculation of a series of prospective advantages and disadvantages, each multiplied by the appropriate probability, waiting to be summed." (Q.J.E. Feb. 1937, p. 214), takes the form—for quite insufficient reasons if looked at rationally—of holding money. Thus the Keynesian liquidity preference function is not

\[ m = k(r, y) \]

as Professor Copeland wrote it

\[ m = \frac{1}{k} \left( \frac{y - c}{w} \right) \]

The "---desire to hold Money as a store of wealth is a barometer of the degree of distrust of our own calculations and conventions concerning the future" (Q.J.E. Feb. 1937, p. 216) and this degree of distrust, being based upon the most tenuous of feelings, is subject to sharp changes.
But the only way an individual portfolio owner can get more money quickly is by selling his other wealth. For the community this means that a rise in the demand for money lowers the market value of physical wealth; $P_{xK}$ must fall. If we assume that the stream of expected future earnings in the present value formula remains unchanged, a fall in $P_{xK}$ means a rise in $r$.

Investment (newly produced capital) and the existing stock of capital are perfect substitutes in portfolios. Thus $P_{x}$ can be taken as the demand price for investment goods. But the cost of production of investment goods is given by $P_{y}$ - which is some function of wages, $w$. That is, any increase in the demand for money first lowers the demand price for investment goods without lowering the costs of inputs for the production of capital goods.

The Keynesian price inflexibility is simply a statement that the price of stocks can fall-or-rise faster than the price of current output. A second Keynesian proposition is that the dynamic adjustment process set up when excess supply exists in the commodity and labor markets is inefficient in generating a rise in the demand price for investment relative to the supply price of current output. This proposition centers around the impact of falling current output prices upon the numerator in the present value formulas of our textbooks.

There is no reason to believe that in such a dynamical content $\frac{d\text{GNP}}{dp} < 0$; that is the dynamics centering around the labor market and the price level of current output cannot rectify the underemployment situation.

\[\text{footnote: Of course a rise in the demand for money is a shift of the liquidity preference function.}\]
1) \( P_k = P_{ID} \)

2) \( P_{ID} = P_{IS} \)

\[ \frac{d}{dt} (m, \bar{m}, T) \]

\( \bar{m} \): institutions

\( m \): uncertainty

\( T \): time

\( P_{IS} = \Phi (I, \bar{w}) \)

\( P_{IS} \): interest rate

\( I \): investment

\( \bar{w} \): real wage
The second function is a cost of investment function - a supply function of investment goods. Thus given $M$ exogenously, the quantity of investment is determined.

If $C = \bar{C}(y)$ and $Y = C + I$, then the above determines income as a function of $M$.

If we assume that the future expected returns from capital to be known, equation (1) $P = \bar{q}(M, \bar{K})$ can be transformed into an $r = \bar{Q}(M, \bar{K})$ relation. With every quantity of $M$ a different price will be paid for the same future income stream, that is a larger quantity of money will be associated with a higher market price of existing capital, a lower rate of return from the market value of capital. In a similar way the cost of production of investment relation can be turned into an $I = I(r)$ relationship. This requires the same information on expected returns as is used in transforming the portfolio relation. In turn the $I = I(r)$ and the $r = \bar{Q}(M)$ can be transformed into $I = \bar{Q}(M)$.

It is impossible from the above to separate the Investment function from the portfolio adjustments of liquidity preference doctrine.

Two phenomena can be distinguished. If $M$ remains fixed as capital is accumulated, a slow downward drift of the MF curve (Diagram 1) will take place. A rise in $M$ is needed to maintain portfolio balance in the face of the rise in real capital. Alternatively, if portfolio preferences change, perhaps because of a change in uncertainty, then, independently of the impact of real accumulation, the $P(M, \bar{K})$ function will shift. It is the second type of shift that occupies center stage in the Keynesian view of the world.

Underlying preferences need not be such that for $P$, to remain constant $\frac{dM}{M} = \frac{dK}{K}$; it may be that $\frac{dM}{M} < \frac{dK}{K}$ or even $\frac{dM}{M} > \frac{dK}{K}$. 
The essential role of a marked increase in uncertainty can be illustrated by the textbook Keynesian investment-saving diagram. The liquidity preference function - Investment supply function - can be transformed into a negatively sloped function relating investment and interest rates. The classical savings-interest rate relation can be assumed to intersect with the investment-interest rate relation at an appropriate and acceptable interest rate for the neo-classical solution. However,

\[
\begin{array}{c}
S(r) \\
I(r) \\
I, S
\end{array}
\]

a shock to the system, a change in uncertainty that shifts preferred portfolios, so that liquidity is valued more highly does two things: it shifts the Investment function to the left and the Savings functions to the right. Once this takes place there is no acceptable interest rate at which \( S \) and \( I \) intersect - it takes an income

\[
\begin{array}{c}
I(r) S_1(\bar{y}, r) \\
S(\bar{y}, r)
\end{array}
\]

fall to shift the S function so that a \( S(y) , I(r) \) solution will result that is consistent with \( \underline{\gamma} < \bar{\gamma} \) , where \( \bar{\gamma} \) is a floor to default free interest rates.

At all times the Investment function has to take into account returns at various expected states of nature. As a result of shock the weight attached to depression returns is increased. However, as the dust settles from the shock a gradual easing of the views as to the likelihood of unfavorable states of nature
occurring will take place. The weights attached to liquidity are decreased and a gradual progression of the investment function to the right occurs.

We now know enough to supplement investment by honorary investments so that the numerators in the computation of expected present values will not again reflect large scale excess capacity. Nevertheless, if a shock takes place it will still take time for the effects of a lack of belief in the validity of the assumed likelihood of different states occurring to wear off.

The essence of the game is that investment is an offshoot to portfolio preferences, and that portfolio preferences reflect the attempt by rational men to do well in a world with uncertainty.

It is the contention here that the shock to portfolio preferences that leads to a sharp drop in the investment function results from experiences with portfolios that go sour. On a large scale, portfolios go sour as the result of a financial crisis.
Incidentally, the remark by Keynes to the effect that a sudden large reduction of money wages (and the price of current output) would be most favorable, which was cited by Professor Wright in his text, is consistent with the above. A once-and-for-all large and unsustainable cut in money wages would abort the pessimistic expectations of future price movements. This could lower the supply price of the real investment needed to generate full employment to a level that is consistent with the demand price as generated by liquidity preference.

When the liquidity preference and investment relations are looked at as the carriers of the uncertainty inherent in decisions pertaining to wealth, Keynesian economics is the economics of tremors and booms. Professor Cope land is on the right track when he introduces indices of confidence into his investment and liquidity preference functions. In fact for the investing unit, real investment is a portfolio decision -- it is a simultaneous decision to emit financial liabilities in order to acquire real assets. A new era such as was "introduced" into the United States by the announcement by members of the Council of Economic Advisers that "the business cycle as we have known it is now obsolete" will lead to a sharp increase in investment demand and an acceptance of liability structures that in prior circumstances would have been considered imprudent. A not unusual disturbance in the face of such euphoric expectations can lead to sharp revisions of desired asset and liability structures and a fall in asset prices which impinges upon real demand.
IV. Financial Instability and Less Than Full Employment Equilibrium

A reinterpretation of Keynesian economics will make precise one way in which financial instability can affect system behavior.

An essential difference between Keynesian and both classical and Neo-classical economics centers around the importance attached to uncertainty. Basic propositions in classical and neo-classical economics are derived by abstracting from uncertainty; the most that uncertainty does is add some minor qualifications to the propositions of the theory. The special Keynesian propositions with respect to money, investment, and under employment equilibrium, as well as the treatment of consumption, can only be understood as statements about optimum behavior in a world of uncertainty. In this world one defense against highly undesirable consequences of possible states of the world takes the form of portfolio decisions. It is necessary to make precise what 'uncertainty' means in this context. One thing it is not is risk, Keynes was quite clear in stating that no 'expected value' computation was possible.

In an attempt to make precise what the 'General Theory...' was all about Keynes asserted that in a world with certainty, no one, outside a lunatic asylum,

would use money as a store of wealth. In the world as it is, money and, even more significantly, Treasury bills are held as assets. Portfolios reflect the choices that sane men make as they attempt to behave in a rational manner in the face of an inherently irrational universe. Typically this means that at all times a significant proportion of wealth holders try to arrange their portfolios so that they are reasonably well protected over the occurrence of any one of a number of alternative possible states of the economy.

In making portfolio choices given the fact of uncertainty all economic units accept nothing as a really proven guide to the state of the economy in the rather near but not immediate future. For want of anything better inertia is often used as a guide to the rather close future. However, even those who accept inertia recognize its fallibility and have doubts as to what it should be attached. (Even if inertia is accepted as a guide, is it to be attached to a level, a rate of change (velocity), a rate of change of a rate of change (acceleration), etc...?) As a result of this underlying lack of confidence in any extrapolation technique, expectations and hence present values of future incomes are inherently unstable. A not unusual event, if it occurs in a 'favorable' environment, may lead to a sharp re-evaluation of expectations and of values; not only may it lead to a sharp change in what some particular rational man expects, but it may lead to a marked change in the consensus as to the future of the economy.

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1 J.M. Keynes "The General Theory of Employment," Quarterly Journal of Economics, Vol. 51, February, 1937, pp. 209-223. The exact quotation, in full, is: "Money, it is well known, serves two principal purposes. By acting as a money of account it facilitates exchange without it being necessary that it should ever come into the picture as a substantive object. In this respect it is a convenience which is devoid of significance or real influence. In the second place it is a store of wealth. So we are told without a smile on the face. But in the world of the classical economy, what an insane use to which to put it! For it is a recognized characteristic of money as a store of wealth that it is barren; whereas practically every other form of storing wealth yields some interest or profit. Why should anyone outside a lunatic asylum wish to use money as a store of wealth?" p. 215.
For analytical purposes we can separate the process of valuing a particular long lived asset or a collection of assets combined into a firm into two stages. In the first stage the subjective beliefs about the likelihood of alternative state-dates of the economy occurring are assumed to be held with confidence. This is followed by a second stage in which the degree of "belief" in the stated likelihoods attached to the various state dates is assessed. At times the degree of belief attached to a proposition that any particular state-date will occur will be nil. For many questions the rational man has the option of saying I don't know - but as a wealth holder he must assess the worth of items for his portfolio even when conditions are such that he would rather not play the game.

When beliefs about the likelihood of various alternative states of the economy actually occurring are held with perfect confidence, then the present value of a long lived asset reflects its (subjective) expected yield at each state date of the economy and the assumed known likelihood of these state dates occurring. That is under stable conditions the expected gross profit after taxes of the \( i^{th} \) asset at the \( t^{th} \) date, \( N_{it} \), will equal \( \sum p_{st} N_{si} \) where \( N_{si} \) is the gross profit after taxes of the \( i^{th} \) asset if the \( S^{th} \) state of nature occurs (assumed independent of date, could be modified to the \( S^{th} \) state of nature at the \( t^{th} \) date) and \( p_{st} \) is the (subjective) probability that the \( S^{th} \) state will occur at the \( t^{th/\text{date}} \). The \( S \) states are so defined that for all \( \sum_{s} p_{st} = 1 \). These \( N_{it} \), discounted at a rate appropriate to the assumed perfect certainty with which the probabilistic expectations are held, yields the present value of the \( i^{th} \) asset, \( \sqrt{i} \). That is when beliefs as to the probability distribution of outcomes are held with perfect confidence, then the standard probability expected values makes sense. The above paragraph describes a risky but not an uncertain situation.

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1 If it is wished, to each outcome \( N_{it} \), a utility \( U(N_{it}) \) can be attached and the probability and present value computation can be undertaken with respect to utilities.
Assume that $S$ is a set of mutually exclusive and exhaustive states of nature. At date $t$, one of the $S_j$ will occur; the sum $p_S = 1$. However, the set of probabilities, $p_S$, which must be attached to the alternative events if the $N_{it}$ and the $V_i$ are to be computed, can be accepted with varying degrees of rational belief. Thus the value of the $i^{th}$ asset will vary not only with the expected payoffs at various state-dates of nature and the probabilities attached to these payoffs, but also with the confidence placed in the probabilities attached to various state-dates of nature. That is $N_{it} = \sum_j (z_{ij} N_{s_j})$ where $0 \leq q \leq 1$ and $q$ reflects the confidence with which the particular weights are attached to the likelihood of various states of nature occurring.

Another way of phrasing the above may be that there are two conjectural elements in determining the expected payoffs, $N_{it}$ and hence $V_i$; one being that the $N_{s_j}$ are conjectures, the other the probability distribution among possible states as reflected in the $p_S$ is not known. Obviously those events which would affect the confidence placed in any assumed probability distribution attached to the alternative possible states may also affect the confidence placed in the assumed expected payoff if state $S$ occurs, $N_{s_j}$. The expected present value of any asset $V_i$ may be accepted with a wide range of degrees of confidence - from well nigh certainty to being considered a most tenuous conjecture. This degree of acceptance of the expected value affects its market price.

The relevant decisions for households are not made with respect to individual assets as much as with respect to bundles of assets. The portfolio problem for households becomes one of combining assets whose payoff's vary quite independently as the states of nature vary so as to achieve the units objective of minimal satisfactory state under any circumstance. We will assume that a portfolio is chosen so as to maximize $V$ subject to the constraint that $V_s > \bar{V}$ for every
likely state of nature.

The assets that are available are inside and outside assets: the outside assets consist of money and government debt. The nominal value of monetary assets is independent of the state of the economy. Government debt is an asset which can exhibit variability in its nominal value, but under conditions where business cycles occur, its nominal value is not highly correlated with the expected nominal value of inside assets.

We assume that two types of periods can be distinguished: one in which beliefs as to the likelihood of alternative states of nature occurring within some horizon period is held with confidence, the second in which whatever "bets" are placed are placed under "duress". During these latter periods of higher order uncertainty, markedly lower values are attached to assets where nominal value depends upon system performance. Periods of higher order uncertainty will see portfolios shift toward assets which protect against large declines in nominal value. In addition almost always flexibility is a virtue, however assets which permit flexibility will have an especial premium whenever such periods of 'higher order uncertainty' occur.

Keynesian liquidity preference encompasses both confidence conditions: that is in a continuous form the statement would be that expectations as to the likelihood of different states of nature occurring may be held with varying degrees of confidence. During periods of stable expectations, portfolios are balanced so that tolerable outcomes occur regardless which state of nature rules. Almost all units tend to weigh heavily the avoidance of disasters - let us say a liquidity crisis for the unit. In addition there exist portfolios with a bias against even transitory capital losses, such a bias against capital losses could be called short run risk aversion. Thus portfolios will be distributed among assets in order to generate acceptable outcomes under varying conditions. Assets

\footnote{Alternatively the desired portfolio objective can be stated in terms of cash flows and such a rather more unconventional view is examined in section VI below.}
which protect against a liquidity crisis would be part of a rational portfolio
under all circumstances. In addition a preferred market may exist for assets
which protect against capital losses. (To argue that the price paid for such
protection is too high is on the same intellectual level as arguing that the price
of olives is too high, people really should not like olives, etc. On the other
hand such evidence of over compensation for uncertainty could be a guide for
'beating' some markets.) Thus liquidity preference, defined as a rational person's
demand for money as an asset because he must live in a world with uncertainty,
leads to a determinate demand function for money at any 'value' for higher order
uncertainty, but this function will shift quite markedly and suddenly if such
valuations are modified.

In addition to periods where subjective estimates as to the likelihood of
various states of nature occurring are stable, there are periods in which times
seem troubled, and the subjective estimates, which must be made as to the likeli-
hood of possible states of nature, are held with much less confidence. The risk
avertor reaction to such a decline in confidence is to attempt to increase the
weight of assets which yield flexibility in portfolio choices, i.e. to increase
the value not only of money but also of all assets which have broad, deep and
resilient markets. Any increase in uncertainty shifts the liquidity preference
function.

There obviously is a reverse side to the coin of an increase in uncertainty,
a decrease in uncertainty. If we assume a dominance of risk-avertor personalites,
then it is likely that an increase in uncertainty can be a rapid phenomena while
a decrease will require a slow accretion of confidence. Nature need not be
symmetrical and may very well proceed in jumps; there is no need for a loss in
confidence to proceed at the same pace as a gain in confidence.

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1 See J. Tobin "Liquidity Preference as Behavior Toward Risk" Review of Economic
Studies.
Rapid changes in desired portfolios are confronted with short period inelastic supplies of primary assets, both real and government liabilities. On the other hand, nominal money, especially if a fractional reserve cum central bank banking system exists, can be well nigh infinitely elastic. However, even if the nominal money supply increases, unless prices are pegged by the Central Bank, any time events occur which increase the uncertainty discount, \( \varphi \), the price of unprotected inside assets will fall relative not only to money but also to default free or protected assets. The stagnant stable state that follows a deep depression is characterized by very low yields on default free assets. The liquidity trap reflects the inability to achieve a meaningful difference between the yields on real assets and on default free earning assets by further lowering the already low yield on default free assets. On the other hand, when conditions are most euphoric, the subjective value placed upon the certainty embodied in default free assets such as Treasury bills will decrease. Under these conditions, Treasury debt will yield more than real assets, as reflected by the current return on stock exchange assets. (Of course, the stock exchange asset price includes a valuation of growth.)

It is impossible to affect rapidly the stock of real capital relative to other factors. However, the value of the produced stock of real capital cannot rise too far above the price of newly produced capital for the stock of capital is infinitely elastic at the price of investment goods. During euphoric periods the yield on real capital does not fall as far as the yield on common stocks; the expected yield on real investment will remain relatively high during such a boom.

Portfolios must hold the existing stock of both real assets and Treasury debt. As the yield of real assets cannot fall very far, the only solution is for the yield on Treasury debt to rise. To paraphrase Keynes 'in a world without
uncertainty, no one outside of a lunatic asylum will hold Treasury Bills as a
store of wealth, unless their yield is the same as the yield on real assets'.

In an euphoric economy it is widely held that past doubts about the future
of the economy were based upon error. The behavior of money market rates during
such a period is consistent with a rapid convergence of the yield upon default
free and default possible assets. This convergence takes place by a decline in
the price of default free assets relative to the price of the underlying real
capital.

In addition to default free (government debt plus gold) and default possible
(real capital, private debts, equities) assets, there are protected assets. These
are assets which in varying degrees and from various sources carry some protection
against consequences that would follow from 'unfavorable' events. The typical
example of such assets are bonds - but real assets for which a guaranteed market
for their product exists are also protected.

Financial intermediaries - including banks as they emit money - generate
at least partially protected assets. Thus a rise in intermediation and particu-
larly a rise in bank money, even if the asset acquired by the bank carries default
possibilities, 'unbalance' portfolios in favor of default free assets. The power
of banking and the creation of bank money to stimulate an economy lies in the
belief that banks and the monetary authorities are able to give to their liabili-
ties greater protection than other financial intermediaries can give.

During an euphoric economy the value of such protection evaporates, and
these instruments also fall in price relative to real assets or equity rights.

Incidentally, the phenomena by which a decrease in the value of some pro-
tection affects observable market prices also exists in the labor market. We
can assume that civil servants, such as firemen, accepted low money incomes relative to others with the same initial job opportunity spectrum in exchange for security; the civil servants value security more than others. In an euphoric, full employment economy the value of such civil servant security evaporates. Hence in order to attract workers, their measured market wage will need to rise.

Real investment flows from portfolio imbalance. It is the function of economic policy that operates by way of private investment to make real capital relatively scarce in private portfolios. This may take the form of increasing conventional bank liability money. Given wage rates (costs) there is a supply curve of increments to the capital stock. Given the stock of capital, other primary assets, the extent of intermediation, the underlying portfolio preferences, and the state of 'uncertainty' there is an infinitely elastic demand price at which increments to real capital will be assimilated to portfolios. The price at which increments to real capital will be assimilated to portfolios will be an increasing function of the assets other than real capital in portfolios, i.e. of the protection contained in the financial assets. Increasing conventional bank money presumably increases this protection.

Consider the case of an euphoric economy where Treasury Bills and real capital are the assets in portfolios. The euphoria means that a desire to substitute real capital for Treasury bills exists. This will result in a rise in the price of the stocks of real capital relative to the price of Treasury bills. As Treasury bills cannot really fall in nominal value, the relative price changes by raising the price of real capital. This adjustment of an invariant census of assets to a desired portfolio by changing the prices attached to assets is affected by and affects the flow relations: new capital can be produced. The
initial portfolio imbalance by way of changing the demand price for capital generates the demand for investment.

Thus the investment process can be detailed in two functions. The portfolio imbalance relation which states the price at which net additions to capital (investment) will be assimilated to portfolios as a function of the other, monetary, asset in portfolios.

Two interpretations of Diagram I's content are possible. I have chosen keeping the stock of capital constant, thus \( V = P_k \bar{K} + M \) where \( V \) = wealth, \( P_k \) = price level of capital, \( \bar{K} \) is the fixed stock of capital and \( M \) is outside money. As \( M \) increases, \( w \) increases due to both the rise in \( M \) and a rise in \( P_k \). With this interpretation where \( M \) increases as "manna from heaven" it would be appropriate for the consumption function to include a \( W/P_y \) variable (\( P_y \) is the price level of current output). This would by today's conventions add an upward drifting consumption function to the mechanism by which a rise in \( M \) affects output.

An alternative interpretation would keep the value of wealth constant, thus \( V = P_k K + M \). An increase in \( M \) is initially an "open market operation" \( OM = P_k K \). However, as 'portfolios' now hold more money and less capital goods, the price of capital goods rises. Capital is expropriated so that \( W \) remains fixed; this is a pure portfolio balance relation.

If starting from an initial position \( V_0 = P_{k0} K_0 + M_0 \), \( M \) is increased then the \( P_k \) of the second variant would lie above that of the first variant. If \( M \) is decreased, the \( P_k \) of the second variant will lie below that of the first; the constant wealth variant cuts the constant capital variant from below. I have assumed constant capital stock \( K \) in drawing Diagram I.
Appendix Section IV: A Model

The model can be written as follows:

1) \( Y = C + I \)
2) \( C = c(Y) \)
3) \( P_{IS} = \rho(I, \bar{W}) \)
4) \( P_K = L(M, K) \)
5) \( P_{I-D} = P_K \)
6) \( P_{IS} = P_{I-D} \)

\( M \) (Money), \( K \) (Capital) and \( \bar{W} \) (wages) exogenous, \( P_M = 1 \).

Symbols have their usual meaning: we add \( P_{I-S} \) as the supply price of investment, \( P_K \) as the market price of the existing real or inside capital and \( P_{I-D} \) is the demand price of investment.

In equation 3) \( \frac{d}{dI} P_{IS} \gg 0, \quad \frac{P_{IS}}{I} \gg 0, \quad \frac{d}{dW} P_{IS} \gg 0 \).

In equation 4) \( \frac{d}{dM} P_K \gg 0, \quad \frac{d}{dK} P_K < 0 \). Equation 4 is unstable with respect to views as to the certainty of the future: it shifts "down" whenever uncertainty increases.

The portfolio balance equation (the liquidity preference function) yields a market price for the stock of real capital (equation 4). Given \( W \), \( I \) adjusts so that \( P_{IS} = P_K \) (equation 3, 5 and 6). Once \( I \) is given \( C \) and \( Y \) are determined (equations 1 and 2). Nowhere in the above model does either the interest rate or productivity appear. "Liquidity preference" determines the market price of the stock of real assets and a shift in liquidity preference means a shift in equation 4, not any movement along the function.
The above model has the tune called by the market price of the stock of real capital. Given a cost curve for investment which has a o output at a positive price, it is possible for the demand price to fall below the price at which there will be an appreciable production of capital goods. Thus the 'complete' collapse of investment is possible.

Of course, productivity is 'almost always' an element in the determination of the market price of a real asset or a collection of assets. However, this formulation is important as it emphasizes that at times the 'liquidity' attribute of any asset or of all assets may be of greater significance in determining its market price than its productivity.

Productivity of capital takes the form of expected future earnings (gross profits after taxes) of a collection of capital goods in a production process. In any real world decision, the earnings on specific items or collections of capital must be estimated, the heterogeneity of the capital stock must be taken into account.

Once earnings are estimated, then given the current market price a discount rate can be computed. That is, we have

\[ P_k \cdot K = \sum N_i / (1 + r_1)^i \]

which states the arithmetic relation that the value of the capital stock is of necessity equal to the discounted value of some 'known' stream of returns. Thus, if the current market determines \( P_k \cdot K \) and if a set of \( N_i \) are estimated, an interest rate can be computed. If it is wished \( N_i \) can be suppressed by using \( r_i \) that is

\[ \sum \frac{N_i}{(1 + r_i)^t} + P_k \cdot K = L(M). \]
If a transaction demand for money is added, and if the $N_i$ are interpreted as function of a fixed $y$ and if all $r_i$ are assumed equal the standard

$M = L (r, y)$ can be derived.

For the investment decision, we can assume that the future return of the increment to capital is the same as to the stock of capital. With the $N_i$ known and with the $N_i$ invariant with the extent of I then

$$P_{I, S} = \frac{N_i}{(1 + r_i)^t}. \text{ Thus given the fact that the supply price of investment rises with investment (constant W), greater investment is associated with a lower interest rate. That is}$$

$$I = (r, y) \quad \text{and} \quad \frac{dI}{dr} < 0.$$

Both $4''$ and $3'$ are arithmetic transformations of $4$ and $3$. $4$ and $3$ represent market phenomena, $4''$ and $3'$ are computed transformations of market conditions.

If bonds exist, then, for these financial contracts, the $N_i$ are presumably known. However, even so the yield to maturity is a computed number - the market number is the price of the bond.

The above argues that if the interest rate is not computed, the investment decision and its relation to liquidity preference are viewed in a much more natural way.

Of course, for real capital the $N_i$ reflect the productivity of capital assets, including the returns expected from currently produced capital, investment. But the 'productivity' of capital and investment affect present performance only after they are filtered through an evaluation of the state of the irrational, uncertain world that is the 'positioning' variable in the liquidity preference function. Productivity and thrift exist, but in a capitalist economy their impact is much attenuated by uncertainty.
V. How Does Tight Money Work?

Tight money - defined as rising interest rates associated with stricter other terms on contracts - can work to restrain demand in two possible ways. One is the conventional way - by rationing along a stable negatively sloped demand curve for investment, or even some consumption. The second is by inducing a dramatic change in expectations - by first generating a financial crisis or at least widespread financial distress. The way in which tight money will in fact operate depends upon the state of the economy and perhaps the cause of the tight money. Both reflect the past of the economy.

In a lagless world - when all decisions are taken, so to speak, with a clean slate - current spending is related to current financial or money market conditions. In a world when today's spending reflects past decisions, the needs for financing today can often be quite inelastic with respect to today's financing conditions; and today's financing conditions may have their major effect upon spending in the future.

Once again, consider an "euphoric" economy, in which with ever increasing confidence the weights attached to the occurrence of states of nature favorable to owning larger stocks of real capital increase. In these circumstances, an upward drift of the price of real capital-money supply function will take place (Diagram I).

This shift to euphoria also means that for all investing and portfolio holding units confidence as to the expected flows of cash from operations is rising. Given these expectations, an enterprise can undertake with safety (1) to emit liabilities which will be met by these now confidently expected cash flows and (2) to undertake projects with the expectation that prosperity level cash flows from operations will be one of the sources of finance. In an euphoric
economy, where the euphoria is based at least in part upon past success, the weight attached to the necessity for cash reserves to ease strains due to unexpected shortfalls in cash flows will be decreasing.

Tight money means, for units which emit liabilities, a rise in cash payment commitments as positions are refinanced, not only because interest rates are higher but also because the other terms of their borrowing contracts are affected. If projects are undertaken with the expectation that they will be financed at least in part by cash from operations and if these cash flows fall short of expectations, then an increase in the need to finance by liability emission or asset sale will take place. This will mean a rise in future cash flows from the unit above target (or a decline in 'cash flows to' due to ownership of financial or real assets).

Many businesses pay debt by emitting new liabilities. Such refunding of debt can lead to a rapid rise in cash flows from a unit as liabilities are turned over. This can lead to a sharp decline in the net portion of income.

In an euphoric economy no one will willingly hold money or Treasury bills. The tightness of money - the rise in interest rates - is not necessarily due to any undue constraint upon supply; rather it reflects demand conditions. The only solution to this type of tight money is to break the euphoric expectations. Any attempt to sate the demand for finance can only lead to the addition of inflationary expectations to the euphoria. The expectations cannot be broken by an autonomous fall in income, as it is the strong demand for investment that is calling the tune. The only way the boom can be broken is by first changing expectations and thus affect investment. The way a change in expectations can be induced is by forcing a reconsideration of portfolio objectives. That is in a euphoric economy, only a sharp break in expectations - a sharp rise in the uncertainty discounts -

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1 This is especially acute for depository institutions where a rise in the rate paid to any depositor is necessarily a rise in the rate to all.
can lower demand. This can take place only if the needs for cash become so well articulated with the flows of cash that a slight not unusual in scope or extent shortfall in cash receipts will lead to a sharp rise in the number of units that are unable to meet their financial commitments. Under these circumstances, the occurrence of even local or sectoral financial distress will have wide repercussions. These repercussions will include sharply lower present values throughout the economy and widespread attempts to gain liquidity by running off or selling out real positions. The simultaneous attempt by many financial organizations to clean up their balance sheet will lead to a rupture of what had been normal and standby financing relations. A new, more conservative view as to the desirable liability structures arises out of units being burned.

Thus in considering the how of tight money, the smoothly applied constraint along a stable investment function needs to be contrasted with a sharp shift in liquidity preference as a crisis or widespread financial distress occurs. If the underlying expansion is due to a rise in investment demand without any euphoric transformation of preferred portfolios, then the system can operate by rationing along a stable investment relation. In this case tight money is quickly reversible and conventional monetary policy can serve as a steering wheel.

If the expansion is associated with desires to transform asset and liability structures that I have identified as characteristic of a euphoric economy, then tight money will constrain demand only if it shifts the demand function for money. It first must generate a financial crisis or at least sufficient financial distress to dampen the euphoria.
Ritter:

§ Conflict between Keynesians & Quasi-Keynesians

1. Modern 1: Theory and 2. Theory

2. Monetary "psychological attachment to classical economics" & minimizing Government intervention.

3. Other arguments.

§ Real challenge to both Keynes 2. Theory & Keynes comes from Sayre & Shaw's Rädelite Report:

Propositions: Drastic reduction in orientation 7 monetary policy (ask Larry to be precise?)

Sayre, Thayer, Rädelite, etc. Modern Quantity Theory: almost all irrelevant. For anti-inflationary policies: monetary & fiscal policies can cure a deep depression.

§ How to control the price level when we get close to full employment:

§ Eliminating 1% unemployment due to "cure?"

II High hopes that economies are changing and answer soon from Great Depression ago.
Stan Sigel:

1. Relation of Theory & Policy to the Economy
   - What is policy when full employment is approached? How do we prevent rate of expansion to a sustainable rate? How is this not handled?

2. Mix of policy is most important when close to ceiling. Complexity of maintaining full employment.

3. Keep economy in even keel.

If kept in even keel one day will some ‘optimistic’ step have you an even keel next day? However young are you.

Worry less.
1. Market, financial, changes.

2. Policy variables under 'monetary policy' heading:

Dose

1. Administer 100 mg.
Andy Anderson

Allocative effects of interest rates

Comment on Anderson. Mostly focusing on Discount Rate and Market Rate. Commercial Paper and Financial Intermediaries and Money Markets.