FINANCIAL INSTABILITY REVISITED:
The Economics of Disaster.
by
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A paper prepared for Board of Governors of the Federal Reserve System Committee for the Fundamental Reappraisal of the Discount Mechanism.

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I. Introduction

A striking characteristic of American economic experience is the repeated occurrence of financial crises, and for these crises to usher in deep depressions and periods of low level economic stagnation. More than forty years has now passed since the financial shock that initiated the Great Depression of the 1930's. This is much longer than the periods between the crises and deep depressions of the previous century.\(^1\) Is the recent experience the result of fundamental changes so that crises and deep depressions cannot happen again, or are the fundamental relations unchanged so that crises and deep depressions remain possible?

The argument of this paper is that the fundamentals are unchanged; sustained economic growth, business cycle booms and the accompanying financial developments still generate conditions conducive to system wide economic disaster.

Every disaster, financial or otherwise, is compounded out of initial displacements (shocks), structural characteristics of the system and human error. The theory developed here argues that the structural characteristics of the financial system change during periods of prolonged expansion and economic boom and that the cumulative effect of these changes is to decrease the domain of stability of the financial system. As a result after an expansion has been in progress for some time, a displacement, which is not of unusual size or duration, can trigger a sharp financial reaction.\(^2\)

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In their chronology of mild and deep depression, it is clear that all clearly deep depression cycles were associated with a financial crisis and that for all clearly mild depression cycles no such financial event occurred. Friedman and Schwartz choose to ignore this phenomenon, preferring a monolithic explanation for both 1929-33 and 1960-61. It seems better to posit that the mild and deep depressions are really quite different types of beast and the differences in length and depth are due to the occurrence of a financial panic. See H.P. Kinsky "Comment on Friedman and Schwartz's Money and Business Cycles", *Review of Economics and Statistics*, Supplement Feb. 1963.

These displacements may be the result of system behavior or human error. The sharp financial reaction will make institutional deficiencies evident. Thus after a crisis occurs it will always be possible to construct plausible arguments, by emphasizing the triggering events or institutional flaws, that accidents, mistakes or easily corrected shortcomings were responsible for the disaster.\(^{(1)}\)

In previous work, I used an accelerator-multiplier cum ceilings and floors model as a representation of the real economy. Within these models the periodic falling away from the ceiling, which reflect parameter values and hence is an endogenous phenomena, is the not unusual event that can trigger the 'unstable' financial reaction - if a 'proper' financial environment or structure existed. The financial reaction in turn lowered the floor to income. Once the gap between floor and ceiling incomes is large enough, it can be assumed that the accelerator coefficient falls to a value consistent with stagnation. In this way a set of parameters that leads to an explosive income expansion is replaced by a set that leads to a stagnant economy. In this model the gap between floor and ceiling income is a determinant of the accelerator coefficient. The immediate impact of financial instability is to lower the floor income. This process takes place because financial variables determine the position of a conventional Keynesian consumption function.\(^{(2)}\)

The above view ignored decision making under uncertainty as a determinant of system behavior. Uncertainty is inherent in an enterprise system.


with decentralised decisions and private ownership of productive resources. The financial system of such an economy partitions and distributes uncertainty. A model which recognizes the problems involved in the making of decisions in the face of the intrinsically irrational fact of uncertainty is needed if financial instability is to be understood. A reinterpretation of Keynesian economics as just such a model as well as an examination of how monetary constraint (whether due to policy or to the behavior of the economy) works are needed before the stability properties of the financial system and thus of the economy can be examined. It turns out that a fundamental instability of a capitalist economy is a tendency to explode, to enter into a "boom" or "euphoric" state.

This paper will not present any empirical research. There is nevertheless, a great need to examine updated information of the type analyzed in prior studies, to explore additional bodies of data, and generate new data (see the section under bank examination). Only in this way can the problem be made precise and the propositions tested.

There is special facet to empirical work on the problems at issue. Financial crisis, panics, instability are rare events with short durations. We have not experienced anything more than unit or minor sectoral financial distress since the early 1930's. The institutions and usages in finance, due to both legislation and the processes of financial evolution, are much different today from what they were prior to the Great Depression. For example, it is necessary to "guess" the power of deposit insurance in order to estimate the conditions under which a crisis can develop from a set of initial events.\(^1\) The short durations of these events means that the smoothing operations that go into data generations as well as econometric analysis will tend to minimize their importance.

Because of such difficulties it might very well be that the most meaningful way to test propositions as to the cause and effect of financial instability will take the form of simulation studies, where the simulation models are designed to reflect alternative possible ways for financial

\(^1\) Perhaps the financial history of 1966 can be interpreted as a test of the power of deposit insurance to offset the destabilizing aspects of financial constraint.
instability to be induced. (1)

The paper is divided into eight additional sections. In section II differences between an economy which is simply growing steadily and a boom economy are discussed. The characteristics of an euphoric economy are identified. The proposition is developed that in a boom or euphoric economy the willingness to invest and to emit liabilities are such that demand conditions will lead to tight money markets defined in terms of the level and rate of change of interest rates and other financing terms, independently of the rate of growth of the money supply.

In section III the focus is upon cash flows due to income production, balance sheet relations and transactions in real and financial assets. Financial instability is related to the relation between cash payment commitments and the normal sources of cash as well as the behavior of markets which will be affected if unusual sources for cash need to be tapped.

In section IV the role of uncertainty as a determinant of the demand for investment is developed within a Keynesian framework.

In section V alternative modes of operation of monetary constraint are examined. In an euphoric economy, tight money does not operate by inducing a smooth movement along a stable investment schedule, rather it operates by shifting the liquidity preference function. Such shifts are typically due to a 'liquidity crisis' of some sort.

In section VI the domain of stability of the financial system and of the economy are explored. The domains of stability are shown to be endogenous and to decrease during a prolonged boom. The financial changes that take place during a period of euphoria also tend to decrease the domain of stability. In addition the feedbacks from euphoria tend to induce sectoral, financial difficulties, which can escalate to a general financial panic. If it occurs, a financial panic will usher in a deep depression, however the Central Bank can abort a financial crisis. Nevertheless the tensions and tremors that pass through the financial

system during such a period may lead to a reconsideration of the desired portfolio composition by both financial institutions and other economic units. If such a reconsideration is induced, a rather severe recession may follow.

In sections VII and VIII two special topics, bank examinations and regional impacts, are dealt with. It is argued in section VII that a bank examination procedure centering around cash flows as determined by balance sheet and contractual relations would be a valuable guide for Federal Reserve policy and an important instrument for bank management. Such an examination procedure would force both managers of financial units and economic policy makers to consider the impact upon financial units of economic system characteristics.

The discussions of the regional impact in section VIII centers around the possibility that there is a concentration of financially vulnerable units within one region. Under these circumstances escalation of constraint to a financial crisis might occur even though the financially vulnerable units on a national basis are too few to cause difficulty.

In the last section guidelines for the Federal Reserve System are put forth. It is argued that the discount window should be open to selected money market position takers (dealers) and that the Federal Reserve should move toward furnishing a larger portion of the total reserves of banks by discounting operations. This policy strategy follows from the increased awareness that a financial crisis is possible and the need to have broad, deep and resilient markets for a wide spectrum of financial instruments once a financial crisis threatens.
II. The Economics of Euphoria

In the mid 1960's the American economy experienced a "change of state". Symptomatic of this, it was announced by political leaders and official economists that the economy had entered upon a 'new era' to be characterized by the end of the business cycle as it had been known. Henceforth if there was a cycle it would be in the positive rate of growth of income. The doctrine of fine tuning asserted that even recessions in the rate of growth of income could be avoided. Contemporary business comments were consistent with these official views.

The substance of the change of state was an investment boom: each year from 1963 through 1966 the rate of increase of investment by corporate business increased. By the mid 1960's the expectations that guided business investment were affected by a belief that the future promised perpetual expansion. An economy ruled by such expectations and exhibiting such investment behavior can properly be labelled euphoric.

Consider the value of a going concern. Expected gross profits after taxes reflect the expected behavior of the economy as well as expected market and management developments. Two immediate consequences follow, if the expectation of a "normal" business cycle is replaced by the expectation

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(2) Investment - Non farm, Non-financial Corporations, 1962-66

<table>
<thead>
<tr>
<th>Year</th>
<th>Purchase of Physical Assets</th>
<th>Growth rate %</th>
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<tbody>
<tr>
<td>1962</td>
<td>44.7</td>
<td>-</td>
</tr>
<tr>
<td>1963</td>
<td>76.7</td>
<td>1.5%</td>
</tr>
<tr>
<td>1964</td>
<td>53.5</td>
<td>14.5%</td>
</tr>
<tr>
<td>1965</td>
<td>64.9</td>
<td>21.5%</td>
</tr>
<tr>
<td>1966</td>
<td>79.8</td>
<td>21.6%</td>
</tr>
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* The 'Crunch' of 1966 occurred in late August, early September, this put a damper on investment, the purchase of physical assets declined to $74.1 billions in 1967.
of steady growth. First those gross profits in the present value calculations that previously had reflected expected "recessions" are replaced by gross profits reflecting continuing expansion. Simultaneously the uncertainty surrounding beliefs as to the future behavior of the economy is decreased. The decrease in the expected down or short time for plant and equipment, as the belief in the reality of a new era emerges, raises present values. The confident expectation of a steady stream of 'prosperity' gross profits makes portfolio 'plunging' more appealing to firm decision makers.

A sharp rise in expected returns from real capital makes the economy capital short 'overnight'. The willingness to achieve liability structures which are less defensive and to take, what would have been considered in earlier times, undesirable chances in order to finance the acquisition of additional capital goods means that this capital shortage will be transformed into demand for financial resources.

In addition the 'suppliers' of financial resources live in the same expectational climate as the 'demanders'. In the several financial markets, once a euphoric change in expectations occurs, liability structures of demanders that previously would have made them ineligible for accommodations in the view of the suppliers become quite acceptable. Thus the supply conditions for financing the acquisitions of real capital improve simultaneously with an increase in the willingness to emit liabilities to finance the acquisition of real capital.

Thus a 'new era' is destabilizing, in an expansionary direction, in three senses. One is that it quite rapidly raises the value of existing capital. The second is an increase in the willingness to finance the acquisition of real capital by emitting what previously would have been considered as high cost liabilities, where the cost of liabilities includes risk or uncertainty borne by the liability emitter (borrowers risk). The third is the acceptance by lenders of assets that previously would have been considered as low yield assets - when the yield is adjusted to allow for the risks borne by the asset acquirer (lenders risk).

These concepts can be made more precise. The present value of a set of capital goods collected in a firm reflects the expected gross profits after taxes of the firm. For any enterprise there is a pattern of how the business cycles of history have affected their gross profits. Initially the present value reflects this past cyclical pattern. For example, with a short horizon

\[ V = \frac{Y_1}{1 + r_1} + \frac{Y_2}{(1 + r_2)^2} + \frac{Y_3}{(1 + r_3)^3} \]

where \( Y_1 \) is a prosperity income, \( Y_2 \) is a recession income, and \( Y_3 \) is a recovery return \( (Y_2 < Y_3 < Y_1) \). With the new era expectations \( Y_2' \) and \( Y_3' \), prosperity returns, replace the depression and recovery returns.

As a result we have: \( V \) (new era) > \( V \) (traditional). This rise in the value of the capital assets collected in firms increases the prices that firms are willing to pay for additions to their capital assets.

Generally, the willingness to emit liabilities is constrained by the need to hedge or protect the organization against the occurrence of unfavorable states. Let us call \( Y_2'' \) and \( Y_3'' \) the gross profits after taxes if possible, but not really expected, rather deeper and longer recession occurs. As a risk averter the portfolio rule might be that the balance sheet structure must be such that even if \( Y_2'' \) and \( Y_3'' \) occur no "serious" consequences will follow; \( Y_2'' \) and \( Y_3'' \) though not likely are significant determinants of balance sheet structure. (1) As a result of the change in state, the view grows that \( Y_2'' \) and \( Y_3'' \) are so unlikely that there is no need to protect the organization against them. A liability structure that is 'expensive' in terms of risk when there are significant chances of the situation characterized by \( Y_2'' \) and \( Y_3'' \) occurring becomes cheap. The cost of capital or of finance by way of such liability structures decreases.

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Financial institutions are simultaneously demanders in one and suppliers in another set of financial markets. Once euphoria infects them, they accept liability structures, their own and borrowers, which, in a more sober emotional climate, they would have rejected. Money and Treasury bills become poor assets to hold as the uncertainty discount on assets whose returns depend upon the performance of the economy decline. Thus the shift to euphoria increases the willingness of financial institutions to finance asset acquisition as a result of liquidity decreasing portfolio transformations.

An euphoric new era means that an investment boom combined with pervasive liquidity decreasing portfolio transformation takes place. Money market interest rates rise because the demand for investment is increasing and the elasticity of this demand decreases with respect to market interest rates and contractual terms. In a complex financial system, it is possible to finance investment by portfolio transformations. As a result when a euphoric transformation of expectations takes place, in the short run the amount of investment financed can be independent of monetary policy. The desire to expand and the willingness to finance expansion by portfolio changes can be so great that, unless there are serious side effects or feedbacks, an inflationary explosion becomes likely.

Even an euphoric boom economy is affected by the financial heritage of other, more insecure days. The world is not born anew each moment. Past portfolio decisions and financial conditions are embodied in the stock of existing financial instruments. In particular, assets which embodied protections against states of nature that are now considered unlikely to occur decrease in market value; or alternatively the interest rate that must be paid in order to induce portfolios to hold such assets rises. To the extent that such assets are long lived and held by deposit institutions with short term or demand liabilities, pressures upon these deposit institutions will accompany the euphoric state of the economy. In addition the same change of state which led to the investment boom and the increased willingness to emit debts affects the portfolio preferences of the holders of the liabilities of deposit institutions. These institutions must meet interest rate competition in a situation in which the
market value of the safety they sell has decreased; i.e. their interest rates must rise by more than other rates.

The rising interest rate on 'safe' assets during an euphoric boom puts strong pressures on financial institutions which offer protection and safety. The linkages between these deposit institutions, conventions as to financing arrangements and particular real markets are such that sectoral depressive pressures are "fed back" from a boom; these depressive pressures are part of the mechanism by which real resources are shifted.

The rise in interest rates means that serious pressures are placed upon particular financial intermediaries. In the current (1966) era the saving and loan associations and the mutual savings banks, together with the closely related home building industry, seem to take a large part of the initial feedback pressure. It may very well be that additional feedback pressures are on life insurance and consumer finance companies.

A poorly understood facet of how financial and real values are linked centers around the effect of stock market values. The value of real capital rises when the expectation that a recession will occur diminishes and this will be reflected in equity prices. The increased debt financing will also raise expected returns on equities. Inasmuch as wealth owners live in the same expectational climate as corporate officers, portfolio preferences shift toward equities as the belief in the possibility of recessions or depressions occurring diminishes. Thus a stock market boom feeds upon and feeds an investment boom.

The financing needs of the investment boom raises interest rates. This lowers the market value of the stock of long term debt and adversely affects some financial institutions. Higher interest rates also increase the cost of credit used to finance positions in equities. The competition for funds among the various financial sectors first facilitates the rapid

expansion of the economy and then as interest rates rise constrains both the profits of investing units and makes the carrying of equities more expensive. This tends to decrease the rate of increase of equity prices, and once the rate of increase decreases, equity prices may very well fall.

All in all the euphoric period has a short life span. Local and sectoral depressions and the fall in equity prices initiate doubts as to whether a new era really has been achieved. Hedging portfolio actions and a reconsideration of investment programs take place. However, the portfolio commitments of the short euphoric era are fixed in liability structures. The reconsideration of investment programs, the lagged effects upon other sectors from the resource shifting pressures, and the inelasticity of aggregate supply which leads to increases in costs results in a shortfall of income of investing units below the more optimistic of the euphoric expectations.

A combination of cash flow commitments inherited from the burst of euphoria and cash flow receipts based upon lower than expected income results. Whether the now less desirable financial positions will be unwound without generating significant shocks or whether a series of financial shocks will occur is the issue. In either case, investment demand decreases from its euphoric levels. However, if the boom is unwound with little trouble it becomes quite easy for the economy once again to enter a "new era" - if the unwinding involves financial instability, then the future will entail the prospects of deep depressions and stagnation.

The pertinent aspects of an euphoric period can be characterized as follows:

(1) The tight money of the euphoric period is due more to runaway demand than to constraint upon supply. Thus those who weigh money supply heavily in estimating money market conditions will be misled.

(2) The run up of short and long term interest rates puts pressure on savings intermediaries and disrupts industries whose financial channels run through these intermediaries. Thus a feed back from euphoria to constraining demand in some sectors exists.

(3) An essential aspect of an euphoric economy is the construction of liability structures which imply payments that are closely articulated
directly, or indirectly via layerings to cash flows due to income production.
If the impact of disrupting financing channels mentioned above occurs after
a significant build up of such tight financial positions, another
depressive factor exists.
III. Cash Flows

Financial crises take place because units need and desire more cash than is forthcoming from their usual sources and as a result they resort to unusual ways to raise cash. In this section various types of cash flows are identified and the relations among them as well as between cash flows and other characteristics of the economy are examined.

The variability of the reliability of sources of cash is a well known phenomena in banking theory. A source of cash may be reliable for a unit as long as there is no net demand for cash upon it and unreliable whenever any significant net demand for cash from it arises. Under financial pressure various financial and non financial units may withdraw, either by necessity or as a result of a defensive financial policy, from some financial markets. Such withdrawals not only affects the potential variability of prices in the market but may disrupt business connections. Both the ordinary way of doing business and standby and defensive sources of cash can be affected.

Such withdrawals from the supply side of financial markets may force demanding units, which were under no special strain and were not directly affected by financial stringencies to look for new financing connections. The cumulative impact of an initial disturbance can depend upon the extent and seriousness of such third party or innocent bystander impacts.

Financial market events which disrupt well established financing channels affect the present value and cash flows of units not directly affected.\(^{(1)}\)

For almost all households and non-financial (ordinary) business firms the largest source of cash during most periods results from its contributions to the production of current income. Wages and salaries are the major source of cash to most households and sales of output are the major source for business firms. For financial intermediaries other than dealers, the ordinary cash flow to the unit can be read from its financial assets. For example, short term business debts in a commercial bank's portfolio state the reserve money that borrowers are committed to make available to

\(^{(1)}\) Thus the disruption of the Southern California Savings and Loan - Mortgage markets in mid-year 1966 affected all present values and cash flow expectations in the economy. After all, it might happen to me.
the bank at stated dates. A Mortgage in a savings and loan association's portfolio state the contractual 'cash flow to' for various dates. For financial market dealers cash receipts usually are the result of their selling out of their position, rather than from the commitments as stated in their inventory of assets. Under ordinary circumstances dealers as going concerns do not expect to sell out their positions, for as they sell one set of assets they expect to acquire a new set.

The above 'ordinary' sources of cash for various classes of financial unit can be called cash flow from operations. All three types of cash flow from operations described above can be considered as functions of national income, the ability to meet payment commitments depend upon the normal functioning of the income production system.

In addition to cash flow from the sale of assets, dealers - and other financial and non-financial units - can meet cash drains due to the need to make payments on liabilities by emiting new liabilities. This process is called the refinancing of positions.

Furthermore, liquidating, or running off, a position is a possible way for some units to obtain cash. This is what retailers and wholesalers do when they sell inventories (seasonal retailers actually do liquidate by selling out their position in, say, Christmas toys). We have identified three sources of cash for economic units: cash flow from operations, the refinancing of positions and the liquidation of positions.

The financial assets and the liabilities of an economic unit can be transformed into time series of contractual cash receipts and payments. The various items in these contractual receipts and payments depend upon national income; the fulfillment of the terms of mortgage contracts depends upon consumer disposable income etc.\(^1\) Estimates of the direct and indirect impact of variations in national income upon the ability of units in the various sectors to meet financial commitments can be derived.\(^2\)

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(1) This becomes the 'rationale' for a cash flow bank examination procedure. The derivation of actual from contractual cash flows depends upon the behavior of the economy.

Each economic unit has its reserve or emergency sources of cash. For many units the emergency source of cash consists of positions in some marketable or redeemable assets. Savings bonds and time deposits are such standby sources of cash for households. A corporation may keep a reserve in Treasury bills or other money market instruments to facilitate adjustments to either unusual needs for cash or an unexpected shortfalls in cash receipt. "Hoards" of idle cash serve this purpose for all units. As will be evident from what follows, cash has the special virtue that its availability does not depend upon the 'normal' functioning of any market.

In principle the normal and secondary sources of cash for all units can be identified and their ratio to financial commitments can be estimated. By far the largest number of units use their income receipts to meet their financial commitments. Mortgage and consumer installment payments for households and interest and sinking fund payments for business firms normally would be financed by income cash flows.

The substitution of a deposit of customer B for a deposit of customer A in a bank liability structure may be viewed as the refinancing of a position. The typical financial unit acquires cash to meet its payment commitments, as stated in its liabilities, not from any cash flow from its assets or by selling assets but rather by omitting substitute liabilities. (The only financial organizations that seem to use its cash flow from assets to meet its cash flow commitments are the closed end investment trust, both levered and unlevered.)

When a unit which normally meets its financial commitments by drawing upon a cash flow that is due to its role in the production of income finds it necessary, or desirable, to refinance its position additional pressures may be placed upon financial institutions.

Some financial relations are based upon the periodic liquidation of positions - the above mentioned seasonal inventory in retailing is one example. Capital market dealers, underwriters, liquidate positions in one set of assets in order to acquire new assets. However if organizations which normally finance their payments by using cash derived from either income or refinancing of positions to some unusual extent attempt to finance their payments by selling out their positions it may turn out that the market from the assets in position is thin: a sharp fall in the
price of the asset occurs. In the market for single family homes a sale
is usually not a forced sale, and to a large extent sellers of one house
are buyers or renters of another. If home owners as a class tried to
sell out their houses, the market would not be able to handle this without
significant price concessions. But significant price concessions mean
a decline in net worth. Not only for the selling unit but for all units
holding this asset. More particularly a fall in price may mean that the
offering unit may be unable to raise the amount of cash required by their
liabilities by dealing in this asset.

As an empirical generalization, almost all financial commitments are
met from two normal sources of cash: income flows and refinancing of posi-
tions. For most units — especially those which have real capital goods as
their asset — selling out the position is not feasible, for others, aside
from marginal adjustments by way of special "money" markets, it is an
unusual source of cash.

Another empirical generalization is that "asset" prices (prices of the
stock) can fall much more rapidly than "income" prices (prices of the
flow). Any need or desire to acquire cash that takes the form of
attempts to sell out positions in reproducible assets will result not only
in large scale financial losses and decreases in net worth but also in
market prices for reproducible assets that are far below their current
cost of production.

However, even in the face of a widespread need or desire to acquire
cash by selling assets, not all assets are allowed to fall in price.
The price of some assets will be stabilized by central bank purchases or
loans (refinancing positions). Such assets with guaranteed minimum
market prices can be called protected assets.

Financial instability occurs whenever a large number of units resort
to extraordinary sources for cash. The conditions under which extra-
ordinary sources of cash have to be tapped — which for financial units

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(1) This is the content of the alleged wage rigidity assumption of
Keyesian theory. See Johnson, H.C., "The 'General Theory' after
mainly means the conditions under which positions have to be liquidated (run off or sold out) - are the conditions under which financial instability can be triggered. The adequacy of cash flows from income relative to debt, refinancing possibilities relative to position and the ratio of unprotected to protected financial assets are determinants of the stability of the financial system. The trend or evolution of the likelihood of financial instability depends upon the trend or evolution of the determinants of financial stability.
IV. Financial Instability and Income Determination

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 underemployment equilibrium, as well as the treatment of consumption, can only be understood as statements about system behavior in a world of uncertainty. One defense against highly undesirable consequences of possible states of the world takes the form of appropriate portfolio decisions.

In an attempt to make precise his view of uncertainty and that 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 Treasury bills are held

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(1) I include the conventional interpretation of Keynes under the rubric of Neo-classical economics. This standard interpretation, which "took off" from Hicks' famous article "Mr. Keynes and the Classics, A Suggested Interpretation", Economic Theory, 1937, and which since has been embattled in standard works like R. Ackley, Macroeconomic Theory, is, inconsistent with Keynes' own succinct and clear statement of the content of the General Theory in his rebuttal to Viner's famous review (Mr. Keynes on the Causes of Employment, Quarterly Journal of Economics, November 1936). Keynes' rebuttal appeared with the title The General Theory of Employment, in the Quarterly Journal of Economics, November 1937 and emphasized the dominance of uncertainty in the determination of portfolios, the pricing of capital and the pace of investment.

(2) J.K. Galbraith in The Affluent Society and K.J. Arrow, "Uncertainty and the Welfare Economics of Medical Care", A.E.R. December, 1963, take the view that various labor and product market deviations from competitive conditions reflect the need to constrain the likelihood of undesirable states of the world occurring. This Galbraith-Arrow view of the optimal behavior of firms and households seems to complement the view in Keynes' rebuttal to Viner. See also K.J. Arrow, "Aspects of the Theory of Risk Bearing", yrjo johnsson lectures, yrjo johnssonin SHATIC, Helsinki, 1965. Lecture 2: "The Theory of Risk Aversion" and lecture 3, "Insurance, Risk and Resource Allocation".

(3) J.B. 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 its 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.
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 whether any one of a number of alternative possible states of the economy occurs.

In making portfolio choices, economic units do not accept any one thing as a proven guide to the state of the economy in the future. In the absence of strong reasons for doing otherwise extrapolation of the current situation or trend is often used as a guide for action. However even those who behave in this manner have doubts about its reliability.\(^1\) As a result of this underlying lack of confidence the ability to predict expectations and hence present values of future incomes are inherently unstable, in the sense that a not unusual event, such as a 'salad oil scandal' or a modest decline in income, if it occurs in a favorable environment, can lead to a sharp revaluation of expectations and of asset values. It may lead not only 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.

The process of valuing a particular long lived asset or a collection of assets can be separated into two stages. In the first the subjective beliefs about the likelihood of alternative states of the economy in successive time periods 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 alternatives is assessed.

When beliefs about the likelihood of various alternative states of the economy actually occurring are held with perfect confidence the standard probability expected values makes sense. The present value of a long lived asset reflects its (subjective) expected yield at each state-date of the economy and the assumed likelihood of these state-dates occurring. That is under stable conditions the expected gross profit after taxes (cash flow)

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\(^1\) The doubts can take the form of uncertainty as to what 'inertia' should be attached; should it be attached to the level, the rate of change (velocity) or the rate of change of the rate of change (acceleration)?
of $i^{th}$ asset at the $t^{th}$ date, $N_{it}$, will equal $E P_{st} N_{si}$ 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 $S_{it}$, the $i^{th}$ state of nature at the $t^{th}$ date) and $P_{st}$ is the (subjective) probability that the $S^{th}$ state will occur at the $t^{th}$ date. The $S$ states are so defined that for each $t$ $E P_{st} = 1$. 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, $V_i$.

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 $E P_{st} = 1$. However, the set of probabilities, $P_{st}$, which must be attached to the alternative events if the expected gross profit and the cash flows are to be computed, can be accepted with varying degrees of rational belief. The value of the $i^{th}$ asset will vary not only with the expected payoffs at various states of nature and the probabilities attached to these payoffs, but also with the confidence placed in the probabilities attached to various states of nature. That is $N_{it} = \sum (P_{st} N_{si})$ where $0 < Q < 1$ 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 $N_{si}$ are conjectures, the other the probability distrib-

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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. The risk aversion character of a decision unit is represented by the curvature of the utility function. A change in confidence can be represented by a change in curvature, decreased confidence being represented by an increase in curvature. If preference systems can be assumed to reflect experience, then a long period of no deep depression will decrease the curvature and the occurrence of a financial crisis will increase the curvature. The psychology of uncertainty, and the social psychology of waves of optimism and pessimism, are two points at which economists need guidance from the relevant sister social sciences. Throughout the discussion of uncertainty and of economic policy in the framework of uncertainty psychological assumptions must be made. At times the conclusions depend in a critical manner upon the assumptions.
bution among possible states of nature, as reflected in the $p_x$, is not known with certainty. Obviously events which affect the confidence placed in any assumed probability distribution of the alternative possible states may also affect the confidence placed in the assumed expected payoff if state $S$ occurs, $N_{e1}$. A computed present value of any asset $V_i$ may be accepted with a wide range of degrees of confidence - from well high certainty to being considered a most tenuous conjecture. This degree of acceptance affects the market price of the asset.

The relevant portfolio decisions for households, firms and financial decisions are not made with respect to individual assets, rather they are made with respect to bundles of assets. The portfolio problem is that of combining assets whose payoff's might vary quite independently as the states of nature vary so as to achieve the units objective, which might be a minimal satisfactory state under any circumstances. This might be stated as follows: a portfolio is chosen so as to maximize $V$ under a specified valuation procedure subject to the constraint that $V_S > \bar{V}$ for every likely state of nature.\(^{(1)}\)

The assets that are available are both inside and outside assets; the outside assets consist of money and government debt.\(^{(2)}\) 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 "bets" are placed under "duress". During these latter periods, what can be called higher order uncertainty, markedly lower values are

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\(^{(1)}\) Alternatively the stated portfolio objective can be stated in terms of cash flows, this less conventional view is examined in section VI below.

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 even though flexibility is almost always a virtue; the premium on assets which permit flexibility will be larger whenever such periods of 'higher order uncertainty' occur. For many questions a rational man has the option of saying I don't know and to postpone a decision. As a wealth owner he must assess the worth of various items for his portfolio even when conditions are so fluid that he would rather not make any decision.

Keynesian liquidity preference encompasses both confidence conditions. 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. Assets which protect against a liquidity crisis or temporarily disorganized asset markets would be part of a rational portfolio under all circumstances. In addition a preferred market may exist for assets which protect against capital losses. Thus liquidity preference is defined as a rational person's demand for money as an asset because he must live in a world with uncertainty; this leads to a determinate demand function for money at any 'value' for higher order uncertainty. \(^{(1)}\)

In addition to periods where subjective estimates as to the likelihood of various states of nature are stable, there are periods in which times seem troubled, and the subjective estimates, which must be made as to the likelihood of possible states of nature, are held with much less confidence. The risk averter reaction to 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, and this shift can be quite marked and sudden.

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-aversers, 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.

Rapid changes in desired portfolios are confronted with short period inelastic supplies of primary assets, both real and government liabilities. As a result, the relative prices of the different assets change. In particular an increase in uncertainty will see the price of inside assets (real capital) fall relative to the price of outside assets (government debt) and money while a decrease in uncertainty will see the price of inside assets rise relative to that of outside assets.

The nominal money supply in our fractional reserve banking system can be well nigh infinitely elastic. However any events which increase uncertainty as perceived by owners of real wealth will also increase uncertainty as perceived by commercial bankers. Thus unless prices of inside assets are pegged by the Central Bank, a sharp increase in uncertainty will result in the price of inside assets falling relative to both money and the price of default free or protected assets.

In a decentralized private enterprise economy with private commercial banks we cannot expect the money supply to increase sufficiently to offset the effects of a sharp increase in uncertainty upon inside asset prices. Symmetrically we cannot expect the money supply to decrease sufficiently to offset the effects of a sharp decrease in uncertainty. In fact we should expect the private, profit maximizing, risk averting commercial banks to behave "perversely" in that a decrease in uncertainty will see banks willing and eager to increase the money supply and an increase in
uncertainty will see banks acting so as to contract the money supply. (1)

Portfolios must hold the existing stocks of real assets, Treasury debt and money. Even during an investment boom the annual increment to the stock of real reproducible capital is small relative to the total stock. However in time the stock of reproducible capital is infinitely elastic at the price of newly produced capital goods. Thus there is a ceiling to the current market period price of a unit of the stock of real capital. This ceiling price allows for an expected decline in the price of the stock to the price of the flow of investment.

The current returns on collections of real capital in firms reflects how the economy is functioning, whether "prosperity" or "depression" rules. During an investment boom current returns are high. Because of the ceilings on the prices of units in the stock of capital imposed by the cost of investment, a shift in the desired composition of portfolios towards a greater proportion of real capital cannot lower the short run yield on real capital valued at market price very far, in fact because of prosperity this yield may increase. As the outside assets, Treasury debt, are now in a significant sense less desirable than in other more uncertain circumstances, their yield must rise to be equal to or even exceed the yield on inside or real assets. 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 that on real assets.

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(1) The stagnant state that follows a deep depression is characterized by very low yields (high prices) on default free assets. One interpretation of the liquidity trap is that it reflects the inability to achieve a meaningful difference between the yields on real assets and on default free assets by further lowering of the yield on default free assets. An equivalent but more enlightening view of the liquidity trap is that in the ruling circumstances it is not possible by increasing the stock of money to raise the price of the units in the stock of existing capital so as to induce investment. Under these conditions fiscal policy, especially government spending, will increase the cash flows that units in the stock of real capital generate. Under otherwise stagnant conditions this realized improvement in earnings will tend to increase the relative price of inside capital, and thus help induce investment.
As the implicit yield on money is primarily the value of the implied insurance policy it embodies, a decrease in uncertainty lowers the implicit yield and thus decreases the amount desired in portfolios. However as all money must be held, as under these circumstances bankers are eager to increase its supply, and as its nominal value cannot decline the money price of other assets, in particular real assets must increase.

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 and capital 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 economy's 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.

Financial intermediaries - including banks as they emit money - generate at least partially protected assets. Thus a rise in intermediation and particularly a rise in bank money, even if the asset acquired by the bank carries default possibilities, 'urbalance' 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 such protection to their liabilities. The liabilities of other financial intermediaries also are protected, but not to the extent of bank money, thus their stimulative effect while not negligible is smaller. In an euphoric economy the value of such protection decreases, and these instruments also fall in price relative to real assets or equities. (1)

(1) Incidentally, the phenomena by which a decrease in the value of some protection affects observable market prices also exists in the labor market. We can assume that civil servants and teachers 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 diminishes. Hence in order to attract workers, their relative measured market wage will need to rise.
To summarize portfolio imbalance, which follows from changing views as to the uncertainty embodied in the economy, affects the relative prices of assets. A decrease in the felt uncertainty will raise the price of units in the stock of real inside assets for any given supply of money, other outside assets, and assets which are in all or part protected against the adverse behavior of the economy; an increase in uncertainty will lower these prices. It is also true that for a given state of uncertainty and stock of real capital assets, the greater the quantity of money, other outside assets and protected assets the greater the price of units in the stock of real capital. Investment consists of producing substitutes for items in the stock of real capital and the price of the units in the stock is the demand price for units to be produced. Thus to the extent that the supply of investment responds positively to its demand price, the pace of investment flows from portfolio imbalance.

The investment process can be detailed in two functions: the portfolio balance relation which states the market price for capital assets as a function of the money supply (Diagram I) and the investment supply function which states how much investment output will be produced at each market price for capital assets (Diagram II). It is assumed that the market price for capital assets is the demand price for investment output. The supply curve of investment output is positively sloped, however at some positive price the output of investment goods becomes zero. The market price of capital assets as determined by portfolio preferences is sensitive to the state of expectations or the degree of uncertainty with respect to the future. (1)

(1) The 'investment' argument builds upon R. Clover "An Investigation into the Dynamics of Investment", *American Economic Review*, March 1954 and J.G. Witte, Jr. "The Micro Foundation of the Social Investment Function", *Journal of Political Economy*, October 1963. Both Clover and Witte emphasize the determination of the price per unit of the stock as a function of exogenously given interest rates; they are wedded to a productivity basis for the demand for real capital assets. The argument here emphasizes the portfolio balance or speculative aspects of the demand for real capital assets and thus interest rates are computed from the relation between expected flows and market prices, i.e. the price of capital as a function of the money supply relation is the liquidity preference function.
In Diagram 1, I have chosen to keep the stock of capital constant. Thus $V = P_k \bar{K} + \bar{M}$ where $V = \text{wealth}$, $P_k = \text{price level of capital}$, $\bar{K}$ is the fixed stock of capital and $\bar{M}$ is outside money. As $M$ increases, $V$ increases due to both the rise in $K$ and a rise in $P_k$. If $M$ increases as "manna from heaven" it would be appropriate for the consumption function to include a $\bar{M}/P_y$ 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. (1)

If $C = f(Y)$ and $Y = C + I$, then the above determines income as a function of $\bar{M}$. (2)

It is impossible to generate an investment function $I = f(r)$ that is independent of the portfolio adjustments of liquidity preference doctrine; investment is a speculative activity in a capitalist economy that is only peripherally related to productivity.

Two phenomena can be distinguished. If $M$ remains fixed as capital is accumulated, a slow downward drift of the $M/P_k$ curve (Diagram 1) will take place. A rise in $M$ is needed to maintain real asset prices in the face of

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(1) Alternatively the value of wealth can be kept constant, thus $V = P_k \bar{K} + \bar{M}$. An increase in $M$ is initially an "open market operation" $\Delta \bar{M} = P_k \Delta K$. However, as 'portfolios' now hold more money and less capital goods, the price per unit of capital goods rises. Capital is expropriated so that $\bar{M}$ remains fixed. This is a pure portfolio balance relation.

If starting from an initial position, $V = P_k \bar{K} + \bar{M}$, $M$ 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 private capital stock from below. I have assumed constant capital stock $K$ in drawing Diagram 1.

(2) If we assume that the future expected returns from capital to be known, equation (1) $P = Q (K, \bar{K})$ can be transformed into an $r = Q (K, \bar{K})$ relation. With every quantity of $M$ a different price will be paid for the same future income stream; a larger quantity of money will be associated with a higher market price of existing capital and thus a lower rate of return on the market value of capital. In a similar way, the 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 $r = Q (K)$ can be transformed into $I = Q (K)$. Because $K$ and not $Y$ is an argument in equation 1, the $I-S, L-M$ construction is not obtained.
the rise in the stock of real capital. Alternatively, if portfolio preferences change, perhaps because of a change in uncertainty, then, independently of the impact of real accumulation, the \( Q(\bar{M}, \bar{K}) \) function will shift. It is the second type of shift that occupies center stage in the Keynesian view of the world.

**Diagram I**

\[ P_k = Q(M, \bar{K}) \]

**Diagram II**

\[ I_s = f(P_{IS}) \]

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(1) Underlying preferences need not be such that for \( P_k \) to remain constant \( \frac{\Delta M}{M} = \frac{\Delta K}{K} \); it may be that \( \frac{\Delta M}{M} < \frac{\Delta K}{K} \) or even \( \frac{\Delta M}{M} > \frac{\Delta K}{K} \), see Arrow "Aspects of the Theory of Risk Bearing" op. cit. Friedman's well known "result" is that \( \frac{\Delta K}{K} > \frac{dP_{IS}}{P_{IS}} \). See M. Friedman "The Demand for Money: Some Theoretical and Empirical Results", Journal of Political Economy, 67(1959), pp. 327-351.
At all times the investment demand has to take into account returns at various expected states of the economy. As a result of a shock the weight attached to depression returns increases. However, as the dust settles from the shock a gradual easing of the views as to the likelihood of unfavorable states of nature occurring take place. The weights attached to liquidity are decreased and a gradual increase of investment takes place.

We now know enough to supplement investment by honorary investments (government spending) so that the expected returns will not again reflect large scale excess capacity. Nevertheless, if a shock takes place, it will still take time for its effects to wear off, honorary investment may have to carry the burden of maintaining full employment for an extended period.

The essence of the argument is that investment is an offshoot of portfolio preferences, and that portfolio preferences reflect the attempt by rational men to do well in a world with uncertainty. The shock to portfolio preferences that leads to a sharp drop in investment results from experiences with portfolios that go sour. On a large scale, portfolios go sour in the aftermath of a financial crisis.
Appendix Section IV: A Model

The model can be written as follows:

1. \( Y = C + I \)
2. \( C = C(Y) \)
3. \( P_{IS} = q(I, \bar{W}) \)
4. \( P_K = L(M, K) \)
5. \( P_{1\cdot S} = P_K \)
6. \( P_{IS} = P_{1\cdot D} \)
7. \( M_0 = N_s \)

\( M_s \) (Money), \( K \) (Capital Stock) and \( \bar{W} \) (wages) are all exogenous, \( P_M = 1 \).

Symbols have their usual meaning: we add \( P_{1\cdot S} \) as the supply price of investment, \( P_K \) as the market price of the existing real or inside capital and \( P_{1\cdot D} \) is the demand price of investment.

In equation (3) \( \frac{dP_{IS}}{dI} > 0, \ \frac{P_{IS}}{1 + \sigma} > 0, \ \frac{dP_{IS}}{dw} > 0 \).

In equation (4) \( \frac{dP_K}{dK} > 0, \ \frac{dP_K}{dK} < 0 \). Equation 4 is unstable with respect to views as to uncertainty it shifts "down" whenever uncertainty increases.

The portfolio balance equation (the liquidity preference function) yields a market price for the stock of real capital for each quantity of money (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" (equation 4) determines the market price of the stock of real assets and a shift in liquidity preference means a shift in equation 4, not a movement along the function.

The above model has the same called by the market price of the stock of real capital. Given a cost curve for investment which has 0 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 which ignores productivity 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

$$\prod_{i=1}^{N} K = \prod_{t=1}^{N} \frac{N_i}{(1 + r_i)^t}$$

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 4 can be suppressed by using 7 that is

$$\prod_{i=1}^{N} \frac{N_i}{(1 + r_i)^t} = L(M, K)$$

If a transaction demand for money is added, if the $N_i$ are interpreted as a function of $Y$, if all $r_i$ are assumed equal and if $K$ is suppressed

$$M_0 = L(r, Y)$$

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 short run extent of $I$, then

$$F_{I,S} = \frac{1}{K} \frac{N_i}{(1 + r_i)}$$

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

$$I = \Phi (r, Y) \text{ and } \frac{\partial I}{\partial r} < 0.$$

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 $N_1$ are known. However, even so the yield to maturity is a computed number - the market number is the price of the bond.

If the interest rate is not computed, the investment decision and its relation to liquidity preference can be viewed in a much more natural way. Of course, for real capital the $N_1$ reflect the productivity of capital assets, including cash flows 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 always filtered 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. (1)(2) In the conventional view tight money operates by rationing demand by way of rising interest rates. Typically this is represented by movements up a stable negatively sloped demand curve for investment (and some forms of consumption) as a function of "the" interest rate. An alternative view, which follows from the argument in Section IV, is that tight money induces a change in "expectations", in the perceived uncertainty, as the result of a financial crisis or financial stringency. This can be represented by a downward shift in the demand curve for investment.

The way in which tight money will in fact operate depends upon the state of the economy. In a non-euphoric expanding economy, where liability structures are considered satisfactory, the likelihood is that monetary constraint will operate by way of rationing along a stable investment demand curve. In a booming euphoric economy, where a high and rising demand curve for investment is associated with a willingness by firms to "extend" liability structures and by financial intermediaries to experiment with both their assets and liabilities, tight money will be effective only if it brings such portfolio, or financial structure, experimentation to a halt. Such a reconsideration of the desirability of financial experimentation will not take place without a triggering event and the reaction can be both quick and disastrous. Thus a euphoric boom is characterized by a stretching or thinning out of liquidity, and the end of a boom occurs when desired liquidity quite quickly becomes significantly greater than actual liquidity.

(1) "Tightness" of money refers to costs (including contract terms) for financing activity by way of debt. High and rising interest rates plus more restrictive other terms on contracts are evidence of tight money. Tightness has nothing directly to do with the rate of change of the money supply or the money base or what you will.

(2) Non-price rationing by suppliers of finance means that the 'other terms' in financing contracts for some demanders increase markedly. The 'tightness' of money is not correctly measured when only one term in a contract, the interest rate, is considered.
In an "euphoric" economy, 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 (Diagram I, p.28) will take place.

This shift toward euphoria means that for all units both the expected flows of cash from operations and the confidence with which these expectations are held are rising. Given these expectations, an enterprise can undertake with safety (1) to exit liabilities whose cash needs will be met by these new confidently expected cash flows and (2) to undertake projects with the expectation that the cash flows from operations will be one of the sources of finance. In an euphoric economy the weight attached to the necessity for cash reserves to ease strains due to unexpected shortfalls in cash flows is ever decreasing.

In a lagless world - where 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. Thus a pattern of lags between money and capital market conditions and spending conditions exists. However this lag pattern is not independent of economic events. A dramatic financial market event, in particular a financial crisis or widespread distress, can have a quite quick effect.

For units which have outstanding debts, tight money means that cash payment commitments rise as positions are refinanced. This is so not only because interest rates are higher but also because other terms of their borrowing contracts are affected. In addition if projects are undertaken with the expectation that they would be financed in part by cash that ongoing operations generate, and if these cash flows fall short of expectations, due perhaps to the increased cost of the refinanced inherited debt, then the amount that will need to be financed by debt or the sale of financial assets increases. This means that the resultant balance sheet and cash flow commitments will be inferior to the target set when the project was undertaken. Symmetrically if gross profits rise
faster than costs, so that a smaller than expected portion of investment is financed by debt, the resultant balance sheet will be superior to that targeted. In this way investment may be retarded or accelerated by cash flow and balance sheet considerations. (1)

Deposit financial institutions are especially vulnerable to tight money if their assets are of significantly longer term than their debts. This is so because they are virtually refinancing their position "daily" by offering terms that are attractive to their depositors. A rapid rise in their required cash flows due to interest payments can take place, which can lead to a sharp reduction in their net income.

Thus during a euphoric expansion the effects of tight money are more than offset for some units, whereas for other units tight money means a significant deterioration in their financial position whether measured by liquidity or net worth.

In an euphoric economy the willingness to hold money or near money decreases. The observed tightness of money - the rise in interest rates on near monies and other debts - is not necessarily due to any undue constraint upon the rate of increase of the money supply, rather it reflects the rapid increase in the demand for financing. An attempt by the authorities to satiate the demand for finance by creating bank credit will lead to rapidly rising prices: inflationary expectations will be added to the euphoria. The euphoric expectations will not be ended by a fall in income, for the strong investment demand that is calling the tune is not sensitive to the changes in financing terms.

In an euphoric economy, characterized by an investment boom, cash payments become even more closely articulated to cash receipts: the reserve stock of money and near monies are depleted. Two phenomena

follow from this closer articulation. The size of the shortfall in cash receipts or of the overrun in cash payments due to normal operations that will result in insufficient cash on hand to meet payments decreases. The frequency with which refinancing or asset sales are necessary so that payment commitments can be met increases. Units become more dependent upon the normal functioning of various financial markets.

Under these emerging circumstances the "size" of the dislocation that can cause serious financial difficulties to a unit decreases, and the likelihood that a unit in difficulty will set other units in difficulty increases. Under these circumstances even local or sectoral financial distress or market disruptions may induce widespread attempts to gain liquidity by running off or selling out positions in real or financial assets (inventory liquidation). This in turn may depress incomes and market prices of real and financial assets. We can expect financial institutions to react to such developments and to try to clear up their balance sheets, to reverse the portfolio changes they entered into during the emerging euphoric period. The simultaneous attempt by financial institutions, households and firms to improve their balance sheets will lead to a rupture of what had been normal as well as standby financing relations. As a result losses take place and these losses combined with the market disruptions induce a more conservative view as to the desired liability structure.

This view, that in conditions of euphoria, tight money operates by causing a re-evaluation of the uncertainties carried by economic units is in marked contrast to the textbook analysis of tight money operating by way of constraining expenditures along a stable investment function. If an expansion is taking place in the absence of a transformation, by way of euphoric expectations of preferred portfolios and liability structures, then the system can operate by rationing along a stable investment relation. In this case tight money can lead to a decline in investment and a relaxation of monetary constraint can reverse the decline: conventional monetary policy can serve as an economic steering wheel.

If the expansion is associated with the transformations of asset and liability structures that have been identified as characteristic of an
euphoric economy, then tight money will constrain demand only if it induces a shift in the demand function for 'money', or in the price function for capital goods. For this to happen the expansion must continue long enough for balance sheets to be substantially changed and then some triggering event that induces a reconsideration of desired balance sheets must occur. A financial crisis or at least some significant amount of financial distress is needed to dampen the euphoria. The fear of financial failure must be credible if expectations built on a long record of success are to be overcome.

During an emerging euphoric boom, the improvement in expectations overwhelms the rising interest rates. As a result of the revision of portfolio standards, the supply of finance seems to be virtually infinitely elastic at stepwise rising rates. Typically this "infinitely" elastic supply is associated with the emergence of new financial instruments and institutions.\(^1\)

Under these circumstances a central bank will see its restriction of the rate of growth of the money supply or the reserve base overwhelmed by the willingness of households, business firms and financial institutions to decrease their cash balances: velocity increases overcome quantity restrictions. Such a frustrated central bank can try to compensate for its lack of success in constraining expansion by further decreasing the rate of growth of the money supply thus forcing a more rapid development of very tightly articulated cash positions. If this analysis is valid, this further tightening will occur within a financial environment that is increasingly vulnerable to disruption. Under these circumstances the transition will not be from too rapid economic expansion to stability by way of a slow deceleration, but a rapid decline will follow a sharp braking of the expansion.

With a financial crisis of sorts seemingly a likely occurrence after an euphoric boom it is difficult to prescribe the correct policy for a central bank, except that the central bank must be aware of this possibility

and that it must be ready to act as a lender of last resort to the financial system as a whole once the break takes place. If the path of the economy is in its gross terms independent of the rate of increase of the money supply and the relative importance of bank financing, the central bank might as well resist the temptation to further tighten its constraints when the initial constraint does not work quick enough. The central bank should sustain the rate of growth of the reserve base and the money supply at a rate consistent with the long term growth of the economy. This course should be adopted in the hope, however slight, that the rise in velocity—deterioration of balance sheets phenomena described above will converge, by a slow deceleration of the euphoric expectations, to a sustainable steady state.

In particular during an euphoric expansion the central bank should resist the temptation to introduce constraining direct controls on that part of the financial system most completely under its control, the commercial banks. The central bank should recognize that an euphoric expansion will be a period of innovation and experimentation by both bank and non bank financial institutions. From the perspective of picking up the pieces, restoring confidence and sustaining the economy it seems best that the portion of the financial system that the central bank most clearly protects be as large as possible. Instead of constraining commercial banks by direct controls, the central bank should aim at sustaining the relative importance of commercial banks even during a period of euphoric expansion; in particular the commercial banks should not be unduly constrained from engaging in rate competition for resources.
VI. The Theory of Financial Instability

The argument of section IV concluded that normal functioning requires that the price level, perhaps implicit, of the stock of real capital assets be consistent with the cost of production of investment goods at the going wage levels. The euphoric boom occurs when portfolio preferences change so that the price level of the stock rises relative to wage levels, causing an increase in the output of investment goods. A sharp fall in the price level of the stock of real assets will lead to a marked decline in investment and thus in income: a deep depression can occur only if such a change in relative prices takes place.

A. Introduction

In our discussion of uncertainty, we identified one element which can lead to a sharp lowering of the price level of the existing stock of capital. A sharp change in the desired composition of assets in portfolios, due to an evaporation of confidence in prior held views as to the likelihood to be attached to various alternative possible state-dates of the economy, will lower the value of real assets relative to both the price level of current output and money. However, such a revaluation of the confidence with which a set of expectations are held does not just happen.

The event which marks the change in portfolio preferences is a period of financial crisis, distress or stringency (used as descriptive terms for different degrees of financial difficulties). However, a financial crisis (used as a generic term) is not an accidental event, nor all financial structures are equally prone to financial instability. Our interest now is in the attributes of the financial system that determine its stability properties.

We are talking about a system which is not globally stable. The economy is best analyzed by assuming that there exists more than one stable equilibrium for the system. We are interested in the determinants of the domain of stability around the various stable equilibria. Our questions are of the form: "What is the maximum displacement that can take place and still have the system return to a particular initial equilibrium point?", and "what does this 'maximum displacement' depend upon?"

The maximum shock that the financial system can absorb and still have the economy return to its initial equilibrium depends upon the financial
structure and the linkages between the financial structure and real income. Two types of shocks that can trigger large depressive movements of financial variables can be identified: one is a shortfall of cash flows from income, due to an overall drop in income, the second is the distress of a unit due to the mismanagement. But not all recessions trigger financial instability and not every financial failure, even of large financial units, triggers a financial panic and crisis. For not unusual events to trigger the unusual it is necessary that the financial environment within which the potential triggering event occurs have a sufficiently small domain of stability.

The contention in this paper is that the domain of stability of the financial system is mainly an endogenous phenomena that depends upon liability structures and institutional arrangements. The exogenous elements in determining the domain of financial stability are the governmental central banking arrangements: after mid-year 1966 it is clear that the exogenous policy instrument of deposit insurance is a powerful offset to events that have the potential for setting off a financial crisis.

There are two basic attributes of the financial system which determine the domain of stability of the financial system. These are (1) the extent to which a close articulation exists between the contractual and customary cash flows from a unit and its various cash receipts and (2) the weight in portfolios of those assets which under almost all circumstances can be sold or pledged at well nigh their book or face value. A third element, not quite so basic, which determines vulnerability to a financial crisis is the extent to which expectations of growth and of rising asset prices have affected current asset prices and the values at which such assets enter the financial systems. The domain of stability of the financial system is smaller the closer the articulation of payments, the smaller the weight of 'protected' assets and the larger the extent to which asset prices reflect

(1)

Assets "enter" the financial system when they are used as collateral for borrowing. A newly built house enters the financial system via its mortgage which is based upon its current production costs. If the expectation takes over that house, prices will rise at say 10% a year henceforth, the market value of existing houses will rise to reflect the expected capital gains. If mortgages are based upon purchase prices, once such a house 'turns over', the values in financial institutions portfolios reflect growth expectations. This happens with takeovers, mergers, conglomorates etc. It is no accident that such corporate developments are most frequent during 'euphoric' periods.
both growth expectations and realized past appreciations. The evolution of the above attributes of the financial structure over time will affect the size of the domain of stability of the financial system. It is a hypothesis of this as well as the earlier presentations of these ideas that when full employment is being sustained by private demand, the domain of stability of the financial system decreases.

In addition to the impact of normal full employment functioning, an euphoric economy with its 'demand pull' tight money will be accompanied by a rapid increase in the layering of financial obligations, which also tends to decrease the domain of stability. For as layering increases the closeness with which payments are articulated to receipts increases and such layering increases the ratio of inside assets to those assets where nominal or book value will not be affected by system behavior.\(^1\) An euphoric economy will typically be associated with a stock market boom, so that an increasing proportion of the value of financial assets will be sensitive to a sharp revaluation of expectation.

Even though a prolonged expansion, dominated by private demand, will bring about a transformation of portfolios and changes in asset structures conducive to financial crises, the portfolio transformations that take place under euphoric conditions sharply accentuate such trends. It may be conjectured that euphoria is a necessary prelude to a financial crisis, and that euphoria is a well nigh inevitable consequence of the successful functioning of an enterprise economy.

Thus the theory of financial stability takes into account two aspects of the behavior of a capitalist economy. The first is the evolution of the financial structure over a longer prolonged expansion, which affects the nature of the primary assets, the extent of financial layering and the evolution of financial institutions and usages. The second is financial impacts over a short period due to the existence of a highly optimistic, euphoric economy; the euphoric economy is a natural consequence of the economy doing well over a prolonged period. Over both the prolonged boom

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\(^1\) The relevant asset structure concept is outside assets as a ratio to the combined assets (or liabilities) of all private units, not the consolidated assets.
and during the euphoric period portfolio transformations occur which decrease the domain of stability of the financial system.

Financial instability as a system characteristic is compounded of two elements. How are units placed in financial distress and how does unit distress escalate into a system wide crisis?

B. The "Banking Theory" for all Units.

It is desirable to analyze all economic units as if they were a "bank"- or at least a financial intermediary. The essential characteristic of such a financial unit is that it finances a position by emitting liabilities. A financial institution does not expect to meet the commitments stated in its liabilities by selling out its position, or allowing it to run off. Rather it expects to refinance its position by emitting new debt. On the other hand every unit, including banks and other financial units, has a 'normal functioning' cash flow from operations. The relation between the 'normal functioning' cash flow and the refinancing opportunities on the one hand and the commitments embodied in the liabilities on the other determine the conditions under which the organization can be placed in financial distress.

It is important for our purpose to look at all organizations from the defensive viewpoint: "What would it take to put the organization in financial distress?" This aspect will be made clearer when we discuss bank and other examination procedures.

1. Solvency and Liquidity Constraints.

All economic units have a balance sheet. Given the valuation of assets and liabilities a net worth or owners equity for the unit is derived. The conditional maximization of owners equity may be the proximate goal of business management - where the conditional aspect derives from the need to protect some minimum owners equity under the most adverse contingency as to the state of the economy.

A unit is solvent, given a set of valuation procedures, when its net worth is positive. (1) A unit is liquid when it can meet its payment

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(1) The valuation procedures usually used takes book or market values. For purposes of both management and central bank decisions it would be better if valuation procedures were conditional i.e. if the economy behaves as follows, then these assets would be worth as follows.
commitments. Solvency and liquidity are two conditions which presumably all private economic organizations must always satisfy. Failure to satisfy either condition, or even coming close to failing, can lead to actions by others that profoundly affects the status of the organization.

Even though textbook statements may consider solvency and liquidity as independent attributes, the two are interrelated. First of all, the willingness to hold debts of any organization depends in part upon the protection to the debt holder embodied in the units net worth. A decline in net worth — perhaps as a result of revaluing assets — can lead to a decreased willingness to hold a unit's debts and hence to difficulties when it needs to refinance a position. Thus a lack of liquidity can result from what first was a solvency problem.

Similarly a net drain (outflow) of cash from an organization can lead to a need to do the unusual — to acquire cash by selling assets. If, because of the thinness of the market, a sharp fall in the asset price occurs, then a sharp fall in net worth takes place, especially if the organization is highly levered.

We can, therefore, identify three sources of a decline in the price level of the stock (capital), relative, of course, to the flow (income and investment). One is a rise in the weight attached to those possible states of the society which makes it disadvantageous to hold real assets, and financial assets whose value is closely tied to real assets. The second is the fall in asset values due to a rise in the discount due to uncertainty. The third is a decline in asset values as the conditions under which a position in these assets can be financed changes. In particular, whenever the need to meet the cash payment commitments stated by liabilities requires the selling our of a position, the possibility exists that a sharp fall in the price of the positioned asset will occur. Such a fall in asset prices may be the trigger for a serious impact of financial markets upon real demand.

2. The Need for Cash for Payments.

Cash is needed for payments. Payments are related to financial as well as income transactions. The layering of financial interrelations affects the total payments that must be made. To the extent that layering
increases over a prolonged boom or in response to rising interest rates or during a euphoric period at a faster rate than income the payments income ratio will rise. The closer the articulation by households and business firms of income receipts with payments due to financial contracts the greater the potential for financial crisis.

Each money payment is a money receipt. As layering increases the importance of the uninterrupted flow of receipts increases. The inability of one unit to meet its payment commitments affects the ability of the would be recipient unit to meet its payment commitments.

Three payment types can be distinguished: income, balance sheet, and portfolio. Each of these can in turn be broken down into subclasses.\(^{(1)}\)

These payment types reflect the fact that economic units have incomes and manage portfolios.

The liabilities in a portfolio state payment commitments. These contractual payment commitments can be separated into dated, demand and contingent commitments. To each liability some penalty is attached for not meeting the commitment: and the payment commitments quite naturally fall into classes according to the seriousness of the default penalty. In particular the payment commitments which involve the pledging of collateral are

\(^{(1)}\) Income payments are those payments directly related to the production of current income. Even though some labor costs are independent of current output, the data are such that all wage payments are in the income payments class. All of the 'Leontief' payments for purchased inputs are such income payments.

Balance sheet payments during a period are those payments that reflect past financial commitments. Lease, interest, and repayment of principal are among balance sheet payments. For a financial intermediary withdrawals by depositors or loans to policy holders are balance sheet payments.

Portfolio payments are due to transactions in assets.

Any payment may be of a different class when viewed by the payor or the receiver. Thus to the producer of investment goods the receipts from the sale of the good is an income receipt, to the purchaser it is a portfolio payment.

In addition to payment types, payments can be classified by "from whom" and "to whom".

If money consisted solely of deposits subject to check, then total payments would be the total debits to accounts and the total receipts would be credits to accounts. Hence it is the implication for system stability of total clearings, where the financial footings are integrated with the income footings, that is being examined.
important – for these payment commitments yield a direct and quick link between a decline in market value of assets and the need to make cash payments. That is, there is a type of contingent payment commitment which involves the supply of additional collateral or cash whenever a market price falls below some threshold. This "margin" or collateral maintenance payment commitment can be a source of considerable disorganization, and lead to sharp price declines.

Another aspect of balance sheet payment commitments is the source of the cash that will be used to make the payments. Three sources can be distinguished – one is the flow due to the production of income; the second is the flow due to the assets in a portfolio; and the third is the flow due to transactions in assets, either the emission of new liabilities or the sale of assets.

For each unit, or class of units, the trend in payment commitments relative to sources of cash yields the changing structure of financial interrelations. The basic empirical hypothesis is that over a prolonged expansion – and in particular during a euphoric period – the ratio of balance sheet commitments to pay to income receipts rises for private units, that layering increases faster than income, so that the total financial commitments rise relative to income. In addition, during euphoric periods, portfolio payments (transactions in assets) increase relative to both income and financial transactions. The measured rise in income velocity during an expansion underestimates the increase in the payment load being carried by the money supply.\(^{(1)}\)

C. Modes of System Behavior.

Three modes of system behavior can be distinguished depending upon how ex-post savings are in fact offset by ex-post investment. The offsets

\(^{(1)}\) In various places, I have tried to estimate by proxies some of these relations. Empirical investigation of stability could begin with a more thorough and also an up to date examination of these payment relations. The relations mentioned in this section are discussed in detail in my C.E.D. paper, "Financial Crisis, Financial Systems and the Performance of the Economy".
to savings that we will consider as investment in real private capital and government deficits. For convenience we will call real private capital inside assets and the accumulated total of government deficits outside assets. Thus the consolidated change in net worth in an economy over a time period equals the change in the value of inside assets plus the change in the value of outside assets.

At any moment in time the total private net worth of the system equals the consolidated value of outside plus inside assets. Assuming the value of outside assets is well nigh independent of system behavior, the ratio of the value of outside to the value of total or inside assets in the consolidated accounts is one gross measure of the financial structure.

Savings of any period are offset by outside and inside assets. The ratio of outside to inside assets in the current offset to savings as compared to the initial ratio of outside to inside assets will determine the "financial bias" of current income. If government deficit is a larger portion of the current offset to savings than it is of the initial wealth structure then the period is biased toward outside assets, if it is smaller than it is biased towards inside assets, and if it is the same then it is neutral.

Over a protracted expansion the bias in financial development is toward inside assets. This bias is compounded out of three elements:

(1) current savings are allocated to private investment rather than to government deficits,

(2) capital gains raise the market price of the stock of inside assets,

(3) interest rate increases lower the nominal value of outside, income earning assets. Thus the vulnerability of portfolios to declines in the market price of the constituent assets increases. (1)

In the long run portfolio balance has been maintained by "cycles" in the relative weights of primary assets accumulated; historically this cycle was the business cycle that centered around deep depressions. However, to

(1) This is, of course, an assertion as to the facts and the truth of these statements can be tested. Perhaps with a government sector that is 10% of G.N.P., they are less true than with a government sector that is 1% of G.N.P.
judge what is happening over time it is necessary to evaluate the significance of usage changes. The existence of effective deposit insurance makes the "inside" assets owned by the banking system at least a bit "outside". Similarly for all other government underwritings and endorsements. Thus with the growth of government and government agency contingent liabilities even a period in which growth is apparently biased toward the emission of private liabilities may in fact be biased toward outside assets. An attempt to enumerate - and then evaluate - the various government endorsements and underwritings of various asset and financial markets in these terms is necessary if the potential for financial instability is to be estimated.

D. Secondary Markets.

The domain of stability of the system depends upon the ratio of the value of those assets whose market value is independent of system behavior to those assets whose market value reflects expected system behavior. The value of particular assets can be independent of system behavior either because its market is pegged or because in fact the flow of payments that will be made does not depend upon system performance and its capital value is largely independent of financial market conditions.

For secondary markets to be an effective determinant of system stability they must transform an asset into a reliable source of cash to a unit whenever needed. This means that the secondary market must be a dealer market, i.e., there need exist a set of position takers who will buy significant amounts for their own account, and who sell out of their own store of assets. Such position takers must be financed. Presumably under normal functioning the position taker is financed by borrowing from banks, financial intermediaries, and other private cash sources. However, to be a venturesome, reliable position taker it is necessary to have adequate standby or emergency financing sources. The earlier argument about re-financing a position applies with especial force to any money market or financial market dealer.

The only source of refinancing whose behavior can be truly independent of any epidemics of confidence or lack of confidence in financial markets is the central bank. Thus if the set of protected assets is to be
extended by the organization of secondary markets, this will best increase
the stability of the financial system if the dealers in these secondary
markets do in fact have guaranteed access to the central bank.

It might be highly desirable to have the normal functioning of the
system encompass dealer intermediaries who finance a portion of their posi-
tion directly at the Federal Reserve Discount Window.

If a Federal Reserve peg existed in the market for some class of pri-
ivate liabilities these liabilities become guaranteed sources of cash at
guaranteed prices. Such assets are at least in part "outside" and they
increase the domain of stability of the system.

The extension of secondary markets to new classes of assets and the
associated opening of the discount window to new financial intermediaries
is a factor that can offset, at least in part - or may even more than
offset - the changes in financial structure due to the dominance of private
investment in the offsets to saving during a prolonged boom.

E. Unit and System Instability.

Financial vulnerability exists when the "tolerance" of the financial
system to shocks has been decreased due to three phenomena that cumulate
over a prolonged boom. These phenomena are (1) the growth of financial
(balance sheet and portfolio) payments relative to income payments; (2)
the decrease in the relative weight of outside and guaranteed assets in
the totality of financial asset values and (3) the building into the
financial structure of asset prices that reflect boon or euphoric expecta-
tions. The triggering device in financial instability may be the finan-
cial distress of a particular unit.

In such a case, the initiating unit, after the event, will be adjudged
guilty of being poorly managed. But the poor management of this unit or of
many units may not be the cause of system instability. The impact of the
difficulties of the initiating units upon other units will, in the existing
financial structure lead to other units being in difficulty or being
tightly pressed.

One general system wide contributing factor to the development of a
 crisis will be a decline in income. A high financial commitment-income
ratio, seems to be a necessary condition for financial instability; a
decline in national income will raise this ratio and would tend to put
units in difficulty. The destabilizing impact upon financial markets of attempts by units whose income has fallen to meet their commitments by selling assets adversely affects other initially quite liquid or solvent organizations. Thus an "explosive" process involving declining asset prices and income flows is set up.

The liabilities of banks and other financial intermediaries are considered by other units as (1) their reservoirs of "cash" for possible delays in income and financial receipts and (2) as an asset that will never depreciate in nominal value. Bank and financial intermediary failure has an impact upon many units — more units hold their liabilities than hold the liabilities of other private sector organizations. In addition such failures, by calling into question the soundness of the asset structure of all units, tends to modify all desired portfolios. Thus a key element in the escalation of financial distress to system-wide instability and crisis is the appearance of financial distress among financial institutions. Without the widespread losses and reconsiderations of desired portfolios that follows a disruption of the financial system, it is difficult for a financial crisis to occur. The development of effective central banking, which makes a pass through of losses from financial institution failures less likely, should decrease the likelihood of the sweeping financial instability which characterized history from taking place.

From our analysis of uncertainty it appears that even if effective action by the central bank aborts a full blown financial crisis by sustaining otherwise insolvent or illiquid organizations, the situation which made such aborting activity necessary will cause both private liability emitters, financial intermediaries and the ultimate holders of assets to now desire more conservative balance sheet structures. The movement toward such more conservative balance sheets will lead to a period of relative stagnation.

The above seems to lead to the following:

(1) The domain of stability of the financial system is endogenous and decreases during a prolonged boom.

(2) A necessary condition for a deep depression is a prior financial crisis.
(3) The central bank does have the power to abort a financial crisis.

(4) Even if a financial crisis is aborted by Central Bank action, the tremor that goes through the system during the abortion can lead to a recession that while more severe than the mild recessions that occur with financial stability nevertheless can be expected to be milder and significantly shorter than the great Depressions of the past.  

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(1) The above was written in the fall of 1966. If the crunch of 1966 is identified as an aborted financial crisis, then the events of 1966-67 can be interpreted as a particularly apt use of central bank and fiscal policy to first abort a financial crisis and then offset the subsequent income decline. It is also evident from the experience since 1966 that if a crisis and serious recession are aborted, the euphoria, now combined with inflationary expectations, may quickly take over again. It may be that for the boom and inflationary expectations evident in 1969 to be broken the possibility of a serious depression taking place again must become a credible threat. Given the experience of the 1960's it may also be true that the only way such a threat may be made credible, is to have a serious depression.
VII. An Aside on Bank Examination.

Commercial banks and other deposit institutions are periodically "examined". It is not my intention to offer a critique of current bank examination objectives and techniques or to inquire into whether it is useful or necessary. It will be assumed that bank examination will continue, the only 'negotiable' issue is its nature.

As presently carried out bank examinations enable the examining authority to determine the credit worthiness of the institution and inform the public that mismanagement and fraud are not obvious. The determination of credit worthiness is an extension of the lender-borrower relationship, the examination for fraud and mismanagement is a "Consumers Union" function. It is argued here that a bank examination procedure that focuses on cash flow relationships can be a useful source of information for Federal Reserve policy making.

Typically the end result of a bank examination is a balance sheet, which means that prices are placed on assets. Many assets of financial institutions - such as bank loans - do not have an active market. Such assets are priced at their face value, especially if they are current, even though at the ruling interest rate they would sell, if a market existed, at a discount.\(^1\) Items which are not current - what some call scheduled items - are valued at some arbitrary ratio to face value in arriving at the balance sheet. An excess of scheduled items is taken as indicating a need for "corrective" action by the institution. It is obvious that the examiners' balance sheet, as cast up, reflects many arbitrary rules, especially to the extent that valuation is divorced from current market prices. An arbitrary element enters into every attempt to place a value on an asset for which no broad, deep and resilient market exists.

In addition adequacy of capital and liquidity measures are derived. These measures reflect examiner's experience, and it may be that an examination procedure that focuses on relationships that determine cash flows will be equivalent to the present capital adequacy and liquidity evaluation procedures.

\(^1\) Of course, with a decline in market interest rates they would sell at a premium. The bias in writing this report has been to examine the effect of monetary constraint and rising interest rates. This essay is a creature of its time - mid year to fall 1966.
Even though the value placed upon a financial asset may be the result of an arbitrary valuation procedure, the commitments of the emitter of the liability are precise. The commitments are to make payments - either at specified dates, on demand or upon the occurrence of some stated contingency. Both the assets and liabilities of a financial institution are such contracts. The examiner, by 'reading' the outstanding contracts, can make a time profile of contractually dated cash flows to and cash flows from the unit. Each 'days' profile of dated payments and receipts needs to be supplemented by behavioral relations detailing the conditions under which demand and contingent clauses in contracts will be exercised. Thus a time series of the needs and sources of cash, under alternative contingencies, can be estimated.\(^1\)

A virtue of cash flow analysis is that it enables the authorities to receive information about the expected impact of various economic policy operations upon the cash flow to and the cash flow from various units and classes of units. That is whereas balance sheet analysis is essentially static, a cash flow analysis of any financial organization which forecasts cash flows at some future date must of necessity be based upon clearly stated assumptions as to the values that various system wide variables will take on as well as functional relations between these system variables and the elements of the unit's cash flows. The conditional nature of any single statement makes it necessary to vary the assumptions - to map out how changes in both the parameter of the functions and the system wide variables affect the cash flow variables. An evaluation of the expected cash status of any institution, or class of institutions, will depend upon assumptions as how the different market determined variables will behave. Thus the examination procedure will have to embody the results of serious economic analysis. Bank and other examination procedure should be forward looking. That is instead of asking questions about the present status and the past of an organization, the questions should

\(^1\) Computer technology makes such a transformation of the examination procedure from an analysis of values to an analysis of cash flows feasible. It may very well be that the emphasis upon capital values in bank and similar examination procedure, as well as in economic analysis, reflects what were at one time insurmountable computational difficulties.
be of the following form: "Given the present status, as an initial condition, what would be the dated impacts upon the organization of various economic system, financial market and management developments?" The vulnerability of say the New York Mutual Savings Banks to rapidly rising interest rates on time deposits and the sensitivity of the income and liquidity of West Coast Savings institutions to a decrease in the rate of growth of the local economy would have been obvious with such an analysis.

Note that the proposed examination procedure becomes an analysis of the unit that is conditional upon the behavior of the economy. Economic policy decisions cannot be made on an adequate factual basis without some knowledge as to their impact upon various classes of financial institutions. Much of what happens seems to surprise the authorities: an adequate examination procedure would minimize such surprise.

Cash flow analysis transforms every asset into a generator of a cash flow to the organization. Financial assets can be divided into three classes with respect to how they generate cash. These classes are cash itself, loans and investments. No need to discuss cash itself. Loans are those assets which generate a contractual cash flow. The ability of the owning organization to accelerate this cash flow by sale is very restricted. We may as well assume it does not exist. However, such assets may serve as collateral for loans, for example at the discount window. Investments, while they do embody contractual cash flows, are also saleable on a market. Thus their current market price more or less states the cash flow the managers can generate if they choose to sell out their position. Presumably true investments would have broad, deep and resilient markets. Obviously many bank and other financial institution investments have thin markets, and the relevant cash flow to the organization from such investments follows from the contractual rather than the marketable properties of the asset.

Whereas current assets yield a cash flow to an organization, the asset acquisition process results in a cash flow from the organization. As a continuing organization at each date a bank will have dated, demand and contingent commitments to acquire assets. The commitments will be both explicit, lines of credit or "letters", or implicit - there has been a long-term financial relation between the bank and the potential borrower.
Banks may similarly have an implicit commitment to bid for local municipal issues. (1)

The cash flow to an organization due to financial asset holdings reflects both a flow of income and the repayment of principal. However this division is not really relevant - what is relevant is the amount that is available from any cash flow for the acquisition of new assets. That is the 'cash flow to' needs to be related to the 'cash flow from'.

The debt liabilities of deposit and other financial intermediaries are commitments to pay cash - at some specified date, on demand or upon the occurrence of some contingency. These commitments include both the repayment of principal and interest payments; although for many deposit institutions interest payments are credited to the depositors' account and do not generate an automatic cash drain.

The debt liabilities of deposit institutions can be separated into 'service' and 'purchased' liabilities. Local demand deposits and passbook savings are almost all service deposits. The volume of such deposits will depend upon the state of the local economy and local competitors. Purchased liabilities include Federal Funds and large Certificates of Deposits for commercial banks as well as 'out of state' deposits for Savings and Loan Associations. In the case of these instruments, market demand may be volatile with respect to system performance. On the other hand the market demand for service liabilities is stable. Thus a bank's potential ability to finance a position in assets without recourse to extraordinary techniques at times of monetary constraint may depend upon the extent to which

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(1) For all economic units, such continuing financial contacts and relations are valuable "assets". True, implicit agreements can be "not honored" if a liquidity squeeze occurs - but this imposes "capital losses" upon the surprised and disappointed potential borrower. One way in which widespread bank failures affected the economy was by rupturing normal financial channels. When the Bank of the United States in New York failed in 1930, not only were there depositors losses but a fairly large portion of the New York garment trade was cast adrift without a continuing bank relationship. Thus in principle we can be cavalier with respect to financial constraint resulting in loan contraction, in fact we must recognize that extreme constraint may cause losses to "innocent bystanders". See Footnote 9, p. 309-10 in Friedman, M. and Schwartz, A.J. Money and Business Cycles, op. cit.
its resources are derived from service rather than from purchased liabilities. The potential for recourse to either the discount window or to the sale of assets in some secondary market is directly related to the extent to which purchased liabilities are a source of funds. Thus the cash flow examination will always have to consider the likelihood that the behavior of the market for such bank liabilities will lead to large cash flows out of the bank and thus force it to resort to discounting or asset sales.

Any cash flow analysis would need to relate each earning asset—both loans and investments—to the market in which they may be sold or pledged. Thus for each asset the terms upon which financing is available to the position takers or lenders in its market needs to be examined. In particular the breadth, depth and resiliency of a market can be guaranteed only if the Central Bank or perhaps its 'chosen instruments' stand ready to finance position takers. Thus if new asset classes become important, the 'examinations' procedure might feed back to the 'Central Bank' a need for the development of new or strengthened "secondary" markets or additional discount facilities.

For the demand and contingent liabilities of deposit institutions the interesting economic question is the conditions under which the demand or contingent claims will be exercised.

The cash flow to and from an organization on account of demand liabilities is a function of at least the terms offered by the institution, the terms available elsewhere and, for certain institutions, national income. Many special variables reflecting the specific contractual terms can enter into determining the impact in terms of cash flows of market determined and policy variables. (1)

The content of cash flow analysis of a financial intermediary can be made more precise by illustrating how it would be applied to a specific

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(1) In the Minsky-Bonham simulation experiments, reported in H.P. Minsky "Financial Crisis, Financial Systems and the Performance of the Economy", op. cit., p. 365-6, least square regression lines were fitted for new deposits and withdrawals at Savings and Loan organizations as functions of disposable income. For particular Savings and Loan organizations similar functions would need to be estimated for this analysis and such functions would include local economic conditions as well as interest rate variables rather than just aggregate income data as was true in our rather primitive analysis.
institution. Let us take, for simplicity sake, and also perhaps because of its recent relevance, the case of a Savings and Loan Association. The assets of such an institution will consist almost entirely of a long term fully amortized mortgages. Because of the rapid growth of these institutions the representative portfolio is rather 'young'. This means that the cash flow to the organization on account of its assets is a relatively small percentage of the total liabilities. In addition to such mortgages there will be some cash and treasury bills — but at most these will be a small percentage of total assets. Thus even allowing for the cash flow which the management can generate by selling assets the cash flow to the organization during one short period (say 90 days) cannot be more than 5 to 10% of total liabilities.

Ignoring standby and lender of last resort refinancing as potential suppliers of cash, these organizations must at all times offer sufficiently interesting interest rates so that no appreciable flight of deposits will occur. However as they cannot readily discriminate among depositors, they must pay all depositors whatever is needed to keep the 'marginal' depositor.

In a period such as the summer of 1966, the need arose to raise interest rates on all deposits in order to prevent large scale withdrawals of some deposits. This resulted in a sharp rise in the total costs of deposit funds. At the same time, these mortgage banks are looked into young portfolios whose contracts reflect past, lower interest rates. The cost of money in many cases may be penal, but unlike the classical penal rate case, the penal rate is not for a short time but may stretch on for years.

The penal rate of classical banking theory was an expensive way of refinancing a position that will run off in the relatively short span of time: 90 to 180 days. As a result of the short original dating of the contracts within six months almost all of the initial assets of a commercial bank will be repaid, the turn over time for assets is short. New assets will be acquired as old ones are repaid, but only at interest rates which are consistent with the penal cost of money. Thus, when the cost of money rises the relevant question is not just "How long will the interest rates be at this higher level?", but also "How long will it take for almost all assets in the portfolio to carry rates consistent with the new rate on liabilities?"

If portfolios are heavily weighted with young, fully amortized, long term
contracts this turn around time can be many years. A cash flow examination procedure would state how long it would take for say 25%, 50% and 75% of assets to adjust to new higher (lower) costs of money.

If interest on liabilities is a cash flow from the organization, a period in which a net cash flow out is financed by selling assets can occur when interest rates rise. If interest on liabilities is credited to the accounts of the depositors, deposit liabilities will rise relative to assets - net worth will decrease. In both cases demand commitments to pay will increase relative to both the contractual cash flow to the unit due to assets and the ability of management to generate a cash flow by selling marketable assets.

There is no need to enlarge upon the conditional relations which are relevant. For example one possible reaction by a deposit institution to prospective pressures for cash payments is to increase the ratio of cash and truly marketable securities to other assets. This means that instead of feeding cash flows generated by its mortgage portfolios to the new high yielding mortgages, a hard pressed Savings and Loan association will withdraw from the mortgage market and use cash flows to acquire low yielding but marketable assets: it prepares its cash and near cash position so as to withstand a deposit drain.

For each of various assumptions as to how units react a cumulative cash flow to, cash flow from, a time series of asset and liability positions can be derived. Presumably in the case given as an example, the cash flow from, because of withdrawals, can actually be greater than cash flow to for some periods. However, even if such withdrawals do not occur, and even if we do not value assets at current (estimated) market price, the growth of demand liabilities which results from the crediting of the high interest rate income to deposits accounts, will lead to an increase in the ratio of deposit liabilities to cash flow to the organization. This means that it becomes an ever more difficult problem to retain deposits.

A conditional cash flow examination of individual and classes of financial institutions would determine the impact upon the institution or class of various alternative policy determined conditions.

One proposition favored by non-academics is that the high cost of funds forces financial intermediaries into making risky loans that carry a
high contractual interest rate. From the above cash flow example it is possible for the cost of funds to rise so rapidly, relative to the fixed returns on the assets, for the organization to foresee that a liquidity crisis is certain to occur at some stated date if it follows a conservative policy in placing accruing cash. However, if it sells its low yield fixed market price investments, reduces its cash position and uses the cash flow on principal, income, and new deposit account to purchase high yield, high risk assets, then, if all turns out well, the liquidity crisis will be avoided. That is, whereas the conservative portfolio policy yields a financial crisis with a probability of well nigh one, the more radical portfolio policy yields a finite probability greater than zero of avoiding the liquidity crisis. Under these conditions the chancey portfolio policy is safer than the risk free policy.

A conditional cash flow analysis of individual and classes of financial institutions will estimate the impact upon the individual institutions and the set of institutions of various alternative policy and market determined conditions. For example, it may be that there is a limit to tight money - (due to the running losses, as illustrated above) - that a non-bank financial intermediary - (such as the Savings and Loan Associations) - can stand. The Federal Reserve System must look beyond the commercial banking system to determine whether, or under what circumstances, its actions are destabilizing.

A unified procedure for all examined financial institutions that focuses on their cash flows will be of help not only to unit managements but also to the regulatory authorities. One real advantage of integrating such an analytic approach into bank examination procedure is that the information on individual units generated by bank examinations will enable an estimate of the distribution of impacts to be generated. The question of how many units are pushed over or too close to some threshold by some constraining event that, for example, lowers the average return on a financial intermediary is of great interest - such an examination procedure should enable us to answer these questions.

The development of a cash-flow oriented bank and other financial institution examination procedure will involve a great deal of experimentation not only with observations on individual banks - the data gathered in
examinations - but also with the system attributes that are the relevant to determining individual bank behavior. Fortunately the recent interest in banking and bank markets has generated a body of studies that can be used as a starting place for the analysis of financial institution behavior under alternative conditions.
VIII. Regional Aspects of Growth and Financial Instability.

The reserve base of the banks in a region must be earned, and to keep such reserves the return offered must be competitive. The global reserve base is the result of Federal Reserve policies. Every change in reserves initially appears as a change in reserves in some particular set of banks. However, even if the Federal Reserve has a policy or program that directs the initial change in reserves toward some region, the ultimate regional distribution depends upon market forces. Any change in the reserve base of the banks of any region will be the result of either an income or an asset transaction with the rest of the country. The monetary system of every region in a country is equivalent to a very strict gold standard, where reserves for a region are the equivalent of gold for a country.

National economic growth is the resultant of the growth of the various regions. Some regions grow more rapidly - and some less rapidly - than the economy. However, the available evidence indicates that the reserve base of the various regions grows at a pace that is consistent with the growth of the region. That is, even if there is a trend in velocity in both the country and the regions, the relative velocity will change but slightly. If there is a rapidly growing region embedded in a slowly growing country - as was true of California in the United States during the 1950's - the money supply and the reserve base of the rapidly growing region will also grow rapidly. Thus, in the 1950's while demand deposits in the United States were growing slowly, demand deposits in California were growing rapidly.

In the California case, two identifiable, large, and rapidly growing sources of reserves to its banks were (1) the excess of Federal government payments over receipts in the state and (2) the flow of funds to the state to finance home construction. Other sources of reserves undoubtedly exist but they were not identifiable at the time the research underlying this section was undertaken.

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(1) Even if there are changes in the reserve base which are not due to Federal Reserve policy, the total reserve change is the result of Federal Reserve action - or inaction, whichever the Federal Reserve wills.

During the decade of the 1950's, the financing of housing generated a large flow of funds toward California. It has been estimated that as much as 40% of the total financing of house building in California came from out of state. This flow of funds to California reflected both the export of mortgages, and a rise in out of state deposits in California Savings and Loan Associations. It was estimated that about 20% of the deposits in California Savings and Loan Associations were out of state deposits.

A build up of the stock of mortgages and deposits owned by out of state investors means that in each period an increasing reserve drain takes place in order to meet the commitments as stated on this growing stock of liabilities. That is, without an appropriate offsetting growth in the cash flow from new mortgages, deposits or other items the growing stock of outstanding liabilities will tend to generate payments that lower the regions reserve base. Thus, any slowdown in the flow of funds to the region on account of the housing and other capital markets can lower the growth prospects for commercial banks and the state's money supply.

Mortgages, especially the standard fully amortized contract, generate a known, dated series of payments; the only variation in the cash drain from the region due to the stock of mortgages will be due to an inability to make payments, prepayments, or the sale of the mortgage. Thus, given that there is some experience on prepayments and sales, it seems clear that the outstanding foreign-owned (out of state) mortgages yield a known cash drain from the regions' banks.

The cash flow due to all, but especially out of state, depositors at California Savings and Loan Associations will depend upon safety and profitability. Deposit insurance is an effective barrier to concern or doubt of the safety offered by Savings and Loan deposits. Thus, the cash flow to California on account of Savings and Loan deposits depends upon relative interest rates. A variety of rate sensitive 'hot money' exists as deposits in these institutions, some of their deposits would be sensitive to small differentials in interest rates. We would expect these potentially 'hot money deposits' to be the large out of state accounts.

Even though all deposits - local and out of state - should be equally sensitive to rate differentials, the convenience factor may dominate in the case of local mostly pass book deposits. The problem of a rapidly
growing region is to maintain a rate structure that attracts funds and that keeps previously acquired out of state funds on deposit. Thus, California Savings and Loan Associations must keep a favorable interest rate premium, even if the present demand for housing financing is slack. Defensive rate competition is based upon the units liability structure. Note that if the national cost of money is high, the supply price of finance from these institutions will remain consistent with this cost of money even though local demand for financing is slack.

One impact of monetary constraint in our euphoric economy is that a rise has taken place in other, market interest rates relative to the rate on California Savings and Loan shares (deposits). The observation that the California mortgage market exhibited signs of disorderly conditions in mid year 1966 needs no documentation. Due to rate competition, these deposits have stepped increasing. Even if there is a net increase in deposits (at a slower rate) the net increase may be compounded of a decrease in foreign (out of state) deposits that is more than offset by rise in domestic (in state) deposits.

Thus during periods of monetary constraint as practiced, the housing related markets have tended to generate a decrease in the regions reserve base. If all else remains the same this means either that monetary velocity in California must increase relative to that of other sectors, or the rate of growth of income must decrease.

There is nothing sacred about the favored growth experience of California, nor is there any general reason why the national authorities should operate to keep California growing more rapidly than the country. However, tight money will be particularly hard on California home building, mortgage financing relations and commercial banks. This will be compounded if a rate ceiling is adopted to 'prevent' competition for deposits. Non-constrained market instruments are substitutes for saving and loan liabilities, and the potential retailing of such market instruments is a threat to deposit institutions.

A decline or a slowdown in the growth of commercial bank reserves in a rapidly growing region will lead to a decline in locally available credit through commercial banks. California banks traditionally are light on secondary reserve assets. Thus, the opportunity to sustain loan growth by
decreasing investments is minimal.

Thus monetary constraint, coming after a period of rapid growth, especially if it is a reaction to a spread of euphoria from a previously rapidly growing region to the country as a whole, will put serious pressures upon the banks and other financial institutions of the previously rapidly growing region. The regional concentration of financial duress may trigger a more general spread of distress than if the same total financial tightness were more evenly distributed geographically.

The practitioner of monetary policy must be aware of the differential regional pressures due to monetary constraint and that contagion phenomena within a region may be one way in which the initiation of financial instability may occur.
IX. Central Banking.

The modern Central Bank has at least two facets. It is a part of the stabilization and growth inducing apparatus of government and it is the lender of last resort to all or part of the financial system. These two functions can conflict.

For the United States, Central Bank functions are decentralized among at least the Federal Reserve System, the various deposit insurance and saving intermediary regulatory bodies, and the Treasury. The decentralization of Central Bank functions and responsibilities makes it possible for buck passing to occur. As a result of the decentralization of Central Bank functions among several legislated institutions along with the fact of usage and market evolution, a perennial problem of defining the scope and functions of the various arms of the 'Central Bank' exist. The behavior of the various agencies in mid-year 1966 indicates that ad-hoc committees among the various agencies can serve as the de-facto Central Bank. However, even though Central Banking functions for the United States are distributed among a number of organizations, the fact that the Federal Reserve System is first among the set should not be obscured. It may be necessary for the Federal Reserve System to make markets in the other institution assets or liabilities if they are to be able to carry out their assigned "sub routines".

The Federal Reserve System undertook, when the peg was removed from the government bond market, to maintain orderly conditions in these markets. The undertaking to maintain orderly conditions in a key asset market is an extension of the lender of last resort functions. It is a 'preventive' lender of last resort so to speak. "If we allowed the now disordered conditions to persist, we will in fact have to be a lender of last resort" is the underlying rationalization behind such action. The undertaking to maintain orderly conditions in some markets serves to protect position takers in the instruments traded on these markets. This protection of position takers may be a necessary ingredient in developing efficient financial markets.

The stabilizer and lender of last resort functions are most directly in conflict as a result of such undertakings to maintain orderly conditions. If constraining action undertaken in an effort to stabilize threatens the solvency of financial institutions, the Central Bank will be forced to back
away from the policy of constraint.

If a financial crisis occurs, it is universally acknowledged that the Central Bank must abandon any policy of constraint. Presumably the Central Bank should intervene before a collapse of market asset values that will lead to a serious depression occurs. However, if it acts too soon and is too effective no appreciable pause to the expansion that made the policy of constraint necessary will take place.

I have already discussed one way in which tight money can cause financial instability, by forcing risky portfolio decisions upon asset holders that are 'locked' into assets bearing terms born of greater ease. In addition the very rise in interest rates, which measures tight money, induces substitutions in portfolios that makes financial instability and thus lender of last resort and maintaining of orderly conditions intervention more likely.

The dilemma of Central Banking under exuberant economic conditions is to determine how disorderly markets will be allowed to get once distress appears before the lender of last resort functions take over and dominate its actions. It may be that the optimum way to handle an euphoric economy is to allow a crisis to develop, so that the portfolios acceptable under euphoric conditions are found to be dangerous, but to act before the severe losses in market values associated with an actual crisis occur. If monetary conditions are eased too soon, then no substantial unlayering of balance sheets will be induced, and the total effect of monetary actions might very well be to reinforce the euphoric expansion. If conditions are eased after a crisis actually occurs - so that desired portfolios have been revised to allow for more protection - but the effective exercise of lender of last resort functions prevents too great a fall in asset prices, then the euphoria will be terminated and a more sustainable relation in terms of investment demand between the capital stock and desired capital will be established. If the lender of last resort functions are exercised 'too late and too little', then the decline in asset prices will lead to a stagnation of investment and a deeper and more protracted recession. Given that the error of easing too soon only delays the problem of constraining an euphoric situation, it may be that the practical best choice for monetary policy really involves preventing those more severe losses in asset
prices that lead to severe recessions rather than preventing any disorderly or near crisis conditions from occurring. If capitalism reacts to past success by trying to explode, it may be that the only effective way to stabilize the system short of direct investment controls is to allow minor financial crises to occur from time to time.

Note that the above is independent of the mix of policies. If, as seems evident, the tight money of 1965-6 was due more to a rapid rise in the demand for money than to a decline in the rate of growth of the supply of money, a greater monetary ease combined with fiscal constraint would not have done the job. If we accept that a major expansionary element over this period was the investment boom, the expenditures attributable to Viet-Nam only affected the degree but not the kind of development, then an increased availability of finance would have resulted in increased investment and nominal income. Thus a changed policy mix would have constituted further evidence that a new era had come about. Of course the fiscal constraint could have been severe enough to cause such a large decline in private incomes that existing commitments to make payments would have been defaulted. A financial crisis or a close equivalent may be induced by too severe an application of fiscal constraint as well as by monetary constraint.

Within the Federal Reserve System, from the perspective of the maintenance of financial stability or at least the minimization of the impact upon income and employment of such instability as occurs, it seems as if a reversal of the trend which has led to the attenuation of the discount window may be in order. If secondary markets are to grow as a way of generating both liquidity while the system is functioning normally and protection while the system is in difficulties, then the dealers in this market will need access to guaranteed refinancing. The only truly believable guaranty is that of the Central Bank.

However, a Central Bank's promise to intervene to maintain orderly conditions in some market will be creditable only if the Central Bank is already operating in that market. If the Central Bank, under normal conditions, does not operate in the market, then it will not have working relations with market participants and it will not be receiving first hand
and continuous information as to conditions in the market: no regular channels feeding information about market conditions will exist as now exists for the government bond market. Thus the Federal Reserve will need to be a normal functioning supplier of funds to the secondary markets it desires to promote.

At present, only a small portion of the total reserve base of banks is due to discounting. Discounting can serve three functions - a temporary offset to money market pressures, a steady source of reserves, and as the route for emergency stabilization of prices. In order to set the ground for the Federal Reserve System to function effectively if a crisis that requires a lender of last resort occurs, the Federal Reserve normally should be "dealing" or "discounting" in a wide variety of asset markets. One way to do this is to encourage the emergence of dealer secondary markets in various assets and to have the Federal Reserve supply some of the normal financing of the dealers. It might be that a much higher percentage of the bank cash assets than at present should be the result of discounting, but the discounting should be by market organizations rather than banks.

Monetary and fiscal constraint may not be enough once the Keynesian lessons have been learned. The monetary - fiscal steering wheel assumes a mechanistic determination of decisions that in reality center around uncertainty: and the system doing well may so affect uncertainty that an arsenal of stabilization weapons that includes larger rationing elements may be necessary.

Let us assume the present arsenal of policy weapons and objectives. The policy objectives will be taken to mean that the high level stagnation of the 1952-60 period does not constitute acceptable performance. Under these conditions, the lender of last resort obligations of the Federal Reserve, redefined as allowing local financial crises to occur while sustaining overall asset prices against large declines, become the most important dimension of Federal Reserve policy. The lender of last resort responsibilities also becomes the arena where human error may play a significant role in determining the actual outcome of economic situations.
It is only in a taut, euphoric and explosive economy that there is much scope for Central Bank error. The importance attached to human error under these circumstances is due to a system characteristic - the tendency to explode - rather than to the human failings of the Board of Governors.
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