

Monetary Policy, Monetary Operations and National Economic Goals

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I. Introduction

The study of monetary policy came to the forefront of studies in monetary economics in the years following the appearance of some selected studies and reports²: notably, *Milton Friedman's* paper on time lags and the monetary and fiscal framework³, *J. Tinbergen's* studies on economic policy generally⁴, and the respective reports of the Royal Commission on Banking and Finance in Canada⁵, the Commission on Money and Credit in the United States⁶ and the

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² The studies and reports in question are dealt with elsewhere in connection with the introductory discussion of monetary policy. See, e. g., *William J. Frazer, jr.*, and *William P. Yohe*, Introduction to the Analytics and Institutions of Money and Banking (Princeton, N.J.: D. Van Nostrand Company, Inc., 1966), Part VIII.

³ *Milton Friedmann*, "A Monetary and Fiscal Framework for Economic Stability", *American Economic Review*, June 1948, pp. 245-264.

⁴ On the Theory of Economic Policy (1952), Centralization and Decentralization in Economic Policy (1954) and Economic Policy, Principles and Design (1956). All three books are parts of a series, Contributions to Economic Analysis, published by the North-Holland Publishing Co., Amsterdam. Also, along lines introduced by *Tinbergen* and *Theil*, *Brainard* deals with some questions concerning "certainty", a policymaker with more instruments than targets, and the prospect of discarding the excess instruments. See *William Brainard*, "Uncertainty and the Effectiveness of Policy", *American Economic Review*, May 1967, pp. 411-425; and see, also, discussion by *Edward J. Kane* in the latter volume, p. 432, and the *Theil* works cited by *Brainard*.

⁵ Report of the Royal Commission on Banking and Finance (Ottawa: Queen's Printer and Controller of Stationary, 1964).

⁶ *Commission on Money and Credit*, Money and Credit: Their Influence on Jobs, Prices, and Growth (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1961).

Radcliffe Committee in Great Britain⁷. Viewing these works and other related ones collectively, the subject matter of the monetary policy area tended to focus on the following: the notion of a policy as a goal; the notion of goals or targets at various levels—operational, intermediate, ultimate; the interrelationships between tools and goals; and questions about time lags—about the time between the need for a policy change and the recognition of the need for a change, about the lag between the latter change and the implementation of a change, and about the lag between the implementation of a policy change and the effect of the change. If the lags were long, there was the view that monetary policy operated with too long a lag to serve as an effective instrument in the quest for economic stability. There were, further, questions with respect to the substitution of “rules” for the exercise of discretion in the conduct of monetary policy, and with respect to the traditional central-bank emphasis on credit conditions.

Brunner and Meltzer, in the United States, were particularly critical of the focus by Federal Reserve officials on credit conditions as distinct from relations between such variables as the money stock and national economic goals⁸. The Federal Reserve’s central policymaking group—the Federal Open Market Committee (FOMC)—moreover, responded to its critics, at least in part, by specifying in its directive that some aggregate monetary measures should behave in a particular way. Some difficulties were encountered, however, in the diversity of the behavior of the desired credit conditions and aggregate monetary measures, and a “proviso” clause was added to the FOMC’s directive to give operating personnel a chance to change desired market conditions between the FOMC’s meetings⁹.

⁷ *Committee on the Working of the Monetary System*, Report Command Paper No. 827 (London: Her Majesty’s Stationary Office, 1959).

⁸ *Karl Brunner and Allan H. Melzer*, *Some General Features of the Federal Reserve’s Approach to Policy* (Washington, D.C.: U.S. Government Printing Office, 1964), pp. 15–16. See also *Jack M. Guttentag*, “The Strategy of Open Market Operations”, *Quarterly Journal of Economics*, February 1966, 1–30.

⁹ See e.g., *Elaine R. Goldstein and Leonall C. Anderson*, “1966—A Year of Challenge for Monetary Management”, *Review*, Federal Reserve Bank of St. Louis, April 1967, pp. 8–23.

The difficulty giving rise to the need for the “proviso” clause is apparently the same as that resulting in the rejection of an hypothesis posed by *Anderson and Levine* about monetary management. The hypothesis they attempted to test and then rejected is as follows: “A change in money market conditions, usually expressed in terms of the degree of pressure in the money market, induced by Federal Reserve actions has a predictable effect on short-run changes in money, bank credit, and long-run interest rates”. See *Leonall C. Anderson and Jules M. Levine*, “A Test of Money Market Conditions as a Means of Short-Run Monetary Management”, *National Banking Review*, September 1966, pp. 41–49. Carlson comments on the *Anderson-Levine* paper, from a rather inoperative *ceteris paribus* point of view (*Keith M. Carlson*, “A Test of Money Market

Some involved in the study of monetary policy attempted to focus on an even narrower area of study—monetary policy “actions”. There was also emphasis on so-called “linkages” or causal sequences beginning with some action such as a discount rate change, or an open market transaction. Lurking in the background of these studies and only occasionally coming to the forefront of discussion was the matter of defining the term “monetary policy” in an operational way.

The present paper is about monetary policy and the preceding study areas, questions, and other matters. It seeks to focus on a difficulty that arises in attempting to relate goals for credit conditions to goals for the money stock, at the operating level. In so doing the paper concludes with a suggestion for bringing ultimate goals closer to the level of central-bank operations and for including national economic goals in the policy directive to operating personnel¹⁰. The earlier sections of the paper are an attempt to put the subject in some perspective, to arrive at some useful conclusions about monetary policy, its nature and workings. On occasions, definitions of credit and monetary policy and portions of the monetary policy literature are surveyed. As we illustrate, the matter of definition affects the conclusions one arrives at about so-called time lags, and one’s view of the role of the central bank, especially the way policy relates to factors impinging on the rate of interest other than changes in the rate of change in the money stock.

Among the points of this paper are these: the classical loanable-funds and early liquidity-preference analysis focused on credit flows and the money stock, respectively, such that an increase in both contributed to a decline in interest rates; more recent analysis incorporating an asset (and liability) approach and employing a modified liquidity-preference approach focuses on imbalances in *desired* and *actual* money balances, such that interest rate changes roughly parallel changes in the income velocity of money; and effects of changes in the flow of bank credit, via loanable-funds analysis, and likely simultaneous changes in the rate of change in the money stock, via modified liquidity-preference

Conditions as a Means of Short-Run Monetary Management: A Comment”, *National Banking Review*, March 1967, pp.347–349).

¹⁰ The emphasis is on the form and concept of the relationship between credit conditions and economic goals, all as distinct from procedures for obtaining current estimates for use by policymaking and operating personnel. On the difficulties involved in obtaining and using currently issued data, especially when estimates are sought in the form of changes in the changes rather than in levels, see *Geoffrey H. Moore* and *Julius Shiskin*, *Indicators of Business Expansion and Contraction* (New York: Columbia University Press for the National Bureau of Economic Research, 1967), pp.16–17, 20–21; *W. Bradock Hickman*, “Monetary Policy in a Changing World”, *Economic Review*, Federal Reserve Bank of Cleveland, pp.2–9; and “A Note on Interpreting Monetary Variables”, *Economic Review*, Federal Reserve Bank of Cleveland, November 1966, pp.2–8.

analysis¹¹, are virtually inseparable through the straightforward use of multivariate, least-squares, regression analysis. Also, in the present paper, explicit quantitative content is given to the notion of credit conditions, and some definitions and concepts of credit and monetary policy are reviewed. Interest rates, the income-money-stock ratio, and the definitions and concepts are related, with the view to focusing on some of the problems and responsibilities facing policymakers.

This paper is an attempt to present some potential ways in which monetary authorities may influence the flow of expenditures (and, therefore, the level of employment, and the average of prices on current output) under certain conditions. These include a view of credit policy in terms of a rate of interest, an imposed logic, and certain facts or prospects. These facts or prospects—entering in effect in the form of constraints on analysis—are threefold: (1) cyclical peaks (troughs) in the rate of interest coincide roughly with similar peaks (troughs) in business conditions; (2) cyclical peaks (troughs) in the velocity of money coincide

¹¹ On bank credit and the flow of saving into investment, see *Frazer and Yohe*, op. cit., pp. 314–316, 440–444. See, too, on loanable-funds theory, *Alvin H. Hansen*, *A Guide to Keynes* (New York: McGraw-Hill Book Company, Inc., 1953), pp. 140–153.

In the loanable-funds framework, we are concerned with bank credit, and the supply of and demand for funds, a broader concept than money. From the financial markets point of view, funds are supplied, as through the acquisition of financial instruments as assets, and funds are obtained through the sale of such instruments and the incurrence of liabilities in the case of new issues. Money balances are used in effecting the latter transactions, and all individuals and institutions other than commercial banks, acquire assets by drawing down on money balances. The banks, in particular, enter in a unique way. They are the only type of institution that extends credit and increases assets without reducing cash, and, indeed, by increasing the money stock. The stock of money balances, however, is not what the banks supply in the loanable-funds framework, as distinct from the liquidity-preference framework, as emphasized later in the paper. Analysts, even so, appear to miss this point in dealing with monetary analysis and the supply of loanable funds, and money stock effects resulting via imbalances in actual and desired money holdings. *Cagan*, for example, may be quoted as follows:

New money enters the economy mainly through the banking system and hence becomes part of the supply of loanable funds. An increased rate of monetary growth might, therefore, be expected to depress interest rates ...

Bank lending produces the first-round effect on interest rates of an injection of new money. Subsequent effects could be of equal or greater importance. A change in monetary growth may produce temporary discrepancies between the public's actual and desired money holdings.

Cagan seems to say, as is a thesis of this paper, that effects via loanable funds are different from effects via imbalances in desired and actual money balances, as in the liquidity preference model in the present instance, and that "both effects could, of course, occur at the same time". The money stock effect, however, is not the one occurring in the loanable-funds framework. See *Phillip Cagan*, "Changes in the Cyclical Behavior of Interest Rates", *Review of Economics and Statistics*, August 1966, pp. 229–230, also published by the National Bureau of Economic Research as occasional paper 100.

roughly with peaks (troughs) in business conditions; and (3) the rate of interest and the velocity of money are not strongly related in the causal sense but respond mainly to similar changes emanating from other sources. The evidence and opinions on these facts and projects are cited. The analysis and conclusions are inapplicable to sectors or economies where some semblance of relatively free markets does not prevail or where the possible effects of interest rate or other policy variables are distorted by agency or voter approved ceilings. It would seem less than fitting, as in the case of the United States, for example, to emphasize the role of monetary policy in a relatively free market economy and then, at the same time, to imply by analysis that principal effects of policy are those on home construction and expenditures by municipal governments where interest rate ceilings exist.

Some guides to policy formation are said to follow from the analysis in the present paper. The approach is somewhat the reverse of the Carnegie Tech approach to constructing simulation models of decision processes from heuristics (or, less formally, decision rules or rules of thumb) actually used by decision makers in attaining goals, given certain information¹². A model that simulates reasonably well—or an analysis that meets standards of scientific inquiry and captures essential elements and developments confronting policymakers—is viewed instead, as providing the basis for deducing rules to guide the policymaker¹³.

¹² On the definition of heuristics, see, e.g., *Geoffrey P. Clarkson and Allan H. Meltzer*, "Portfolio Selection: A Heuristic Approach", *Journal of Finance*, December 1960, p. 466; and *Geoffrey P. Clarkson*, *Portfolio Selection: A Simulation of Trust Investment* (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1962), p. 4.

Research on the heuristic-model simulation of the decision processes of the Federal Open Market Committee, in the United States, has been underway at Duke University for several years. See *William P. Yohe*, "A Model of Federal Open Market Committee Decision Processes", paper presented at the November 11, 1966 meetings of the Southern Economic Association in Atlanta, Georgia. Preliminary papers on FOMC decision making by *Yohe* include "The Open Market Committee Decision Processes and the 1964 Patman Hearings", *National Banking Review*, March 1965, pp. 351–362; and "A Study of Federal Open Market Committee Voting, 1955–65", *Southern Economic Journal*: April 1966, pp. 396–405.

Also, on the study of policymaking behavior, see *John H. Wood*, "A Model of Federal Reserve Behavior", *Staff Economic Studies*, Board of Governors of the Federal Reserve System, June 1966, *Yohe* discusses the *Wood* model and Carnegie Tech, heuristic-type models in the first of his papers cited above.

¹³ Rules and views with respect to them have a history in monetary economics. In this perspective, the present emphasis on decision rules as an analogue to Carnegie Tech heuristics are distinguished by emphasis on rules for use by policymakers, especially in dealing with socio-psychological phenomena of a type implied by "shock effects", and "responses to special factors".

M. Bronfenbrenner outlines five classes of rules in his "Monetary Rules: A New Look", *Journal of Law and Economics*, October 1965, pp. 173–194. See, also on rules,

There has been a large amount of research devoted to constructing models with numerous equations and variables, including so-called policy variables, with the view to simulating the effects of changes in specific instruments of general credit controls, such as the discount rate¹⁴, and, therefore, with the view to helping the policymaker assess the effects resulting from the uses of the instru-

Milton Friedman, "A Program for Monetary Stability" (New York City: Fordham University Press 1959), pp.91-99; *Edward S. Shaw*, "Money Supply and Stable Economic Growth", United States Monetary Policy, second edition, ed., *Neil H. Jacoby* (New York: Frederick A. Praeger for the American Assembly, Columbia University, 1964), pp.83-91; *M. Bronfenbrenner*, "Statistical Tests of Rival Monetary Rules", *Journal of Political Economy*, February 1961, pp.1-14; and *Franco Modigliani*, "Some Empirical Tests of Monetary Management and Rules versus Discretion", *Journal of Political Economy*, June 1964, pp.211-245; *Milton Friedman*, "Interest Rates and the Demand for Money", *Journal of Law and Economics*, October 1966, pp.83-84; and *Milton Friedman*, "The Monetary Theory and Policy of Henry Simons", *Journal of Law and Economics*, October 1967, pp.1-13.

¹⁴ See, e.g., *Gary Fromm*, "Recent Monetary Policy: An Econometric View", *National Banking Review*, March 1966, pp.229-306; and *Gary Fromm*, "An Evaluation of Monetary Policy Instruments", a paper presented at the annual meetings of the Econometric Society, San Francisco, December 1966. The latter paper is based in part on work for a joint monograph with *Paul Taubman*, *Policy Simulation with an Econometric Model*. Also, a preliminary paper—namely, *Albert Ando* and *Stephen M. Goldfeld*, "An Econometric Model for Stabilization Policies"—was circulated in the Fall of 1966 on the Federal Reserve System's large, special purpose model. For another paper on the latter, see *Frank de Leeuw* and *Edward Gramlich*, "The Federal Reserve-MIT Econometric Model", *Federal Reserve Bulletin*, January 1968, pp. 11-40.

The emphasis in these models has been on forecasting changes or simulating the effect of changes in policy variables, where, as in the case of *Fromm's* 1966 paper ("Recent Monetary Policy", op.cit.), simulation is defined as a "solution to the system changing some set of conditions from those which otherwise would prevail, e.g., a shift in the discount rate". Despite the emphasis on the use of large models as forecasting devices, however, *Taubman* has taken the position "that now and for the foreseeable future a properly constructed small model will do as well or better for forecasting as any large model currently existing or likely to exist in the near future", given the requirements that a forecast should be a current and accurate prediction of relevant variables. See, *Paul Taubman*, "Chicago ASA Talk", a paper delivered at the meetings of the Chicago Chapter of the American Statistical Association, June 15, 1967.

For earlier discussion of forecasting and large versus small models, see *Irwin Friend* and *Robert C. Jones*, "Short-Run Forecasting Models Incorporating Anticipatory Data", and comments by *F. Thomas Jester*, and *Lawrence R. Klein* in *Models of Income Determination, Studies in Income and Wealth, Volume Twenty-Eight* (Princeton, N.J.: Princeton University Press for the National Bureau of Economic Research, 1964), pp.279-326; and for a review of some comments on prediction, multicollinearity, and a controversy over the economic interpretation of identification and the single-equation versus the simultaneous equation approaches for estimating regression parameters, see *Wilford L. L'Esperance*, "Further Evidence on the Predictive Power of Various Estimators", *International Economic Review*, February 1967, pp. 45-48.

ments. The present approach is different. Monetary policy is viewed as something more than policy with respect to the use of instruments of credit control. In combination with the broader view of policy, possible diverse effects of simultaneous changes in the flow of bank credit and in the rate of change in the money stock, and the tendency for monetary and real variables to be highly interdependent¹⁵ are viewed as complications affecting the usefulness of econometric models—exclusive of explicit allowance for the need to change parameters as a means of accommodating shock effects of certain events and pronouncements, after the events. Instead of the econometric view with fixed parameters, there is the present view that policy indicators reflect shock effects, responses to exogeneous factors, and either inactions or offsetting and reinforcing actions of the policymakers. In fact, the latter sorts of actions or inactions in response to events are viewed as primary functions of the policymakers.

II. Some Elements of Analysis

A number of elements of analysis form the foundations of this paper. They include, among others, aspects of the general theory of consumer choice, a relationship between income and wealth, and elementary Keynesian analysis. Neutral credit and monetary conditions are shown to be those characterized by a constant income velocity of money, and equal percentage changes in broad aggregates in the form of stock and flow variables. These also indicate constant business conditions, and differential changes in the growth rates for the respective stock and flow variables represent changes in business conditions. The

¹⁵ On the interpretation of statistical evidence dealing with relationships between economic variables, see *Donald E. Farrar* and *Robert G. Glauber*, "Multicollinearity in Regression Analysis: The Problems Revisited", *Review of Economics and Statistics*, February 1967, pp. 92–107; *Zvi Griliches*, "Distributed Lags: A Survey", *Econometrica* (forthcoming); and *William H. White*, "The Trustworthiness of Reliable Econometric Evidence", *Zeitschrift für Nationalökonomie*, March 1967, pp. 19–38; *C.W. Granger*, "New Techniques for Analyzing Economic Time Series and Their Place in Econometrics", in *Martin Shubik*, ed., *Essays in Mathematical Economics* (Princeton, N.J.: Princeton University Press, 1967), pp. 423–442; and *Karl A. Fox*, *Jati K. Sengupta*, and *Erik Thorbecke*, *The Theory of Quantitative Economic Policy with Applications to Economic Growth and Stabilization* (Amsterdam: North-Holland Publishing Company, 1966), pp. 51–104.

For earlier work on the interdependence of variables and causation, see *R. Bentzel* and *B. Hansen*, "On Recursiveness and Interdependence in Econometric Models", *Review of Economic Studies*, Vol. XXII (3), 1954–1955, pp. 153–168; and *Herman Wold* and *Lars Jureen*, *Demand Analysis: A Study in Econometrics* (New York: John Wiley and Sons, Inc., 1953), pp. 1–59.

changes in the credit and monetary conditions, on the one hand, and those in business conditions, on the other, are related by definition and indicated by changes in the same sets of conditions, as the analysis in this and subsequent sections develops. There is an emphasis on expectations and the exogenous determination of some variables. Factors affecting expectations are treated in a variety of mechanical forms, as well as in terms of "shock" effects. Shock effects and exogenous factors are introduced mainly as a means of bringing to the forefront some crucial changes with which monetary authorities should deal in the conduct of credit and monetary policy.

Efforts to suppress the destabilizing role of expectations, or to capture their essence through reliance on anticipatory series, have not resulted in sufficiently operational analyses. Reviewing the *Friedman-Schwartz* analysis of economic stability, for example, Meltzer notes that "transitory" changes in income are excluded from analysis by the use of concealing measurement procedures, and that special factors are unsystematically used to explain special developments¹⁶. As widely discussed¹⁷, a *Friedman* hypothesis about the wealth (or income) elasticity of the demand for money called for a secular decline in the velocity of money over the post-World War II years. As matters turned out, the average growth rate in the money stock was less than the assumed rate and the income velocity of money underwent a secular rise. Greater certainty about the future, the exact sort of phenomena with which operating officials must deal as a routine matter, was consequently invoked to explain the decline in the public's holdings of money balances in relations to income.

The theory of choice. The general theory of consumer choice envisions economic units as maximizing the flow of returns from holding assets subject to a constraint, such as the size of total assets. In particular, from the point of view of the present paper, it yields sets of equilibrium conditions whereby absolute returns are maximized when the rates of return from additions to alternative classes of assets are equal. Differential changes in the rates of return constitute imbalances. These coincide with differential changes in the rates of change for the alternative classes of assets, and differential changes in the rates of change constitute equilibrating adjustments. The process of adjustment and readjustment is a continuous one. The economic subjects are searching for and groping toward equilibrium. Equilibrium with respect to assets or wealth is emphasized, but the analysis may be viewed as applying to liabilities as well.

¹⁶ See *Allan H. Meltzer*, "Monetary Theory and Monetary History", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, December 1965, pp. 404-422.

¹⁷ See *Meltzer*, op. cit.; *William J. Frazer, jr.*, "Monetary Analysis and the Postwar Rise in the Velocity of Money in the United States", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, December 1964, pp. 584-596; and *William J. Frazer, jr.*, "The Demand for Money, Statistical Results and Monetary Policy", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, March 1967, pp. 11-29.

Liquidity preference and some exogenous factors. The ensuing liquidity preference model and analysis is thought to be adequate as a means of introducing some relevant, aggregative measures and providing a mechanism for illustrating the response of both the rate of interest and the income velocity of money to selected factors. The elementary model has been used previously, in a related paper, in discussing imbalances in *desired* and *actual* money balances¹⁸. It is as follows:

$$\text{Demand:} \quad M_d = cY + \frac{bY}{i}, \quad b > 0$$

$$\text{Supply:} \quad M_s = \gamma \bar{Y}$$

$$\text{Equilibrium:} \quad \bar{M}_s = \bar{M}_d$$

$$\text{The rate of interest:} \quad i = \frac{b\bar{Y}}{\gamma\bar{Y} - c\bar{Y}}$$

where $Y = C + I$, and where cY is the proportion of money balances held to satisfy the precautionary and transactions motives, $b\bar{Y}$ is the proportion held to satisfy the speculative motive, M_d is the quantity of money demanded, M_s is the stock of money supplied by the monetary authorities, i is the rate of interest, I is the flow of investment, $Y (= Y_d)$ is income received in the form of payments to the factors of production, Y_d is aggregate demand, $C(Y)$ and $S(Y)$ are consumption and saving as respective functions of income.

In the classical loanable-funds view, the intersection of schedules $S(i)_{Y=\text{const.}}$ and $I(i)$ also yields the rate of interest. This classical model, as we know, yields a more completely determined rate of interest, when combined with the liquidity-preference model¹⁹. Nothing is added, operationally, but intersecting saving and investment schedules can be said to enter as determinants of the equilibrium rate of interest (i), along with the liquidity-preference demand for money balances. Still, when the flow of investment shifts from its neutral growth path, then income changes, and when all other flow and stock variables change by the same percentages, the rate of interest and the income velocity of money remain unchanged and yield neutral credit and monetary conditions²⁰.

¹⁸ See William J. Frazer, jr., "The Demand for Money", op. cit., pp. 11–29.

¹⁹ The determination of the rate of interest in terms of classical and Keynesian analysis is reviewed in Frazer and Yohe, op. cit., pp. 440–444. On bank credit and the flow of saving into investment, see Frazer and Yohe, op. cit., pp. 314–316. Changes in bank credit, as on the liabilities side of banks' balance sheets, are distinguished from changes in the money stock.

²⁰ This definition of neutral credit conditions is the same as the "rough" definition employed by Johnson and Winder, although in the latter view deviations from the neutral position are in terms of changes in the rate of change in the money supply series.

With respect to the liquidity preference model and the equilibrium value for the rate of interest ($\bar{i}$), in particular, equal percentage changes in the flow of income (Y) and in the money stock (γY) leave the rate of interest (i) and the velocity of money ($Y/\gamma Y$) unchanged. A 100 percent increase in the rate of interest and the velocity of money parallels a doubling of income in relation to the balances (i. e., bY and cY) for satisfying the various motives, or, in general, as a simple first approximation,

$$\frac{d \ln V_r}{d \ln i} = 1$$

$$\frac{B_i + B_v}{2} = \text{percent change in credit and monetary conditions,}$$

where B_i is the average growth rate (as a percentage) for the interest rate per annum, B_v is the average growth rate (as a percentage) for the income velocity of money per annum, and the rate of interest is an indicator of credit conditions.

Now, proceeding from the neutral position of equal percentage changes in the stock and flow variables, tax (or tax and fiscal policy) factors may be introduced to give rise to differential percentage changes. These may include such diverse sorts of changes as those in income tax rates and in a tax credit²¹, i. e., a credit against income tax payments amounting to some percentage of capital expenditures. In the case of a tax cut for consumers, as in 1964 in the United States, the flow of consumption expenditures shifts upward from its growth path and the rate of change in income increases, such that the rate of interest and the velocity of money will also increase, given a constant rate of change in the money stock, with the monetary authorities controlling γ . In the case of the tax credit, an increase would accelerate the flow of investment and therefore income. It would also affect the rate of return on the flow of capital outlays and operate in the capital value, supply price framework: namely,

$$CV = R_1/(1+i) + R_2/(1+i)^2 + \dots + R_n/(1+i)^n,$$

$$C = R_1/(1+r) + R_2/(1+r)^2 + \dots + R_n/(1+r)^n,$$

where CV is the value at time zero of a given flow of instrumental capital, C is the cost or supply price of a given instrumental flow at time zero, $R_1, R_2, \dots$,

See *Harry G. Johnson and John W. L. Winder*, *Lags in the Effects of Monetary Policy in Canada*, Working paper prepared for the Royal Commission on Banking and Finance, November 1962, p. 13.

²¹ On the tax measures in question and the Keynesian models, see *Frazer and Yohe*, op. cit., pp. 366–367, and 428.

R_n is the stream of prospective returns per annum from the flow of instrumental capital after allowance for risk and liquidity elements, and r is the rate of return on the flow of capital outlays. An increase in a factor such as a tax credit for expenditures on instrumental capital has a shock effect on expectations. It increases R_1 above, $i = \text{constant}$ and $C = \text{constant}$ temporarily, so that $r > \bar{i}$ and $CV > C$. We have here the inducement for expanding the flow of investment. The movement is in effect toward equilibrium ($\bar{r} = \bar{i}$) with the velocity of money and the flow of investment rising, and with the monetary authorities responding by going along with increases in velocity and the rate of interest.

Temporary imbalances in the relations between *the rate of interest* and *the rate of return, value and cost*, and *desired* and *actual balances* are the imbalances relating to changes in the flow of investment, and changes in monetary and credit conditions. The main factors giving rise to changes in the rate of change in the above stock and flow variables, moreover, are obviously operating from outside of the overall framework consisting of the preceding elements of analysis. The outside operators involve changes in credit conditions, the tax credit (also, related to credit conditions), and so on. They are factors impinging on expectations, the prospective streams of returns, degrees of certainty about the future, and so on.

Expectations. Expectations enter the above relations and models in a variety of ways, exclusive of the shock effects of non-repetitive exogenous factors. For one, wealth (W) is the capitalized value of the prospective stream of income, i. e., Y/r . A given flow of investment, too, is the discounted value of a prospective stream of returns. In the first instance, moreover, expectations are sometimes viewed as being determined by past values of income. Such a view, in some contexts, has led to a definition of permanent income as some function of a weighted average of current and past incomes²². The average of past values, however, cannot forecast all of the customarily experienced changes in prospective income, nor embody all of the short-run or even secular effects of factors impinging on expectations with respect to future income. The averaging process may, in effect, even conceal some of the short-run effects on expectations that contribute to instability in expenditures. *Meltzer*, for example, points out that *Milton Friedman's* use of the permanent income measure leads to an exclusion of "transitory" changes in income from *Friedman's* analyses. *Meltzer* says, the latter changes are another name for the business cycle²³.

²² See *Mincer* on *Friedman* in *Jacob Mincer*, "Employment and Consumption", Review of Economics and Statistics, February 1960, p. 21, and see *William J. Frazer, jr.*, *The Demand for Money* (Cleveland, Ohio: The World Publishing Company, 1967), pp. 142-143.

²³ See *Meltzer*, "Monetary Theory and Monetary History", op. cit., pp. 404-422; and *Frazer*, *The Demand for Money*, op. cit., Appendix to Chapter 6.

Expectations, further, enter the above relations and models in terms of the preference for money balances in relation to other classes of assets, including assets with a residual claim against future income such as inventories, plant, equipment, and other goods. Prospective price-level changes on goods and services, for example, increase the prospective returns from the residual-claim type of assets and reduce the prospective purchasing power of money balances, as well as that obtainable from assets with a fixed income stream and maturity value such as bonds. Consequently, prospective price-level changes affect the cost of holding money balances and bonds. To deal with these prospects, some analysts introduce the rate of change in prices as a measure of the opportunity cost of holding money. It is denoted $d \ln P/dt$ or $(1/P)dP/dt$, where P is the average of prices on the current output of goods and services, and $d(\ln P)/dt = (1/P)(dP/dt)$ by logarithmic differentiation and the composite function rule. The idea is that a prospective increase in the price level affects the fixed-claim type assets adversely, contributes to declines in such assets as proportions of total assets, wealth or income, and consequently gives rise to increases in the income velocity of money and the rate of interest.

In the latter instance, the prospect of changes in the average of prices is thought to be captured by the rate of change in current prices. Factors other than prospective price-level changes, however, can affect the value of inventories, plants, and other goods, in relation to the value of money balances and other fixed-claim type assets. The tax credit was introduced above as one such factor. Greater certainty about the future is another, since it weakens the motive for holding money balances and assets commonly ranked on a balance sheet as being relatively more liquid²⁴.

Changes in velocity and interest rates reflect changes in prospective prices²⁵, degrees of certainty about the future, the tax credit, and so on. They also involve another form of switching of assets, notably between cash and bonds. As

²⁴ In particular, greater certainty narrows the variance in possible returns from residual-claim type assets, decreases the risk element for determining their value, and therefore, increases the value of such assets, as well as increases the willingness of asset holders to reduce liquidity (including reductions in cash in relation to total assets and increases in liabilities serving as drains on liquidity). The prospect of price increases, along with greater certainty, may be said to reduce variance in prospective returns in the downward direction and to in effect increase variance in the upward direction in a subjective probability sense, all so as to increase the value of residual-claim type assets.

²⁵ *Jorgenson*, commenting on the Keynesian investment demand model, says that the "criterion for optimal investment behavior ... is inconsistent with maximization of the present value of the firm" unless "the rate of change of the price of investment goods varies with the rate of interest". See *Dale W. Jorgenson*, "The Theory of Investment Behavior", *Determinants of Investment Behavior*, ed., *Robert Ferber* (New York: Columbia University Press for the National Bureau of Economic Research, 1967), pp. 151-152.

developed as a part of the assignment of probability values to the liquidity-preference demand function for money and of the rationale underlying the shape of the demand function for money²⁶, interest rates are expected to decline (rise) and the value of bonds rise (decline), when the rate of interest (i) is above (below) the normal rate²⁷. The prospect of a rise in rates of interest then contributes to a switching from bonds as a proportion of assets to money balances and subsequently out of money balances in relation to income or assets, since the same factors affecting the cost of holding bonds are affecting the so-called opportunity cost of holding money balances. The various changes are developed with respect to selected changes in prices, values, degrees of certainty, interest rates, and velocity, but the overall analysis also applies when the converse changes are being dealt with.

Cyclical and secular changes, and business conditions. The present analysis involves growth rates, exponential curves, and changes in the growth rates (or slopes of the curves). The average growth rates and their corresponding curves provide the base around which cyclical fluctuations or changes in economic or business conditions occur. The average growth rates or secular trends themselves may change, but, even so, the secular changes are analytically distinct, equal percentage changes in all stock and flow variables leave the rate of interest and the income velocity of money unchanged, and differential percentage changes in selected stock and flow variables involve changes in interest rates, income velocity, and business conditions²⁸.

²⁶ See *William J. Frazer, jr.*, "Some Comments on Professor Ritters Interpretations of Keynes and Changes in Income Velocity", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, March 1963, pp. 70-78.

²⁷ The normal rate of interest may be thought of as some average of rates in the recent past. For a discussion of a method for estimating a normal "rate" or "level", see *Franco Modigliani* and *Richard Sutch*, "Innovations in Interest Rate Policy", *American Economic Review*, May 1966, pp. 185-187.

²⁸ For evidence on past-World War II turning points for interest rates, velocity, and business conditions in the United States, see *Frazer*, "The Demand for Money", op. cit., pp. 28-29. Reviewing such evidence over longer periods for interest rates and business activity, *Cagan* finds that changes in the turning points for interest rates conform well with changes in business activity on the whole, although there are discrepancies at times. (See *Cagan*, op. cit., pp. 219-244.)

The failure of interest-rate changes and National-Bureau measures of changes in business activity to conform perfectly at times could be due to the possible effects of some institutional changes on financial markets and instruments and to the imperfect nature of National Bureau estimates of cyclical turning points. The 1966 period in the United States provides an example of the failure of the respective sets of turning points to roughly coincide, although *Cagan* recognizes interest-rate measures as providing one of the most useful bodies of evidence on cycles. In September 1966, in particular, the widely cited interest rates reached peaks, and numerous analyses dealt with a business adjustment following that date, but the National Bureau did not report a cyclical peak.

The terms "economic activity" and "business conditions" are used interchangeably. The former term has been said to suggest activity such as the hours of work, the number of people working, and so on. Economic activity may be constant and still coincide with an exponential growth in output and income (in constant prices) per annum; it may decline without output and income per annum declining; and it may increase with the result that the growth curve for output and income simply takes on a greater slope²⁹. "Economic activity" or "business conditions" suggests—in the context of the preceding analysis of equal percentage changes in stock and flow variables and a constant rate of interest—a built-in dynamic, "a tendency for output to grow in an economy with a constant level of employment, given a neutral monetary policy (presently denoted as a constant rate of interest)". Technological change has been said to displace some workers such that their re-employment constitutes a source of growth in output with a neutral monetary policy, under reasonably competitive conditions at a given level of employment³⁰.

The money stock and the interest rate: exogenously determined variables. The preceding liquidity-preference model includes the money stock as an exogenously determined variable. This assumption is, of course, quite common in monetary analysis. Alternatives to it are yet to be proven superior in facilitating operational analyses³¹. The analysis treating the money stock as an exogenous variable, of course, must occasionally be modified by incidental remarks

The period had symptoms of a business adjustment, but large increases in military, defense, and other government expenditures offset possible adjustment-type changes in some series.

²⁹ *Culbertson* and *Friedman* entered a controversy on the question of the adequacy of lag measures based on the "timing" of peaks and troughs in the rate of change of the stock of money relative to peaks and troughs in general business. (See *Milton Friedman*, "The Lag in Effect of Monetary Policy", *Journal of Political Economy*, October 1961, pp. 447–448, 452–454.) The controversy centered on what was meant by the "level of business". We have referred to a constant level of business and secular growth, and business cycles (i.e., changes in business conditions and changes in the growth rate or the slope of an exponential growth curve), and *Friedman's* discussion amounts to about the same thing. He says (*ibid.*, p. 452), "the rate of change in the stock of money ... has the same dimensions as the so-called level of business." Further, he recognizes the difficulty "in principle" of selecting turning points in general business, but, as a practical matter he chooses to use National Bureau reference cycle dates (*ibid.*, p. 453). In objecting to the use of simple ups and downs in selected series, *Friedman* points out that some series rise during expansions and contractions in general business. Indeed, as cyclical or business conditions indicators we are interested in changes in the slopes of growth curves.

³⁰ *Frazer*, "The Demand for Money", *op. cit.*, p. 23.

³¹ Research on supply equations has been conducted in a variety of quarters. It is continuing. See *Allan H. Meltzer*, "Money Supply Revisited: A Review Article", *Journal of Political Economy*, April 1967, pp. 169–182.

and, in recent years, by the recognition of a shock effect of specific conditions on the liquidity-preference demand by banks for excess reserves³². One of the grave difficulties encountered in monetary policy analysis, furthermore, is the recognition of the fact that monetary authorities have influences on the demand side of the markets for bank reserves and money, exclusive of those they exert on bank credit through changes in bank reserves.

Jacoby speaks of important qualifications of the Federal Reserve's power to influence the money stock, although it is true, he says "that the Federal Reserve authorities can dominate the amount of member-bank reserves available for backing up bank deposits, and, under a fractional reserve system, can thereby effectively control the potential stock of money"³³. His main qualification is that "general pessimistic expectations in the economy may inhibit a recovery in the demand for loans". Continuing he says, "interest rates may fall to very low levels, as they did during the 1930's. Here, a point causing some difficulty for some analyses involving an independence of variables³⁴ is that some analysts credit Federal Reserve officials with being able to influence expectations about the future, degrees of certainty, and so on³⁵.

Teigen takes a strong objection to the view "that the Federal Reserve System can set the money stock at any desired level", as do some others cited later (Sec. III). He views the question as an empirical one, apparently to be answered by a use of the methods of regression analysis: "to what degree are the monetary authorities able to influence monetary variables through their manipulation of the instruments of monetary policy, and how stable are these relationships through time?"³⁶. To date, research involving the classical methods of regres-

³² See *George R. Morrison*, *Liquidity Preferences of Commercial Banks* (Chicago: University of Chicago Press, 1966). See a review of the latter book in the *Southern Economic Journal*, July 1967.

Brunner and *Meltzer* also outline a rationale for banks' demands for excess reserves and refer to a "probability distribution summarizing a bank's uncertain prospects with respect to the flow of reserve funds ..." See *Brunner* and *Meltzer*, *An Alternative Approach to the Monetary Mechanism* (Washington, D.C.: U.S. Government Printing Office, 1964).

³³ *Neil H. Jacoby*, "Introduction: Contemporary Monetary Issues", *United States Monetary Policy*, in *Jacoby*, op. cit., p. 11.

³⁴ The assumption of the independence of the independent variables in the classical, linear, regression model is quite basic. It involves the problem of multicollinearity. On this problem, see *Farrar* and *Glauber*, op. cit., pp. 92-107. See, also *Frazer*, *The Demand for Money*, op. cit., pp. 54-56.

³⁵ See, e.g., *Frazer*, "The Demand for Money, Statistical Results and Monetary Policy", op. cit., pp. 11-29; and *Frazer*, *The Demand for Money*, op. cit., Chapter 11; and *Morrison*, op. cit.

³⁶ *Ronald L. Teigen*, "A Structural Approach to the Impact of Monetary Policy", *Journal of Finance*, May 1964, pp. 284-285.

sion analysis, including restrictive assumptions involving their use, has done little to answer *Teigen's* questions. Quite commonly the assumptions about the uses of the tools ignore the way they have come to be used in Federal Reserve operations³⁷. *Teigen* is also critical of the assertion "that the simple money multiplier [the reciprocal of the reserve requirement] is merely modified in a predictable way by the operations of commercial banks, and that the link between reserve operations and the money supply remains unique and dependable"³⁸.

III. Definitions of Credit and Monetary Policies

The number of titles of works purporting to be about monetary policy and its effects is exceedingly large, and, by contrast, statements of definitions of the term "monetary policy" are exceedingly few³⁹. This possibly seems bewildering in view of the obvious difficulties inherent in discussing the effects of monetary policy without stating what it is in reasonably operational and precise terms. Even so, the term "monetary policy" has been used in different ways and in some common ways. In the first instance, it has been used to mean almost everything a central bank does, exclusive of bank and personnel administration, and so on. The term has been widely used, too, to imply the use of the tools of monetary and credit control such as the discount rate, although in the mid-1960's one increasingly encountered the use of the phrase "monetary policy actions" to refer to actions, involving the tools. One encounters serious works purporting to deal with monetary policy whereas in fact they deal with "monetary policy actions"⁴⁰.

³⁷ See, e.g., *Frazer*, *The Demand for Money*, op. cit., pp.290, 291, 310.

³⁸ *Ronald L. Teigen*, "A Structural Approach", op. cit., pp.284-285.

³⁹ See as examples of works explicitly mentioning the question of definition, *Jacoby*, op. cit., pp.5-60; *J.G.S.Wilson*, "Some Reflections of the Radcliffe Committee's Report", *Journal of the Institute of Bankers*, August 1960, reprinted in *J.G.S.Wilson*, *Monetary Policy and the Development of Money Markets* (London: George Allen & Urwin Ltd., 1966), pp.64-75; *Ervin Miller*, "Monetary Policy in a Changing World", *Quarterly Journal of Economics*, February 1956, reprinted in *Richard A.Ward*, ed., *Monetary Theory and Policy* (Scranton, Pennsylvania: International Textbook Company, 1966), pp.118-135; *G.L.Reuber*, *The Objectives of Monetary Policy*, Working paper prepared for the Royal Commission on Banking and Finance, December 1962; *Johnson and Winder*, op. cit.; *R.S.Sayers*, "Monetary Thought and Monetary Policy in England", *Economic Journal*, December 1960, reprinted in *Ward*, ed., op. cit., pp.353-369; and *Frazer*, "The Demand for Money, Statistical Results and Monetary Policy", op. cit., pp.11-29.

⁴⁰ See, e.g., *S.M.Goldfeld*, *Commercial Bank Behavior and Economic Activity: A Structural Study of Monetary Policy in the Postwar United States* (Amsterdam: North-Holland Publishing Company, 1966), pp.1-2, 4-5, 63, 68, 98, 102, 114, 130, 174-175,

Some common usages of the term "monetary policy" are set forth below. They are not, however, conclusive as far as possible monetary-type policies are concerned. Section IV deals with additional policy concepts and lags in the recognition, implementation, and effects of policy. The definition of credit or monetary policy one adopts is of crucial importance with respect to the conclusions one arrives at about the effects of policy and the lags in the effects of policy, as Section IV reveals. It is related presently, too, to the question of the independence of a central bank within the framework of government.

Some definitions of credit and monetary policies. A most common usage of the term "monetary policy" is as a synonym for "credit policy" and "credit" and "monetary conditions"⁴¹. In these instances, interest rate changes are cited as indicators of changes in credit conditions, the "tone" and "feel" of the money and credit markets. As introduced in the next section, there are complications in equating credit and monetary policy, due mainly to some differential effects of common factors on the stock of bank credit and the money stock (defined as currency plus demand deposits adjusted), respectively. Nevertheless, in broad outline there is a close relationship.

If by credit policy or conditions we mean the cost and availability of credit as reflected in some fundamental rate of interest, and if by monetary policy or conditions we mean the policy with respect to the stock of money in relation to income, then we are led to expect a very close relationship between the respec-

195-196. On a distinction between policy actions and possibly indicators such as "free reserves, the money supply, and interest rates", see *Thomas Havrilesky*, "A Test of Monetary Policy Action", *Journal of Political Economy*, June 1967, pp. 299-303.

⁴¹ See, e.g., *Wilson*, op. cit., pp. 64-75; a portion of the 1964 report of Canada's Royal Commission on Banking and Finance, reprinted in *Ward*, op. cit., p. 1; and *Mark H. Willis*, *The Framework of Monetary Policy: A Staff Analysis of the Federal Open Market Committee in its Conduct of Monetary Policy* (Washington, D. C.: U. S. Government Printing Office, for the House Subcommittee on Banking and Currency, 1967).

Miller persistently equates "traditional monetary policies" with the "manipulation of interest rates", where "traditional restrictive practice would call for increases in interest rates". See *Miller*, in *Ward* op. cit., pp. 118, 119, 123, 124, 134.

Karl Brunner and *Allan H. Meltzer* review aspects of interest rates as indicators of monetary policy in an unpublished manuscript, "What Did We Learn From U. S. Experience in the Great Depression?", May 1967. On classical theory of central banking and American experience, they may be quoted as follows:

Market interest rates were taken to be the key indicator of monetary policy. If market rates—and in particular short-term rates—fell, policy was regarded as expansive, even "easy"; when market interest rates rose, policy was regarded as "tight" or anti-inflationary.

Referring to the 1920's and early 1930's *Brunner* and *Meltzer* conclude:

The Governors of the Federal Reserve System believed then, as for the most part they appear to believe now, that short-term money market rates are the most reliable indicator of monetary policy.

tive policies, at least in the analytical framework of Section II. We were led, in particular, to view a very close relationship between the rate of interest (i) and the income velocity of money (V_y), so that percentage changes in one coincided with percentage changes in the other, and so that the average of the rate of change in the rate of interest and the rate of change in the velocity of money could be viewed as a measure of the change in credit and monetary conditions⁴². In symbolic form, as a simple first approximation, $(B_i + B_v)/2$ = average rate of change in credit conditions, where B_i is the average rate of change in the rate of interest, and B_v is the average rate of change in the velocity of money. In such a context, credit is "easy", "neutral" or "tight" when the interest rate is declining, continuing unchanged, or rising, respectively, while the corresponding monetary conditions are in effect the reverse of the credit conditions. For example, interest rates and velocity vary directly, but tight credit (i. e., rising interest rates) corresponds with easy money (i. e., rising velocity) in the sense that *actual* balances exceed *desired* balances. Velocity is rising in the latter instance as a part of efforts by the holders of money balances to effect an equilibrium between *desired* and *actual* balances by reducing balances in relation to income through increasing the flow of expenditures. Credit is tight when velocity is rising, but credit is being sought as a liability and as a source of funds for increasing assets rather than as a means of achieving larger holdings of money balances in relation to income or assets. Adopting the preceding measures as indicators of credit, and monetary policy, respectively, we could then distinguish between random, seasonal, cyclical, and secular changes in policy, in view of the tendency to make such distinctions in analyses of time series. A number of writers speak of a distinction between long-run movements in interest rates and a cyclical policy⁴³, and *Sayers*—emphasizing the growth of money in relation to other assets and liabilities—reminds us that the public in the long-run chooses what it will accept as money⁴⁴.

⁴² An analytical argument for relating velocity and rate of interest as indicators of credit and monetary conditions was set forth in *Frazer*, "The Demand for Money, Statistical Results and Monetary Policy", op. cit.

⁴³ *Axilrod* and *Young* emphasize the point: To understand the behavior of interest rates, it is important to distinguish the long-run trend in rates from cyclical and other short-run variations in rates. In practice, of course, what we call long-run forces are always present and they influence short-run changes, while the effects of short-run forces may also ramify into the future.

(See *Stephen H. Axilrod* and *Ralph A. Young*, "Interest Rates and Monetary Policy", Federal Reserve Bulletin, September 1962, in *Ward*, op. cit., p. 254.) *Culbertson* and *Cagan* also speak of the need to distinguish trend factors. (See *John M. Culbertson*, "Monetary Management and Mismanagement", in *Ward*, op. cit., p. 201; and *Cagan*, op. cit., p. 230.)

⁴⁴ Monetary policy may be varied and restrictive, but excessive and overly prolonged restriction or expansion of money and credit will ultimately give rise to the demise of

Levels of policy: tools and targets. A policy is a chosen course relating to desired objectives. In this sense, a policy implies a target or goal. In the case of the Federal Reserve in the United States, there may be a variety of policies with respect to a variety of matters—the administration of the discount windows at the respective Federal Reserve banks, the administration of the System's trading desk at the Federal Reserve Bank of New York, the rate of change in aggregate bank credit, the rate of change in the stock of money, and so on. There may be policies at different levels (operational, intermediate and so on), too, with those at some initial level serving as the means of implementing a policy at another level.

Three levels are commonly distinguished in dealing with relationships or "interrelationships" between policies at different levels—an operations level, an intermediate level, and an ultimate level⁴⁵. At the first of these levels, bank reserves are presently emphasized as a target, in the context of the bank reserve equation, as in the case of the Federal Reserve. Credit and monetary conditions, as previously defined are goals at the intermediate level. The ultimate goals are the commonly cited ones—maximum employment⁴⁶, production and purchasing power (i. e., stable averages of prices on current output).

The bank reserve equation is as follows⁴⁷:

$$R + G + C_T - C_S - T_C - F - R_M = 0$$

or

$$R + G + C_T - C_S - T_C - F = R_M$$

where R is Federal Reserve credit, G is monetary gold stock, C_T is Treasury currency, C_S is currency in circulation (net), T_C is Treasury cash, F is foreign and other Federal Reserve deposits and miscellaneous accounts, and R_M is member-bank reserves (exclusive of member-bank vault cash). The bank-reserve equation is an identity, but the goal at the operating level is presently viewed as member-bank reserves, as set off in the latter arrangement of terms. The main variable controlled by the Federal Reserve in the equation, however, is Federal Reserve credit (R), although the level of the required portion of member-

the importance of bank deposits as money. See *R. S. Sayers*, "Monetary Thought and Monetary Policy in England", *Economic Journal*, December 1960, pp. 711-724, also reprinted in *Ward*, ed., op. cit.; and *Frazer and Yohe*, op. cit., Chapter 2.

⁴⁵ See *Frazer and Yohe*, op. cit., pp. 564-566.

⁴⁶ For a review of definitions of maximum employment, see *Frazer and Yohe*, op. cit., pp. 337-341.

⁴⁷ The equation is set forth and related to balance sheet items in *Frazer and Yohe*, op. cit., pp. 215. For a discussion of the control over member-bank reserves, see *William G. Dewall and William E. Gibson*, "Sources of Variation in Member Bank Reserves", *Review of Economics and Statistics*, May 1967, pp. 143-150.

bank reserves is set within limits by the Federal Reserve's control of reserve requirements. Other variables in the equation may be viewed as residuals over which the Federal Reserve has little direct control, and among these, the monetary gold stock (G) is of particular importance in terms of the magnitude of its influence on reserves of commercial banks.

Federal Reserve credit in the bank-reserve equation is the direct result of discounts and advances made through the discount windows of the respective Federal Reserve Banks and of open market transactions in securities for the open market account. The main point, now, is that the Federal Reserve controls Federal Reserve credit (R) by varying the size of the open market account and in other ways, but that member-bank reserves can undergo substantial changes without any changes in open market operations, the administration of the discount window, or changes in the required reserve ratio. The point is important because it means that some changes or portions of changes in member-bank reserves are directly the result of a lack of action by the monetary authorities. The central bank, or the Federal Reserve in the United States, becomes the controlling agent for bank reserves, either by supplying the reserves, failing to offset increments arising from other sources, or by absorbing increments arising from other sources.

Next, at the intermediate policy level, there is the goal of the rate of interest, or credit conditions—often as indicated by rates on Treasury bills, and commercial paper⁴⁸, but also as indicated under some conditions by a long-term rate such as the yield on Aaa corporate bonds⁴⁹. The short-term rates have a larger variance, and—although the rates on all marketable debt instruments reflect shifts in expectations in response to day-to-day and week-to-week developments—the short rates also reflect prospective changes in long-term rates and marginal changes in different time-to-maturity classes of noncash fixed-claim type assets. The yield on the high-grade corporate bonds, on the other hand, would seem to reflect fundamental changes in credit conditions, along lines indicated in the present and subsequent sections. These changes in the long-term yield would also seem to be the sorts of changes most directly relating to capital expenditures and marginal changes in broad classes of assets—including both the fixed-claim and the residual-claim type as mentioned in the previous section.

Rates of interest are commonly viewed as being determined by the interaction of certain supply and demand schedules: namely, (1) the liquidity-preference demand for money, and the supply of money; (2) the liquidity-preference demand for bank reserves and the supply of bank reserves; and (3) the inter-

⁴⁸ For a review of these rates, see *Frazer and Yohe*, op. cit., pp. 286–298.

⁴⁹ On long- and short-term rates, see *Frazer*, *The Demand for Money*, op. cit., pp. 87–88.

action of the schedules relating income not spent on consumption (i. e., saving) to investment (i. e., the portion of income allocated to capital expenditures)⁵⁰. In the first of these instances, as emphasized in Section II, changes in the supply of money affect the rate of interest directly and they affect simultaneously imbalances in *desired* and *actual* balances, and thus, from the demand side, the rate of interest and the income velocity of money. In addition, there are special factors that may affect the demand side of the market for money and, therefore, the rate of interest, all as emphasized earlier.

In the second instance—that of the preference for bank reserves—the central bank may influence in particular the supply (i. e. R_M in equation form and contribute to rates of change in bank credit (i. e., the aggregate of commercial bank loans and investments) and the money supply, depending on changes in currency holdings of the public in relation to deposits and on changes in the division of deposits between demand and non-demand deposits⁵¹. The pref-

⁵⁰ For a review of the determination of the rate of interest in terms of interacting Keynesian and loanable funds schedules, see *Frazer and Yohe*, op. cit., pp. 440–457. For another review, as well as an orthodox view of the velocity-interest rate association, see *Paul A. Samuelson*, *Economics*, seventh edition (New York: McGraw-Hill Book Company, 1967), pp. 330–332.

⁵¹ The changes in question involve money (credit) multipliers and currency and time deposit drains (see *Frazer and Yohe*, op. cit., pp. 39–48). A number of writers deal with the drains (e. g., *Frazer*, *The Demand for Money*, op. cit., pp. 111–113, 152–153) and with the question of central bank control over the quantity of money, particularly in the United States.

In particular, *Gramley* and *Chase* give special emphasis to the time deposit drain (see *Lyle E. Gramley* and *Samuel B. Chase, jr.*, “Money Supply Versus Interest Rates: A Reply”, *National Banking Review*, December 1966, pp. 205–213). *Dewald* too emphasizes the point that “the public and bank-desired holdings of various assets clearly are vital determinants of the quantity of money or of interest rates”, as well as the constraints imposed on the money supply by required reserve ratios and the level of bank reserves. Assuming no excess reserves and “a given distribution of currency and deposits subject to different required reserve ratios”, he calculates the maximum money supply as (actual money/required reserves) x (actual reserves), and finds “that 94 percent of the quantity variation in changes in the quantity of money from 1948 through 1965 [in the United States] was attributable to changes in maximum money”. He interpreted this to suggest “that the constraints of required reserve ratios and bank reserves could not easily be ignored” as determinants of the money supply. (See *William G. Dewald*, “Money Supply Versus Interest Rates as Proximate Objectives of Monetary policy”, *National Banking Review*, June 1966, pp. 512–513.) *Dewald* also cites other works dealing with maximum money or bank credit measures, and with some controversy between economists favoring actions to control the money supply versus actions to control the rate of interest. The view in the present paper is that control over one implies control over the other, along lines set forth in the text although the two are not simply related.

Weintraub attempts to deal abstractly with the question, among others, of whether the Federal Reserve System in the United States “has the power in a technical sense to

erence of commercial banks for excess reserves (i. e., reserves in excess of legally required reserves) or net excess reserves (i. e., free reserves, a net reserve surplus, or excess reserves less borrowing through the discount windows of Federal Reserve Banks), however, may also affect credit conditions and the rate of interest on trading in reserves⁵². In evaluating the effect of differential rates of change in bank reserves on the various sectors of the financial market, the prospect of shifts in banks' preferences for short-term securities in relation to size should be allowed for.

In the third of the above instances—that involving the flow of saving into investment—there is a good bit of direct investment (or use of internal sources of funds from a firm's point of view, for example). But some of the financing on expenditures for instrumental capital is external, taking place in the overall financial markets—i. e., the money, credit, and capital markets. Here, banks enter as suppliers (and possible assimilators) of a proportion of the new funds entering the loanable-funds market⁵³. Rates are set in the sense of a supply of and demand for funds as distinct from money-balances, the calendar of new issues of securities representing one aspect of the demand for funds. In this in-

crease the quantity of money at whatever rates—within reason, of course—it chooses". He views the money stock as depending on the reserve base or the volume of "high-powered or base money" and the simple money or credit multiplier. He then concludes (1) that the Fed can control the high-powered or base money, depending on the size of the marketable government debt, but (2) that efforts to increase the reserves may affect interest rates and the money (credit) multiplier via the time deposit drain and the ratio of excess reserves to deposit liabilities such that changes in the money stock approach or fall below zero as reserves increase. However, in the first instance, open market purchases that give rise to additional reserves need not be limited to government securities, and, in the second, the economic argument depends on considerations where, in principle, open market purchases increase reserves (i. e., the "high-powered or base money") and result in a decrease in the rate of interest in the short-run, with the latter decrease contributing to an increase in the time deposit preference (and, presumably, a decrease in the money stock). The latter argument is in contrast to the analysis running through the present paper, in that faster growth in the money stock contributes to higher interest rates or a mitigation of their decline by operating via imbalances in *desired* and *actual* balances.

On *Weintraub's* treatment of the question of the adequacy of the central bank's power, see *Robert Weintraub*, "The Stock of Money, Interest Rates and the Business Cycle, 1952-1964", *Western Economic Journal*, June 1967, pp. 257-262.

⁵² In applying such an analysis, for example, banks' preferences for a stock of excess free reserves over longer periods of time should be evaluated in relation to some other stock or flow indicator of the size of the banks in question, such as total credit or deposits. This is contrary to wide practice but it is in keeping with the notion that the burden or drain of debt on liquidity is relevant to size.

⁵³ On the *ex post* equality of saving and investment, the flow of saving into investment, and the role of commercial banks and financial intermediaries in expediting or controlling the flow, see *Frazer and Yohe*, *op. cit.*, pp. 309-316.

stance, too, an increase in the flow of bank credit into the market is supposed to contribute to the condition of credit ease, but the prospect of its doing so is exclusive of allowance for additional relationships and prospects. These include, in particular, the relationship between the flow of bank credit and the rate of change in the money stock, and the prospect that an increase in the rate of change in the money stock contributes to a further rise or lessening of a decline in the income velocity of money and interest rates, via the introduction of a dynamic property in the form of an imbalance between *desired* and *actual* money balances.

In view of what has been said about commercial banks entry into the loanable funds market, about the adjustment between *desired* and *actual* balances, about change in the money stock and interest rates, and about the simultaneous changes in the flow of credit and the rate of change in the money stock, the process by which the rate of interest becomes an indicator of credit conditions may be summarized thusly: an increase in the flow of bank credit tends to lower money market yields as banks acquire liquid assets; but the growth of the money stock accelerates too so as to mitigate a decline or contribute to a rise in long-term rates, expenditures, the income-money-stock ratio, the demand for loanable funds, and thus to credit conditions, via the demand side of the market.

The foregoing is simply a means of suggesting the absence of a causally linked sequence beginning with policy actions, such as the following:

$$\Delta \frac{1}{R_M} \frac{dR_M}{dt} \rightarrow \Delta \frac{1}{M} \frac{dM}{dt} \rightarrow -\Delta i \rightarrow \Delta \frac{1}{I} \frac{dI}{dt} \rightarrow \Delta \frac{1}{Y} \frac{dY}{dt}$$

where the arrows indicate causation, and where the members of the sequence are, respectively, changes in the rate of change in reserves, the rate of change in the money stock, the interest rate, the rate of change in investment expenditures, and the rate of change in income. In contrast to such linkages, the Federal Reserve or central bank is presently viewed as giving effect to member bank reserves through a combination of actions and inactions, and as having diverse influence on credit conditions. The analysis of these influences and conditions is complicated by developments on the demand side of the respective markets for funds and money balances, by allowances for special effects of changes in the rate of change in the money stock on imbalances between *desired* and *actual* balances, and by allowance for the rationale of parallel movements in income velocity and the rate of interest. In fact, the prior introduction of changes in the velocity of money and the rate of interest may be viewed as the introduction of dynamics that alter and distinguish the present analysis from the more conventional uses for comparative static methods.

Monetary policy, fiscal policy, and the independence of the central bank. The preceding measure and review of credit and monetary conditions (and policies) give the Federal Reserve or central bank responsibility both for its actions with respect to the use of its tools—open market operations and so on—and for the impact of other factors on the rate of interest. On the one hand, we have recognized responsibilities for contributing to the achievement of national economic goals, and we purport to approximate changes in credit and monetary conditions in terms of the average of the rate of change in the rate of interest and the rate of change in velocity. And, on the other hand, we have in effect recognized Federal Reserve responsibilities for countering or reinforcing the effects of some fiscal or tax measures by demonstrating the impact of some changes in tax measures (Sec. II) on interest rates and by defining credit conditions in terms of the rate of interest. Such a relationship of fiscal policy to monetary policy is emphasized by *Wilson*:

Just what should be included by the term “monetary policy” is exceedingly difficult to define. It might be extended to comprehend any action that is concerned to influence the volume and character of the flows of money and of money substitutes throughout the economy. On a strict interpretation, this would embrace much of fiscal policy also, since action concerned with the raising and expenditure of the public revenues obviously has monetary effects⁵⁴.

In addition to the general relationship of fiscal to monetary policy, there is a special kind of long-run relationship between fiscal (or fiscal and tax) policy and policy with respect to bank credit and the money stock, given the prospect of a secular rise in prices and the central bank’s assumption of price-level stability as an ultimate goal. Notably, the central bank can expand credit and money at faster rates and assure adequate growth of the banking sector without sacrificing price-level stability, if fiscal policy and moral suasion on the part of the executive branch of government assumes a larger part of the burden of controlling price-level increases and possibly assuring adherence to guidelines for wage increases⁵⁵. In the long run, bank credit and the money stock should grow at sufficient rates to assure the continued acceptance of bank deposits as money, and the avoidance of the acceptance by the public of other sorts of assets as money in view of the immense convenience and economy in using bookkeeping entries as money.

In the short run, in some instances such as that of the Federal Reserve in the United States, the monetary authorities have some special protection from political pressures in money and credit policy matters. This is provided by a form of independence within the structure of government, but, at the same time, it is

⁵⁴ See *Wilson*, op. cit.

⁵⁵ On moral suasion and the chief executive, see *J. T. Romans*, “Moral Suasion as an Instrument of Economic Policy”, *American Economic Review*, December 1966.

presently matched by a degree of responsibility implicit in the definitions of credit and monetary policy. On the one hand, given independence, the monetary authorities can pursue an unpopular cause, such as restricting the growth of bank credit, when the attainment of ultimate goals calls for the pursuit of such a cause, and, on the other hand, the definitions of credit and monetary policy imply a responsibility for reinforcing or offsetting effects on the rate of interest arising from other quarters⁵⁶. *Reuber* deals with both the political difficulties raised by independence and the justification for it:

Independence, apart from the political difficulties it raises, may create unnecessary additional conflicts among objectives and among instruments which means that a less favorable combination of objectives will be attained than in the absence of such independence. Independence can never improve on a fully coordinated approach to policy unless one is willing to assume that an agency having such independence is both willing and able to accept as one of its objectives *the goal of compensating for errors being made by other policy makers*⁵⁷ (italics added).

IV. Lags and Alternative Concepts of Monetary Policy

Possible lags in recognizing the need for and in effecting changes in monetary policy, on the one hand, and in the effects of changes in monetary policy, on the other, were outlined by *Milton Friedman* in a 1948 article⁵⁸. Since then—following the restoration of a flexible monetary policy in the United States in the early 1950's, and coinciding with the establishment of monetary commissions in the late 1950's and early 1960's—monetary policy lags have been widely discussed⁵⁹. The lags dealt with have included the *inside lag* and the *out-*

⁵⁶ Some analysts, as emphasized earlier, have dealt with monetary policy actions (see Sec. III, p. 16, n. 40) and taken a more restrictive view of monetary policy than that presented in the text. *Havrilesky*, for example, assumes as a criterion for selecting a preferred indicator of policy actions "that non-policy forces affecting it can be reasonably assumed to be known and compensated for by the policy maker". He says, "certain indicators, for example, for reserves, the money supply, and interest rates, are often strongly influenced by market forces which are not compensated for by policy action". Continuing, he says, the use of such indicators is inappropriate in his study. Instead, *Havrilesky* mentions adjusted total reserves as yielding the best results as the dependent variable in his "action function"—a function with measures for unemployment percentage, a price-level goal, income and balance of payments deficit (or surplus) as explanatory variables. The "action function" is said to relate a selected indicator of monetary policy action to explanatory variables that are thought to affect monetary policy. (*Havrilesky*, op. cit., pp. 299–303.)

⁵⁷ *Reuber*, op. cit., p. 41.

⁵⁸ *Friedman*, "A Monetary and Fiscal Framework for Economic Stability", op. cit., pp. 245–264.

⁵⁹ See, e.g., *Milton Friedman*, "The Lag in Effect of Monetary Policy", *Journal of Political Economy*, October 1961, pp. 446–447; *J. M. Culbertson*, "The Lag in Effect of Monetary Policy: Reply", *Journal of Political Economy*, October 1961, pp. 467–477,

side lag, where the *inside lag* consists of a *recognition* and *action lag*, i. e., the lag between the need for action and the recognition of this need and the lag between recognition of the need for action and the action. Overall, the *inside lag* is said to be implicit in estimates of "the time elapsing between changes in the indicators of a need for policy changes and the actual responses of policy"⁶⁰. Among the estimates of such a lag are those resulting from regressing single monetary policy indicators, such as the nominal stock of money, on indicators of economic performance, such as prices and the percentage of unemployment⁶¹. Some other estimates involve other methods, including the measurement of the average lag time between turning points in selected time series⁶².

J. M. Culbertson, "United States Monetary History: Its Implications for Monetary Theory", *National Banking Review*, March 1964, p. 374; *Thomas Mayer*, "The Inflexibility of Monetary Policy", *Review of Economics and Statistics*, November 1958, pp. 358-374; *William H. White*, "The Flexibility of Monetary Policy", *Review of Economics and Statistics*, May 1961, pp. 142-147; *Beryl Sprinkle*, "Monetary Growth as a Cyclical Predictor", *Journal of Finance*, September 1959, pp. 353-346; *Milton Friedman*, "The Supply of Money and Changes in Prices and Output", *The Relationship of Prices to Economic Stability and Growth: Compendium* (Washington, D.C.: U.S. Government Printing Office, March 1958), reprinted in *Edwin Dean*, ed., *The Controversy over the Quantity Theory of Money* (Boston: D.C. Heath and Company, 1965), pp. 88-107; *Johnson and Winder*, op. cit.; *Karl Brunner and Allan H. Meltzer*, "The Federal Reserve's Attachment to the Free Reserve's Concept" (Washington, D.C.: U.S. Government Printing Office, 1964), pp. 36-50; *John Kareken and Robert M. Solow*, "Lags in Monetary Policy", in *Commission on Money and Credit, Stabilization Policies* (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1963), pp. 14-96; *William G. Dewald and Harry G. Johnson*, "An Objective Analysis of the Objectives of American Monetary Policy, 1952-1961", *Dean Carson*, ed., "Banking and Monetary Studies" (Homewood, Illinois: Richard D. Irwin, Inc., 1963), pp. 171-189; *G. L. Reuber*, "The Objectives of Canadian Monetary Policy, 1949-1961: Empirical "Trade-offs" and the Reaction Function of the Authorities", *Journal of Political Economy*, April 1964; *Reuber*, "The Objectives of Monetary Policy", op. cit.; *Report of the Royal Commission on Banking and Finance* (Ottawa: Queen's Printer and Controller of Stationary, 1964), pp. 436-438, reprinted in *Ward*, ed., op. cit., pp. 345-348; *Patric H. Hendershott*, "The Inside Lag in Monetary Policy: A Comment", *Journal of Political Economy*, October 1966, pp. 519-523; *Mark H. Willes*, "The Framework of Monetary Policy: A Staff Analysis of the Federal Open Market Committee in its Conduct of Monetary Policy" (Washington, D.C.: U.S. Government Printing Office, for the Subcommittee on Banking and Currency, 1967); and *Dale W. Jorgenson and James A. Stephenson*, "The Time Structure of Investment Behavior in the United States, 1947-1960", *Review of Economics and Statistics*, February 1967.

See, also *Frazer*, *The Demand for Money*, op. cit., Chapters 9 and 10, and the works cited in those chapters.

⁶⁰ *Reuber*, *The Objectives of Monetary Policy*, op. cit., p. 143; *Johnson and Winder*, op. cit., pp. 116-117.

⁶¹ See *Dewald and Johnson*, op. cit.; and *Reuber*, *The Objectives of Monetary Policy*, op. cit.

⁶² See, e.g., *Friedman*, "The Lag in Effect of Monetary Policy", op. cit.

The *outside lag* is the lag in the effect of a change in policy. *Jorgenson* and *Stephenson* emphasize such a lag in their concern with the "time structure" of the relationship between investment behavior and its determinants⁶³. The time structure, in their analysis encompasses *the average length of the lag* between changes in a policy instrument and its effects, and the *form of the lag*—i. e., whether the lag is of the form of a geometric, Pascal, inverted-V, or some arbitrary lag distribution. On the length of the lag, they note that a long lag suggests a possibly adverse effect of an intended policy of stabilization on investment behavior. On the form of the lag, they note that a high concentration of effects in time calls for a precise control of the timing of policy measures, in the one instance, and a distribution of effects over very substantial periods of time calls for a less precise control, in the other.

Estimates of the presence of lags, moreover, are dependent on the use of definitions and the selection of indicators of changes. Earlier (Sec. II), the prospect of covariation in the income velocity of money and the rate of interest was introduced. Business conditions were then identified with changes in income velocity and the rate of interest, and, following this, definitions of credit and monetary conditions (Sec. III) were reviewed and equated with changes in the rate of interest. Consequently, viewing the change in business conditions as indication of a need for change in policy and viewing a change in policy as a change in credit conditions, analysis leads to the prospect of an inside lag time of approximately zero. Similarly, if we view cyclical changes in the rate of change in the money stock, with maximum rates occurring in an expansion phase of business activity and a minimum rate in a recession phase, and if we view an increasing (decreasing) rate as causing an increase (a decrease) in economic activity, then we are led to expect a relatively long lag in the effect of monetary policy.

The preceding results from a priori speculation are in accord with the results of several prominent studies of lags in policy. These are reviewed below, prior to the outline of the concept of a policy over a complete cycle of business conditions. Only brief mention is made, however, of a study relying primarily on results from regression analysis with lagged and other variables. Such studies have encountered a number of methodological difficulties, thereby reducing the reliability of estimates based on their results. These difficulties have included, primarily, the absence of true independence in the regression model⁶⁴, and the notion of a lag in the relation between a "dependent" and a

⁶³ *Jorgenson* and *Stephenson*, op. cit., pp. 16–27. Also on investment behavior see *William J. Frazer, jr.*, "Monetary Policy, Business Loans By Banks and Capital Outlays by Manufacturing Corporations", *Southern Journal of Business*, April 1968.

⁶⁴ See, e. g., the report on regression results and lagged relations in *Frazer*, *The Demand for Money*, op. cit., Chapters 9–10; and *Farrar* and *Glauber*, op. cit.; and in

given “independent” variable of a fixed (average) time dimension and “time shape” as distinct from, say, a lag distribution in which peakness and disbursement vary with time and with the extent of economic instability.

A zero inside lag. The prospect that changes in credit conditions coincide roughly with cyclical turning points is borne out by several analyses, including a *Brunner-Meltzer* analysis relating turning points in the United States to statements from the record of each meeting of the FOMC concerning credit ease and credit tightness in the 1952–62 period⁶⁵. Summarizing the results in one of their tables, they in effect say, the table suggests that the recognition and action lags are comparatively short, i. e., approach a zero inside lag. They also make a distinction between a *desired* change and an *actual* change and report on imbalances between these. The *desired* changes are determined from an examination of remarks in the record for each meeting of the FOMC and from a ranking of the desired changes in terms of a scale ranging from + 1 (decisive ease), to 0 (no change), to –1 (decisive tightening). An *actual* change is one occurring in some indicator for a change in policy—notably, in the *Brunner-Meltzer* analysis, a change in the moving average of free reserves⁶⁶.

Several aspects of their conclusions stand out: (1) no significant action lag occurs, given the indicator of a change in policy, (2) an *action lag* occurs between turning points and *desired* changes, and (3) at times *desired* changes are not noticeably reflected in the level of free reserves. The first of these suggest the tendency for changes in policy and business conditions, respectively, to coincide, as if they are related by definition. The other aspects of the conclusions probably reflect the irrelevance of *desired* changes when they involve an the case of the distributed lag model in particular, the presence of serial correlation is said to lead to inconsistent results, see *Griliches*, op. cit.

⁶⁵ See *Brunner and Meltzer*, “The Federal Reserve Attachment to the Free Reserve Concept”, op. cit.

⁶⁶ From their overall analysis, *Brunner and Meltzer* arrived at such specific conclusions as the following:

(1) “The moving average of free reserves is often an adequate guide to System policy and ... movements in the level of free reserves are often made in anticipation of decisions by the FOMC.”

(2) “At other times ... changes in desired policy are not noticeably reflected in the level of free reserves.”

(3) “The evidence suggests that the FOMC moves rather quickly at times of change in the direction of economic activity.”

(4) “On two of the three occasions when the economy turned toward recession, the ‘recognition lag’ was negative, when the economy turned toward recovery, the ‘recognition lag’ was longer, averaging 3 to 4 months.”

(5) “This longer lag [the latter 3 to 4 month lag] is most likely a reflection of the desire on the part of the FOMC to avoid stifling an incipient recovery.”

(6) “The ‘action lag’ ... is almost zero and often negative, if we choose the moving average of free reserves as the measure of the System’s policy.”

attempt to discriminate between a change in credit and business conditions⁶⁷ as if they were independent rather than simultaneous occurrences.

Others who have found a close relation between credit conditions and business conditions include *Dewald* and *Johnson*. They reported on regression results involving credit conditions (i. e., interest rate) variables and the money stock as alternative targets, the timing of changes in policy, and a variety of business conditions variables. They found a closer relationship between the credit condition and business conditions variables, including the percentage of unemployment, real GNP in billions of dollars, the consumer price index, and the balance of payments deficit. They concluded as follows:

The results of the two sets of monetary policy indicators—quantity of money, and money market conditions—do on the other hand conflict sharply with respect to the implied lag in the response of monetary policy to changes in the economic environment⁶⁷.

Continuing, they concluded:

The monetary authorities appear to react more quickly to changes in the environment if they are assumed to aim at controlling money market conditions than if they are assumed to aim at controlling the quantity of money. The former assumption is probably more consistent with generally accepted views of how monetary policy is conducted in practice than the latter, and adoption of it leads to conclusions about the flexibility of monetary policy much more flattering to the monetary authorities⁶⁸.

Quite possibly, as analysis in Section II suggests, changes in credit conditions (i. e., the rate of interest) are such a fundamental part of changes in economic activity that it is impossible in a properly functioning, peacetime, market economy to alter the timing of changes in interest rates in relation to changes in economic activity. Indeed, some analysis leads us to believe that what the central bank, or Federal Reserve in the United States, influences is changes in economic activity itself and that rates of interest are only one manifestation of those changes. What we suggest below is the concept of a stabilization policy over an entire cycle in which the central bank or Federal Reserve is determining within limits the timing of peaks and troughs in business conditions with the view to achieving national economic goals.

⁶⁷ *Dewald and Johnson*, op. cit., p. 187.

⁶⁸ *Dewald and Johnson*, op. cit., p. 189, and see also, p. 174.

Willes also found a close relationship. Using the interest rate as a measure of monetary conditions, *Willes*, in a staff study for the Committee on Banking and Currency, United States House of Representatives, concluded as follows:

They (Federal Reserve) regarded a cyclical peak as a signal to begin to ease monetary policy (during the 1952–1960 period). That is, they thought that a contraction in general economic activity should be countered by a stimulative monetary policy. They regarded a cyclical trough as a signal to begin to tighten monetary policy, accepting the idea that expansion in economic activity should be countered by a restrictive monetary policy. (*Willes*, op. cit., p. 2.)

A Friedman analysis of the effects of monetary policy. Friedman's analysis of the effects of monetary policy—and, in some instances, an analysis conducted with *Anna Jacobson Schwartz*—involves emphasis on special elements of monetary analysis, and an empirical study of cyclical changes⁶⁹. Reports on the latter have led some to conclude as follows⁷⁰: (1) That *Friedman's* reporting of cyclical patterns suggests a long *outside lag* in the effects of monetary policy; (2) that a change in monetary policy, as viewed by *Friedman*, is a change in the money stock; (3) that the lag in the effect of a change in the rate of change in the money stock is measurable, in an expansion phase of business conditions, from the peak rate of change in the money stock to the peak in business conditions.

Friedman does view changes in monetary policy in terms of changes in the rate of change in the money stock, as have others⁷¹, but the lag in the effect is not long⁷² as some assert. There is, however, a long lag when measured from peak rates of change in the money stock to their corresponding peaks in business conditions, on the average, but the analysis in this instance is of overall cyclical patterns of changes in economic variables rather than of a lag in the effect of a given change in the rate of change in the money stock. The overall cyclical analysis provides support, in *Friedman's* view, for stabilizing the rate of change in the money stock.

Elements of analysis emphasized by *Friedman* include the following: the notion of an imbalance between *desired* money balances and *actual* balances, such that an excess of the latter over the former gives rise to an increase in the velocity of money and so on; the notion that a prospective change in prices, as indicated by the rate of change in prices, affects interest rates and the cost of holding money, and the velocity of money; and that changes in the rate of change in the stock of money affect the balance (or imbalance) between *desired* and *actual* money balances, and the rate of change in prices.

⁶⁹ See *Friedman*, "The Lag in Effect of Monetary Policy", op. cit., pp. 446–447; *Allan H. Meltzer*, "Monetary Theory and Monetary History", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, December 1965, pp. 404–422; and *Frazer*, *The Demand for Money*, op. cit., pp. 139–185.

⁷⁰ *Kareken* and *Solow*, op. cit., pp. 14–18.

⁷¹ See *Johnson* and *Winder*, op. cit., p. 13.

⁷² *Friedman* views holders of money balances as being able to readily adjust their balances to a desired level by increasing expenditures (measured as the product of the average of prices and output) and pushing prices upward if necessary. The adjustment by holders of money balances to changes in the money stock and imbalances between *desired* and *actual* money balances is relatively rapid. (See *Milton Friedman*, "The Demand for Money: Some Theoretical and Empirical Results", *Journal of Political Economy*, August 1959, pp. 330–331.) *Allais*, too, assumes "that the discrepancy between the actual and desired value of money holdings is always relatively small". (See *Maurice Allais*, "A Restatement of the Quantity Theory of Money", *American Economic Review*, December 1966, pp. 1137–1138, pp. 1150–1151, p. 1154.)

Friedman begins by treating changes in the rate of change in the money stock because of their theoretical appeal. He says, for example, that it is "theoretically appealing to regard the 'normal' or secular monetary base around which cyclical fluctuations occur as described by a constant percentage rate of change in the stock of money and to regard changes in the percentage rate of change as the feature of monetary behavior that contributes to the generation of cycles". With respect to the role of the rate of change in prices, imbalances in *desired* and *actual* money balances, and further changes in prices, *Friedman* may be quoted as follows:

The percentage rate of change in prices itself is the opportunity cost of holding money rather than goods. An unanticipated change in the rate of change of the stock of money would then produce a deviation of the actual from the desired stock of money for two reasons: initially, it would make the actual stock deviate from the expected stock and therefore from the desired stock; subsequently, by altering the cost of holding money [presumably, via expenditures and further influence on prices], it would change the desired stock of money itself. These discrepancies will set up adjustments that may very well be cyclical, involving overshooting and reversal. It is therefore theoretically appealing to regard the 'normal' or secular monetary base around which cyclical fluctuations occur as described by a constant percentage rate of change in the stock of money and to regard changes in the percentage rate of change as the feature of monetary behavior that contributes to generation of cycles⁷³.

The *Friedman* results that some find "startling" are described by *Friedman* as follows:

If my conclusions about the independence and importance of money changes are valid—conclusions not themselves based primarily on observed timing relations—then monetary policy actions that produce a peak in the rate of change in the stock of money can be expected on the average to be followed by a peak in general business some sixteen months later partly because these same actions and their consequences will also produce a peak in the deviation of the money stock from its trend some eleven months later. The timing of the peak in the rate of change is not a full description of the behavior of the money stock; or of the effects of monetary policy on the money stock; it is rather one summary measure of that behavior and of those effects that have been found to have a consistent relation with the subsequent course of business. Presumably, one reason for this constant relation is because this feature of monetary behavior is consistently linked with other features, and one reason for variability in the relation is because these links are not rigid⁷⁴.

A principal conclusion of *Friedman's* in the context of his cyclical analysis of the lag between peaks (troughs) in the rate of change in the money stock and business conditions is the following:

⁷³ *Friedman*, "The Lag in Effect of Monetary Policy", op. cit., p. 455.

⁷⁴ See *Friedman*, "The Lag in Effect of Monetary Policy", op. cit., p. 457. The results are also described in a passage cited by *Kareken* and *Solow* (see *Kareken* and *Solow*, op. cit., p. 14), and "The Supply of Money ..." in *Dean*, ed., op. cit., pp. 98–99. See, also, on

Changes in the behavior of the stock of money (A) exert an important independent influence on the subsequent course of events with a lag that is (B) on the average sizable and (C) highly variable, relative to the usual length of cyclical movements⁷⁶.

Part A of the conclusion is developed as follows:

The direction of influence between the money stock and income and prices is less clear-cut and more complex for the business cycle than for the longer movements [i. e., secular movements]... Thus changes in the money stock are a consequence as well as an independent cause of changes in income and prices, though once they occur they will in their turn produce still further effects on income and prices.

The two-way causation, *Friedman* says, is "one reason why the lag in the effect of monetary action might be expected to be long and variable"⁷⁶. However, the money stock change is considered largely independent and free of two-way causation, as would be consistent with holding the Federal Reserve responsible for it. On this point, *Friedman* says, "there are numerous episodes for which it is crystal clear that the factors producing the changes in the stock of money were predominantly independent of the contemporaneous or prior course of business, except as there may have affected the actions of monetary authorities..."⁷⁷.

The two-way causation has to do with the effect of the rate of change in the money stock on the flow of money expenditures and prices and then the feedback effect on the imbalance between the *desired* and *actual* money stocks as the rate of change in prices is interpreted as the expected rate of price rises. *Friedman* in the latter respect, says: "A feedback from business conditions to money means further indirect effects as the induced changes in money exert their influence in turn." He says, continuing, "the more important the feedback, the larger will be these indirect effects and the longer, and presumably also the more variable, will be the average lag between a monetary adjustment and the whole of its effect"⁷⁸.

Parts B and C of *Friedman's* conclusion, lead him to deal with the difficulty of anticipating developments a year or so ahead, as would be required for effective stabilization. Alternative analysis (Sec. II) suggests that imbalances in the *desired* and *actual* money stocks may arise from sources other than changes in the rate of change in the money stock. In this context, discretionary changes in

the cyclical pattern of the rate of change in the money stock, *Milton Friedman* and *Anna J. Schwartz*, "Money and Business Cycles" Review of Economics and Statistics, Supplement, February 1963, pp. 35-38.

⁷⁶ See *Friedman*, "The Lag in Effect of Monetary Policy", op. cit., p. 449.

⁷⁸ *Friedman*, "The Lag in Effect of Monetary Policy", op. cit., p. 449.

⁷⁷ *Friedman*, "The Lag in Effect of Monetary Policy", op. cit., p. 450.

⁷⁸ *Friedman*, "The Lag in Effect of Monetary Policy", op. cit., p. 449.

the rate of change in the money stock may be desirable as a means of counter-ing destabilizing imbalances in the *desired* and *actual* stock of money⁷⁹.

The concept of a policy over a cycle. As introduced in Section II, average growth rates in stock and flow variables provide the base around which cyclical fluctuations or changes in economic or business conditions occur. These changes in business conditions coincide with changes in the rate of interest and the income velocity of money, reflect adjustments in response to imbalances in *desired* and *actual* money balances, and reflect adjustments in various classes of assets (and liabilities) via differential rates of changes in the respective classes in response to the impact of outside factors on the prospective returns from the alternative classes of assets. The outside factors involve the determination of the rate of change in the money stock, some shock effects in forms such as a change in the tax credit, and others contributing to degrees of certainty about the future, price-level changes and so on. *Friedman* emphasizes the rate of change in prices as the major determinant of the "opportunity cost of holding money" and changes in the velocity of money and the rate of expenditures on goods and services. Also, an increase in the rate of change in prices, or the prospect of a rising price level, is mainly the result of a rise in the rate of change in the money stock.

The present analysis allows for a wider variety of factors impinging on expectations. It implies that they be treated more systematically in monetary analyses, that monetary policy and the responsibilities of officials be viewed broadly so as to encompass allowances for shock effects, responses to exogeneous factors, and the role of policy inactions as well as actions. The prospect of price-level changes, as distinct from changes in the value of additions to alternative classes of assets, are not the only prospective changes that can give rise to changes in business conditions, as some analyses imply. Consequently, business conditions

⁷⁹ This, *Friedman* does not entirely approve of. He makes two points:

First, discretionary policy at times tends to be dominated by goals other than, and even contrary to stabilization (for example, pegging bond yields, halting gold flows), whereas the automatic framework cannot be so readily exploited for other purposes. Second, the inertia and the political considerations...that inhibit the ready reversal of discretionary policies when they turn out to be in the wrong direction make for a longer lag than would otherwise exist between the recognition of the need for action and the taking of action and introduce much higher serial correlation into perverse automatic reactions. (See *Friedman*, "The Lag in Effect of Monetary Policy" op. cit., p. 466).

Elsewhere, *Friedman* says "the major argument for the rule has always seemed to me to be far less that it would moderate minor cyclical fluctuations than that it would render impossible the major mistakes in monetary policy that have from time to time had such devastating effects". (See *Friedman*, "Interest Rates", op. cit., p. 84.) For a review of major mistakes in policy in the late 1920's and early 1930's, and some additional asides on a rule in the form of the quantity of money, see *Friedman*, "The Monetary Theory and Policy", pp. 1-13.

are subject to change, exclusive of changes caused by changes in the rate of change in the money stock, and the monetary authorities are left with something to stabilize, even if they were to effect a constant growth rate in the money stock.

As factors have differential effects on alternative classes of assets and on the value of goods and services, differential changes occur in the rates of change in the various classes of assets, i. e., in terms of changes in business conditions. For some institutions, such as banks, these changes occur in various time-to-maturity classes of debt type assets (Sec. III) and between loans and investments, with the flow of business loans by banks depending more on business conditions than on the liquidity of commercial banks. For non-financial business firms relative changes in asset and liability accounts involve broader classes — the fixed-claim type of assets and liabilities such as government securities and bank loans, and the residual claim type of assets such as plant, equipment, and inventories⁸⁰.

The balance sheet changes involve, in broad outline, declining rates of change in the more liquid classes of assets and rising rates in other classes of balance sheet accounts in the expansion phase of business activity. Approaching an upper turning point a liquidity crisis in effect takes place, and a shift into liquidity occurs, following a period involving some involuntary expenditures for goods under contract and on order. The declining phase of business activity, moreover, is a re-adjustment phase. The liquidity of business firms, however, is also related to planned capital expenditures in the early phase of expansion⁸¹. Whenever rates of change in the various classes of assets and liabilities deviate from sustainable trend rates, by the definition of sustainable rates, adjustments must occur. The more extreme the deviation of the rates of change from the sustainable rates, the more extreme the required and ensuing adjustments.

In the present analysis, the role *Friedman* attributes to the rate of change in the money stock is present, except it is not the only factor affecting business conditions. Consequently, a stabilizing influence can still be exercised by the Federal Reserve on business conditions. It can do this by attempting to bring about sustainable rates of growth in a variety of classes of assets, liabilities, and expenditures on the current output of goods and services, and by attempting to counter changes in the various rates of change as they deviate from sustainable rates. Changes in the rates of change in bank credit and the money stock are means of influencing rates of change in other variables. Credit conditions are simultaneously both the result of changes in the rate of change in the money stock, changes in the flow of bank reserves, and the changes on the demand

⁸⁰ See *Frazer*, *The Demand for Money*, op.cit., Chapters 7 and 8; and *Frazer*, "Monetary Policy", op.cit.

⁸¹ See *Frazer*, "Monetary policy", op.cit.

side of the market for credit. The latter flows are working simultaneously and in opposition at times, in the sense that an increase flow of credit tends to contribute to credit ease, and an increase in the rate of change in the money stock contributes to credit tightness, by increasing the flow of bank credit demanded. The interacting nature of these diverse influences poses one obstacle to separating and isolating causal sequences or "linkages" with classical, multivariate statistical methods. It is also a likely source of the difficulty in relating aggregate monetary policy measures to money market conditions in the FOMC's directive to the manager of the open market account at the Federal Reserve in the United States. We have—instead of sequences of linkages emanating from changes in money or credit alone—a process of interacting causes and effects with the Federal Reserve simultaneously influencing credit and business conditions. There is little wonder that the *inside* policy lag has approached zero, in view of the strong relationship between credit and business conditions⁸², and in view of the historical tendency for the Federal Reserve to focus on credit conditions as a means of countering changes in business conditions⁸³. According to *Brunner and Meltzer*, "in the case of an onsetting recession the Federal Reserve observes the rapid upsurge of free reserves and feels that it has pursued a 'stimulative policy' ". It has, they say, "become aware of the change in circumstances and adjusted the prevailing policy posture according to its own conceptions"⁸⁴.

Suggested decision rules. The above review and earlier analysis brings out certain rules for stabilizing business conditions and suggest a rather direct relationship between instructions to the manager of the open market account and the ultimate goals of the Federal Reserve. Examples of rules that follow from prior analysis include the following: (1) To accelerate an expansion (contraction) of business activity, the rate of interest should be reduced further below (raised above or further above) the rate expected to prevail in the future (i. e.,

⁸² This relationship between credit and business conditions was initially emphasized in the following article: *Frazer*, "The Demand for Money, Statistical Results and Monetary Policy", op. cit., pp. 11–29.

⁸³ *Willes*, for example, reports as follows:

The reasons given by the Federal Reserve for regarding a cyclical trough as a signal to begin to tighten monetary policy is that if it did not move quickly to begin to restrain monetary policy once an expansion of economic activity was underway, inflation would develop that would lead to an economic "bust" and a recession of major proportions. The research staff of the Board of Governors stated the view quite clearly when it said that the monetary authorities "in recoveries should begin early to reimpose restraints in order to avert emergence of an inflationary spiral that might intensify ensuing boom and subsequent recession". (*Willes*, op. cit., p. 6.)

⁸⁴ See *Brunner and Meltzer*, The Federal Reserve's Attachment to the Free Reserve Concept, op. cit., p. 45.

the "normal" rate); and (2) constrain an expansion in business conditions as a means of sustaining the expansion, mitigating the duration of the succeeding adjustment, and overall mitigating the variance of changes in rates of change about their trend values⁸⁵.

Changes in the flow of credit and the rate of change in the money stock are means of achieving conditions implied by rule 1 — i. e., of changing credit conditions and the interest rate structure (or the slope and position of the familiar yield curve)⁸⁶. Expanding the flow of bank credit tends to lower rates of interest via the impact on the supply of loanable funds, but the accompanying increases in the money supply mitigate any declining tendency in interest rates or contribute to a rise by operating on the imbalance in *desired* and *actual* money balances. This operation on the imbalance mitigates declines or contributes to an acceleration and the prospect of acceleration in the flow of expenditures for current output. It also increases or mitigates the decline in the demand for funds. Here, then, we in effect introduce a combination of changes in bank credit, the money stock and expectations that are reflected in and contribute to changes in the shape and position of the yield curve or more simply in the spread between the yield on long- and short-dated securities of a comparable type. Along lines similar to those outlined in relating probabilities to the liquidity preference demand for money⁸⁷, a widening (narrowing) spread between long- and short-term yields may be said to reflect an increasing (decreasing) subjective probability of a future rise (decline) in the rate of interest. The short-dated securities

⁸⁵ This notion of mitigating an adjustment following a period of tight credit appears to be related to Mayer's concepts of the "balancing point" and the "compensation point". (See *Mayer*, op. cit., p. 371.) *Mayer* emphasizes that "in the early months of the easy money (credit) policy, it has as yet little effect on income, the main monetary influence is still the 'tailing off' of the tight money policy". Eventually a "balancing point is reached". *Mayer* calls it the point at which the effect of the previous tight credit conditions are just offset by the effects of the easy credit conditions. From the "balancing point" on the easy credit conditions have the greater effect, but "more time must pass until the damage done in previous months has been made up". The latter point is called the "compensation point". As *Mayer* points out, and as would be consistent with the present emphasis on an adjustment phase and the concept of a policy over some time dimension such as a cycle, "a monetary policy may be quickly reversed" although "its effects may not". *Mayer* (op. cit., pp. 372-374) cites measurement procedures suggested by *Friedman* for dealing with unstabilizing aspects of lags in the effects of policy. On the subject of this note see, also, *White*, "The Flexibility of Anticyclical Monetary Policy", op. cit., pp. 142-147.

⁸⁶ The yield curve, of course, simply results from fitting a line or curve to a scatter of coordinates (points) consisting of yields and the corresponding maturities for debt instruments that differ primarily with respect to time to maturity.

⁸⁷ See *William J. Frazer, jr.*, "Some Comments on Professor Ritter's Interpretations of Keynes and Changes in Income Velocity", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, March 1963, pp. 70-73.

provide some marginal degree of protection from the loss of a decline in bond prices in the event of a rise in the rate of interest, or more specifically an upward movement in the yield curve, and long-dated securities provide the best prospect of a speculative gain in the event of a rise in bond prices (and a decline in yields).

Expectations and the prospect of varying the composition of a portfolio of debt-type assets are mentioned, but we are interested, especially, in credit conditions and in business conditions and capital expenditures, say, by business firms. The connection is twofold: changes in the yield spread and the rate of interest parallel one another over time (or more specifically, the long-rate-minus-the-short-rate spread varies inversely with the rate of interest) and thus the yield spread serves as a substitute indicator of credit conditions; and the relevant expectations of the respective decision making groups are viewed as responding to the same changes in the setting, as emphasized elsewhere⁸⁸.

As a process of accelerating the growth of credit and the money stock continues and as long as current interest rates are rising—as a result of increasing expenditures and demand—for funds, the credit policy is one of increasing tightness. At some point beyond the normal level of interest rates, readjustments must occur and the reverse of the tight credit conditions set in. Following the analysis running throughout this paper, tightness beyond the normal level, viewed as a subjective probability, cannot be sustained indefinitely. In effect the cyclical peak level of interest rates occurs in response to decreases in the flow of credit and the accompanying changes in the money stock or, subsequently, under the weight of conditions that cannot be sustained in any event. Furthermore, imbalances and adjustments are stated in terms of differential rates of change in selected stock and flow variables, and the latter changes may involve sets of lagged relationships between selected time series.

Monetary operations and ultimate goals: a suggestion. A suggestion with respect to instructions to the manager of the open market account follows from various themes of this paper. They relate to the broader aspects of monetary policy and the responsibilities of the monetary officials. The several themes include: parallel movements in the rate of interest and the velocity ratio; the quantification of the notion of changes in credit conditions; and the tendency toward a zero lag in the recognition of the need for and implementation of credit policy, given the rate of interest as an indicator of credit conditions. Attributing quantitative meaning to the notion of credit conditions appears to be consistent with traditional usage. Furthermore, the tendency toward a zero *inside lag*, as revealed in independent studies, would seem to support the use of the velocity ratio as an indicator of business conditions and the use of the rate of interest as an indicator of credit conditions, all as emphasized in terms of

⁸⁸ See Frazer, "Monetary Policy", op.cit.

analysis. Empirical support for the relationship between the velocity ratio and the rate of interest is mentioned elsewhere⁸⁹.

The use of the interest rate as a measure of credit conditions might appear to require some qualifying statements about long- and short-term rates, but the effects of changes in the flow of credit possibly occur in the loanable funds market generally and on the demand side of the market, via influences on expectations about price levels, returns on capital outlays, and interest rates. The prospect that effects occur via the latter route is consistent with conclusions in selected empirical studies of the term structure of interest rates. Apparently, expectations remain the foundation of changes in the term structure of interest rates⁹⁰.

Characteristically the Federal Reserve's (or FOMC's) directive to the manager of the open market account has included instructions about money market and credit conditions, and, more recently, some aggregative measures for bank credit and deposits as well. It is suggested, then, that such instructions could be broadened to include an instruction about long-term rates and the income velocity of money, as well as about short-term rates. The instruction would, consequently, include the desired expenditure or income level (i. e., the product of the average of prices and current output) as the numerator for the income velocity of money, and, thus, given the relationship between velocity and the rate of interest, it would also include a money supply target. Or alternatively, to the extent that credit conditions and money supply targets are included, an income target is implied in terms of the velocity-interest rate association, even though actual income data are available only on a quarterly basis. The money supply and income targets would, in effect, be achieved as a result of achieving the long-term, interest rate target. The mid-1967 instructional framework could be expanded and enlarged—for example, allowances may be made for the effect of changes in the rate of interest on time deposits relative to other rates and for differential rates of change in the credit and money stock variables, re-

⁸⁹ See *Frazer*, "The Demand for Money", op. cit., pp. 11–29.

In reviewing some of his own articles, and work by others on the velocity-interest rate association, *Warburton* concluded:

The evidence adduced by various writers that velocity variations are causally related, as a dependent variable, to variations in the rate of interest or the cost of holding money, have not seemed to me convincing (except to a degree that is negligible with respect to business-fluctuation theory), and my own re-examination of the relation of circuit velocity to the rate of interest, for the 1919–64 period, has not led to alteration of opinions expressed in articles reprinted in this book.

See *Clark-Warburton*, *Depression, Inflation, and Monetary Policy: Selected Papers, 1945–1953* (Baltimore: The Johns Hopkins Press, 1967), p. 15.

⁹⁰ See, e.g., *John H. Wood*, "The Expectations Hypothesis, the Yield Curve, and Monetary Policy", *Quarterly Journal of Economics*, August 1964, pp. 457–470. See e.g., *Modigliani and Sutch*, op. cit., pp. 178–197; and *Michael J. Hamburger and Cynthia M. Latta*, "The Term Structure of Rates: Some Additional Evidence", revised ver-

spectively. Even so, in an analytical sense we have currently brought ultimate goals to the operating level.

V. Summary

In the monetary policy area of study, questions arise about the definition of the term "monetary policy", about the *lag* in recognizing the need for and in effecting a change in policy, about the *lag* in the effect of a change in policy, and about the traditional emphasis by central bankers on conditions of the credit and money markets as distinct from the relationship between central-bank operations and ultimate economic goals. Defining "monetary policy" is more than an idle exercise, however, since the definition one adopts affects his views about lagged relations and other matters, including the way monetary policy relates to factors affecting interest rates other than changes in the rate of change in the money stock. Studies attaching a conventional meaning to the term "monetary policy"—as, say, a synonym for "credit policy"—reveal an *inside lag* of approximately zero. Other studies—most notably, by *Milton Friedman*—focus on the rate of change in the money stock and find a long lag in the effect of policy. In measuring the lag in the effect of policy *Friedman* considers the time dimension between extreme values for the rate of change in the money stock and their corresponding turning points in business conditions. A change in the rate of change in the money stock—operating via imbalances between *desired* and *actual* money balances and adjustments in responses to imbalances

sion of a paper presented at meeting of the Federal Reserve System's Committee on Financial Analysis in Richmond, April 17, 1967. Some relevant conclusions from the *Modigliani-Sutch* paper (op.cit., p.196) are:

1. The expectation model can account remarkably well for the relation between short- and long-term rates in the United States...
2. There is no evidence that the maturity structure of the Federal debt, or changes in this structure, exert a significant, lasting or transient, influence on the relation between the two rates.

A relevant conclusion of the *Hamburger-Latta* paper is that "the effects of monetary operations undertaken in either Treasury bills or long-term bonds will be transmitted to the other end of the yield curve fairly promptly and in a predictable way".

Malkiel reviews the literature on the term structure of interest rates, presents a bibliography of that literature (exclusive of the *Hamburger-Latta* paper), advances an alternative formulation of the expectations theory, and presents a synthesis of different theories. He reports that expectations remain the foundation of an overall theory of the determination of the rate structure, although "exogenous" changes in the relative supplies of debt instruments of different maturities may effect the term structure. See *Burton Gordon Malkiel*, *The Term Structure of Interest Rates: Expectations and Behavior Patterns* (Princeton, N.J.: Princeton University Press, 1966). See, also, *Dudley G. Lockett*, "Multi-Period Expectations and the Term Structure of Interest Rates", *Quarterly Journal of Economics*, May 1967, pp. 321-329.

—has a rather rapid effect on expenditures and prices in *Friedman's* analysis, as in others, but *Friedman's* view of the *lag* in the effect of monetary policy involves a broader concept of policy.

In some instances, credit and monetary policies have been distinguished where the former refers to the conditions surrounding the cost and availability of bank credit and the latter to the rate of change in the money stock in relations to the rate of change in income. Here we focus on the tendency for the rate of interest and the income velocity of money to vary directly over time, on the one hand, and for the two to vary directly in analytical contexts, on the other—all responding similarly to changes in the same sets of conditions, tax factors, other factors affecting the degree of certainty about the future, and so on. Indeed, viewing differential rates of change in stock and flow variables as giving rise to interest rate and velocity changes and as giving rise to fluctuations about secular changes, the changes in the interest rate and velocity are viewed as indicators of changes in credit and business conditions. Adopting the common definition of “credit conditions”, then, credit conditions (as indicated by the rate of interest) are related to business conditions (as indicated by the velocity of money). We, in effect, have different names for similar phenomena. As a simple first approximation the analysis leads us to view a percentage change in credit and monetary conditions as the average of the growth in the interest rate per annum and the growth in velocity per annum. This constitutes a quantitative measure for changes in credit conditions at a high level of abstraction, emphasizes that credit conditions are strongly affected by business conditions, and suggests that central-bank concern over a point of entry in any single sector of the overall financial markets is likely of secondary importance, as far as credit (monetary) policy per se is concerned.

In introducing central-bank operations, we deal with credit conditions and changes in bank credit. These are—with allowance for selected drains and changes in bankers' preferences for reserves—directly related to changes in the money stock. The effects of the one, however, are directly the opposite of the effects of the other. An increase in the flow of bank credit is traditionally and correctly viewed analytically, at least, as contributing to credit ease. An increase in the rate of change in the money stock—operating via an imbalance between *desired* and *actual* balances—on the other hand, mitigates any decline in the rate of interest or accelerates its rise, depending on whether the rate is rising or declining. At times of rising rates *actual* balances exceed *desired* balances. Credit is tight; it is in demand. But credit is being sought as a liability from the point of view of the borrower rather than as a means of increasing the stock of money balances in relation to income.

The effects of related changes in the flow of credit and the money stock are apparently different and operating at the same time. Analyses by policymaking

personnel that emphasize one, and de-emphasize the other are unlikely to contribute to the achievement of desired objectives. Viewing the interrelationships between changes in the flow of credit and changes in the income velocity of money, however, the possibility of including velocity targets along with credit conditions targets in the directive for operating personnel of the central bank becomes apparent, and in effect suggests a source of difficulty in attempting to directly relate single monetary measures to money market conditions. Further, a suggestion is in effect made for bringing ultimate economic goals to the level of central bank operations. The goals are implicit in the numerator of the velocity measure. We have, also, set forth the concept of a policy over a complete cycle, and suggested rules for use in implementing such a policy, all with the view to stabilizing changes or otherwise maximizing employment production and purchasing power over the cycle.

