

## Some Issues in Monetary Economics (\*)

### Introduction

Basic issues in monetary theory are being debated at the present time, and increasing attention is now being directed to the following rather technical questions: Can the central bank control the (nominal) money stock within fairly close limits, or should we adopt the analytically more complete (and neutral) approach of the large scale econometric models and treat it as an endogenous variable? Can the central bank implement its policy decisions and calibrate its actions by means of an interest rate criterion — expressed in money market variables — or would it do better to use one of the monetary aggregates as an indicator and target for monetary policy? (1) Can

(\*) Financial support by the National Science Foundation and Wayne State University is gratefully acknowledged.

(1) See W. DEWALD, "Money Supply vs. Interest Rates as Proximate Objectives of Monetary Policy", *National Banking Review*, June 1966; P. CAGAN, "Interest Rates vs. the Quantity Theory: The Policy Issues" and L. GRAMLÉY, "The Informational Content of Interest Rates as Indicators of Monetary Policy" in *Proceedings: 1968 Money and Banking Workshop*, Federal Reserve Bank of Minneapolis, May 1968; M. FRIEDMAN, "The Role of Monetary Policy", *American Economic Review*, March 1968; P. HENDERSHOTT, *The Neutralized Money Stock* (Irwiln, 1968); the Joint Economic Committee Hearings on *Standards for Guiding Monetary Action* (Washington, 1968); D. I. FAND, "Comment: The Impact of Monetary Policy in 1966", *Journal of Political Economy*, August 1968; the House Committee on Banking and Currency *Compendium on Monetary Policy Guidelines and Federal Reserve Structure* (Washington, 1968); T. MAYER, *Monetary Policy in the United States* (Random House, 1968).

See also A. J. MEIGS, "Financial Stability and Inflation", *Bankers Magazine* (London, February 1969); A. J. MEIGS, "The Case for Simple Rules", and L. GRAMLÉY, "Guidelines for Monetary Policy - The Case Against Simple Rules", presented at the Financial Conference sponsored by the National Industrial Conference Board, February 21, 1969; A. MELTZER, "Controlling Money" in the May 1969 *Review* of the Federal Reserve Bank of St. Louis; L. C. ANDERSEN, "Money and Economic Forecasts", and E. M. GRAMLICH, "Complicated and Simple Approaches to Estimating the Role of Money in Economic Activity", forthcoming in *Business Economics*; K. Brunner (ed.), *Indicators of Monetary Policy*, forthcoming; and L. C. ANDERSEN, "The Influence of Economic Activity on the Money Stock: Some Additional Evidence", August 1969 *Review* of the Federal Reserve Bank of St. Louis.

For an interpretation of the Federal Reserve's money market strategy — the strategy encompassing *instrument variables* (e.g., open market operations), *money market variables* (e.g., free reserves) and *monetary variables* (e.g., the monetary aggregates) — and an inter-

the central bank lower (or raise) market interest rates if such a change is thought to be desirable? (2) And can the authorities better the stabilization performance of recent years by giving more emphasis to the behaviour of monetary aggregates? (3)

The growing interest among monetary theorists in defining instrument and policy variables that are genuinely exogenous, and in developing indicators, targets, and operating guides for the monetary authorities, reflects the sharply different views of monetary policy and its role in recent stabilization policy: Is the post-1965 inflation a monetary phenomenon resulting from the extraordinary expansion in the monetary aggregates, or is it primarily due to an excessively lax, and inappropriate, fiscal policy? (4) Does the theory of fiscal policy (and its calculated multipliers) often assume an elastic, permissive, or accommodating monetary policy, and does it therefore fail to distinguish between a pure fiscal deficit excluding any money stock effects, and an increase in the monetary aggregates accompanied by a fiscal deficit? (5) Is the transmission mechanism as conceived

pretation of the *proviso clause* as a device for correcting errors in the projected relation between money market variables and the monetary variables, see the recent paper by Governor SHERMAN MAISEL, "Controlling Monetary Aggregates" (June 4, 1969). See also J. M. GUR-TENTAG, "The Strategy of Open Market Operations", *Quarterly Journal of Economics*, (February, 1966).

(2) The hearings in March and April of the U.S. Senate Committee on Banking and Currency on *High Interest Rates* (Washington, 1969) were directed at the causes of high and rising market interest rates, and the extent to which they could be influenced by the central bank.

(3) For an articulate and influential statement of the fiscal policy approach to stabilization emphasizing discretionary changes in the full-employment surplus, see W. W. HELLER, *New Dimensions of Political Economy* (Norton, 1966). The key stabilization role assigned to changes in the full-employment surplus is critically reviewed by G. Terborgh in his *The New Economics* (Washington, 1968). For a discussion of the stabilization roles to be assigned to monetary and fiscal policy see the Friedman-Heller dialogue, *Monetary vs. Fiscal Policy* (Norton, 1969).

(4) See D. I. FAND, "The Chain Reaction-Original Sin (CROS) Theory of Inflation", *Financial Analysts Journal* (July 1969), and his "A Monetary Interpretation of the Post-1965 Inflation in the United States", this journal (June 1969), and especially Section I, "Has Monetary Policy Been Tight Since 1965?", pp. 103-106; and the testimony by Chairman Martin (Board of Governors) and Chairman McCracken (Council of Economic Advisers) in *High Interest Rates*, pp. 6-41.

(5) See L. C. ANDERSEN and J. JORDAN, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization", November 1968 issue of the *Review*, Federal Reserve Bank of St. Louis; the *Comments* by F. De Leeuw and J. Kalchbrenner, and *Rejoinder* by Andersen and Jordan in the April 1969 *Review* of the Federal Reserve Bank of St. Louis; M. E. LEVY, "Monetary Pilot Policy, Growth and Inflation" and W. LEWIS, "Money is Everything Economics - A Tempest in a Teapot" in the *Conference Board Record* for January and April 1969; R. G. DAVIS, "How Much Does Money Matter? A Look at

in the income-expenditure models a valid one, or may changes in the nominal money stock *directly* affect private expenditures, aggregate demand, and price levels? (6) And should stabilization policy continue to stress temporary changes (discretionary or automatic) in the full-employment surplus, as if it were the ultimate weapon, in light of our recent experience? (7)

In this paper we take up some of these issues. We first consider whether the central bank can actually control the money stock. One may grant, of course, that the money stock can be controlled within fairly close limits and still favor an interest rate criterion for policy; nevertheless, many of the policy differences can be traced to differences concerning technical feasibility. We then consider whether changes in the (nominal) money stock are identifiable with changes in real cash balances, and whether movements in *market* interest rates adequately reflect movements in *real* rates. The third question that we take up concerns the analytical structure and policy implications of the non-monetary theories of the price level.

The fourth and final question is: How do we define, and measure, the monetary and fiscal effects that follow a particular policy? Thus, consider a tax cut and an accommodating monetary policy which attempts to keep interest rates stable: the monetary and fiscal policy changes may be judged as *independent* events, and the rise in GNP attributed solely to fiscal policy, if monetary policy is defined in terms of interest rates, or as *complements*, and the rise in GNP attributed to monetary expansion, if monetary policy is

Some Recent Evidence", in the June 1969 *Monthly Review*, Federal Reserve Bank of New York; and L. C. ANDERSEN, "The Influence of Economic Activity on the Money Stock: Some Additional Evidence", *op. cit.*

(6) The transmission mechanism in aggregative models views interest rates as an *indicator* of monetary policy, as a *measure* of the cost of capital, and as a key element in the transmission mechanism. For a criticism, see D. I. FAND, "Comment: The Impact of Monetary Policy in 1966", *op. cit.*, especially Section II, "The Role of Interest Rates", pp. 825-830; "A Monetary Interpretation of the Post-1965 Inflation in the United States", *op. cit.*, especially Section II, pp. 106-113, and Section IV, "Market Interest Rates (Conventional Yields) or Prices (Implicit Yields)", pp. 116-119; and "Keynesian Monetary Theories, Stabilization Policy, and the Recent Inflation", *Journal of Money, Credit and Banking*, August 1969, especially Section IV on "Keynesian Theories of Money and Interest Rates". See also G. G. KAUFMAN, "Current Issues in Monetary Economics and Policy: A Review", Bulletin #57, *N.Y.U. Institute of Finance*, May 1969.

(7) The symposium volume *Fiscal Policy and Business Capital Formation* (Washington, 1967) contains several valuable papers on this subject. See especially the papers by P. W. McCracken, C. L. Harris, S. Fabricant, and R. A. Musgrave, and the comments by G. Heberler and N. Turc. See also H. STEIN, "Unemployment, Inflation and Economic Stability" in K. Gordon (ed.), *Agenda for the Nation* (Brookings, 1968).

defined in terms of money stock behavior. The theory of fiscal policy and of the multiplier must separate out the *ceteris paribus* effect, excluding monetary effects, from the *mutatis mutandis* effect, including both monetary and fiscal effects; and it must consider alternative formulations of the *ceteris paribus* fiscal effect to distinguish the monetary effects defined by market interest rates, from the monetary effects defined by the monetary aggregates.

### l. Can the Central Bank Control the Nominal Money Stock

The money stock at any moment in time is the result of portfolio decisions by the central bank, by the commercial banks, and by the public (including the non-bank intermediaries) (8); the central bank determines the amount of High-Powered Money or Monetary Base (M.B.) — i.e., currency plus bank reserves — that it will supply (9); the commercial banks determine the volume of loans and other assets that they will acquire, and the quantity of reserves they will hold as excess (and free) reserves; and the public determines how to allocate their holdings of monetary wealth among currency, demand, time and savings deposits, CD's, intermediary claims, and other financial assets. The money stock that emerges reflects all these decisions.

It is a natural question to consider whether the central bank, by controlling the monetary base, can actually achieve fairly precise control over the money stock. This depends on whether the link between (M.B.) and bank reserves, and between bank reserves and the money stock — *the (M.B.) — bank reserves — money stock*

(8) For a discussion of the determinants of the money supply see M. FRIEDMAN and A. SCHWARTZ, *A Monetary History of the U.S. 1867-1960* (Princeton, 1963), Appendix B on "Proximate Determinants of the Nominal Stock of Money"; P. CAGAN, *Determinants and Effects of Changes in the Stock of Money 1875-1960* (Columbia University Press, 1965), Chapter I on "The Money Stock and its Three Determinants"; K. BRUNNER, "A Schema for the Supply Theory of Money"; *International Economic Review*, January 1961; D. I. FAND, "Some Implications of Money Supply Analysis", *American Economic Review*, May 1967.

(9) The high-powered money concept used by M. Friedman, A. Schwartz and P. Cagan is essentially the monetary base concept used by K. Brunner, A. Meltzer, and others. The monetary base may be defined either in terms of the *sources* (Federal Reserve credit, gold stock, Treasury items, etc.) or *uses* (member bank reserves and currency). To compare movements in the monetary base over time, we need to make a correction for changes in reserve requirements. As used here, the monetary base includes a reserve adjustment; that is, it is equal to the source base plus the reserve adjustment.

For a very clear exposition see L. ANDERSEN and J. JORDAN, "The Monetary Base: Explanations and Analytical Use" in the August 1968 *Review*, Federal Reserve Bank of St. Louis.

linkage — is fairly tight and therefore predictable. If there is a tight linkage the authorities can formulate their policies and achieve any particular target for the money stock; on the other hand, if there is slippage, and the central bank control over the money stock is not sufficiently precise to achieve a given target, it will necessarily have to formulate its policies in terms of other variables that it can control. The variable used to express, or define, the central bank's objective or implement its policy decisions must therefore be one that it can control within reasonable limits (10).

The recently recurring idea that the money stock is perhaps best viewed as an endogenous variable, although not a new idea (it would have been acceptable to "real bill" theorists) has received new and powerful support from those who follow the "New View" approach in Monetary Economics (11). New View theorists have questioned the validity of much of the received doctrine in Monetary Theory concerning the importance of money relative to other liquid assets, the uniqueness of commercial banks relative to other intermediaries, and the extent to which the central bank can control the nominal money stock (12). They argue that the central bank can

(10) Some models treat unborrowed reserves as the policy variable (the practice followed in the FRB-MIT model and other econometric models), presumably because they believe that some components of the monetary base, and perhaps the entire base, behave as endogenous variables — they respond to income changes, and are not directly or completely under the control of the central bank. Clearly, if the Fed does not have sufficient direct control over the monetary base, it obviously has even less control over the money stock.

(11) For the development of the New View see J. G. GURLEY and E. S. SHAW, *Money in a Theory of Finance* (Brookings, 1960); D. I. FAND, "Intermediary Claims and the Adequacy of our Monetary Controls" and J. TOBIN, "Commercial Banks as Creators of 'Money'", in D. Carson (ed.), *Banking and Monetary Studies* (Irwin, 1963); H. G. JOHNSON, *Essays in Monetary Economics* (Allen and Unwin, 1967), Chapters 1 and 2; W. BRAINARD, "Financial Intermediaries and a Theory of Monetary Control", in Hester and Tobin (eds.), *Financial Markets and Economic Activity* (Wiley, 1967); and K. BRUNNER, "The Role of Money and Monetary Policy", *Review*, Federal Reserve Bank of St. Louis, July 1968.

(12) Tobin describes the New View as follows:

"A more recent development in monetary economics tends to blur the sharp traditional distinctions between money and other assets and between commercial banks and other financial intermediaries; to focus on demands for and supplies of the whole spectrum of assets rather than on the quantity and velocity of 'money'; and to regard the structure of interest rates, asset yields, and credit availabilities rather than the quantity of money as the linkage between monetary and financial institutions and policies on the one hand and the real economy on the other."

One consequence of this general equilibrium approach to the financial sector is that:

"Neither individually nor collectively do commercial banks possess a widow's cruse. Quite apart from legal reserve requirements, commercial banks are limited in scale by the same kinds of economic processes that determine the aggregate size of other intermediaries". J. TOBIN, "Commercial Banks as Creators of 'Money'", *op. cit.*

control its instruments (open market operations, reserve requirements, discount rate) and some money market variables (free reserves, bill rate); that the commercial banks supply deposits at a fixed rate; and that the stock of money and liquid assets which emerges — at least in the short run — largely reflects the public's preference for demand and time deposits, intermediary claims, and other financial assets (13).

Two schools of Monetary Economics differ on the use of the money stock as an indicator or target variable, and on the extent to which it is an endogenous variable and therefore not available to the authorities as a stabilization instrument. The *non-monetarists* believe that the central bank should formulate its policies in terms of money market variables and implement them through operations on the instrument variables, view the money stock as (in part) an endogenous variable, and do not conceive of it as a proper instrument or target variable; the *monetarists* believe that the central bank can, and should, define its objectives and implement its policies in terms of the money stock. Indeed these two conceptions of the money stock and its role in monetary policy decisions summarize some important substantive differences that have emerged in monetary economics: 1) between the *monetarist* view that changes in (M) — the nominal money stock — may be a causal, active, and independent factor in influencing aggregate demand and the price level, and the non-monetary views ranging from (i) the older "real bills" doctrine (M) responds primarily to changes in the real economy, (ii) the income-expenditure theories (associated with the 45° diagram) which views (M) as an accommodating factor, and (iii) the more recent New View doctrine that (M) is best viewed as one of several endogenous liquidity aggregates; 2) between the *monetarist* view that the money stock — using either the conventional or the broader definition — is a reasonably well-behaved quantity, and the Radcliffe-type view that rejects these measures as narrow and inappropriate, and argues for a broader liquidity aggregate; and 3) between the *monetarist* view that the monetary policy posture should be gauged by the

(13) Some monetary theorists acknowledge that a skillful central bank can manipulate its controls to keep the nominal money stock (M) on target, but nevertheless prefer to think of (M) as an endogenous variable. They argue that a "theory which takes as data the instruments of control rather than M, will not break down if and when there are changes in the targets or the marksmanship of the authorities". See J. TOBIN, "Money, Capital and Other Stores of Value", *American Economic Review*, May 1961.

behavior of a monetary aggregate, and the income (expenditure) theories viewing market interest rates as the proper indicator variable.

Many who question the advisability of operating monetary policy in terms of money stock guidelines also question whether the central bank control is precise enough to comply with the guideline requirements. The extent of this control is therefore a key question. Is the money stock best viewed as an endogenous variable — determined by the interaction of the financial and real sectors — and outside the direct control of the central bank? Or is it more nearly correct to view it as an exogenous variable — as a policy instrument — that the authorities can control, and whose behavior can be made to conform to the stabilization guidelines.

This issue is essentially an empirical one: Does control over the monetary base and other instruments provide the central bank with sufficient powers to fit the behavior of the money stock into a given stabilization program? The *monetarists*, in assigning an important role for (M) in stabilization policy, assume that the central bank can engineer the desired behavior of the money stock. The substantive issue can be reformulated in terms of an empirically refutable hypothesis, as follows: Do changes in commercial bank free reserve behavior, and do portfolio shifts by the public involving currency, demand and time deposits, and other financial assets, introduce enough variability and enough "noise" to break the (M.B.) — *bank reserves — money stock* link, and justify treating the money stock as an endogenous variable — and essentially outside the control of the central bank?

The empirical examination of this issue fits in naturally to a framework of money supply analysis which I have described in an earlier article. The analysis developed there defines four money supply functions which incorporate alternative assumptions concerning portfolio adjustments (14):

If we let

M = the nominal money stock

X = a vector of Federal Reserve (monetary policy) instruments variables (the monetary base, reserve requirements, discount rate, Reg. Q)

(14) See D. I. FAND, "Some Implications of Money Supply Analysis", *American Economic Review*, May 1967.

$r_b$  = a vector of endogenous financial variables (e.g., the Treasury bill rate, the Federal funds rate, the Euro-dollar rate, the rate on time deposits, and other intermediary claims)

T, C, S = time deposits, currency, shares and other financial assets that are close substitutes for demand deposits

Y = a vector of real sector variables (e.g., GNP, business investment, durables, etc.).

A Money Supply Function may be written as follows:

$$M = f(X, r_b; T, C; Y)$$

The four M.S. functions reflect alternative *ceteris paribus* conditions changing the portfolio adjustments that we permit for both the banks and the public, as follows:

1. M.S. (I) is a short-run supply concept. It gives the money supply response to a change in reserves on the assumption that while banks may choose to adjust their free reserves, the public can only carry out a limited adjustment with respect to currency, time deposits and other financial assets. There are several ways to impose *ceteris paribus* conditions on the public's holdings of currency, time deposits, and other financial assets. Some investigators hold *levels* of these assets constant, others hold *ratios* constant, and different investigators impose this *ceteris paribus* condition in a manner most compatible with their model. M.S. (I) is of the form  $f(X, r_b, T, C; Y)$ , where X is a vector of monetary policy instrument variables,  $r_b$  is a vector of endogenous financial variables, T and C specify our assumptions for currency, time deposits, and other close substitutes, and Y is a vector of real sector variables. To use it as a short run concept we assume that all variables in the real sector of the economy, including stocks of real assets and flows such as consumption and investment are held constant, so that it is primarily a function of the monetary policy instrument variables. Accordingly, if M.S. (I) is fairly stable it provides some support for the view that the monetary authorities can achieve fairly precise control over the money stock.

2. To construct M.S. (II) we remove some of these portfolio restrictions by permitting the holdings of currency and time deposits, and the terms on which banks supply time deposits to reflect the underlying preferences. This function is of the form  $f(X, r_b; Y)$ , and does not contain any arbitrary assumptions about currency, time deposits, or the rate paid on time deposits. It is derived by assum-

ing: (a) that the banks may adjust their free reserves and the rate paid on time deposits; (b) that the public's holdings of currency and time deposits will be determined by their demand function for these assets. Although M.S. (II) does permit a greater degree of portfolio adjustment it still is a short run and restricted function because it assumes that the real sector variables and all other financial assets are held constant.

3. To construct M.S. (III) we permit portfolio adjustments throughout the entire financial sector and solve all the equations in the financial sector simultaneously. The Treasury bill rate and other rates which are endogenous variables in the financial sector will therefore be determined, and no longer enter as independent arguments in the money supply function. M.S. (III) is a reduced form equation of the form  $M = g(X; Y)$  where all endogenous financial variables will have values determined by the simultaneous solution of the behavior equations in the financial sector. This function measures the supply response due to a change in the monetary base or some other policy instrument, assuming that all the variables in the financial sector adjust simultaneously.

4. Finally, we define M.S. (IV) in the form of  $M = g(X)$ , a reduced form equation which measures the movements in the money stock in response to adjustments in both the real and the financial sector. To derive this money supply we must solve all the structural equations in the financial and real sectors simultaneously to obtain the reduced form. The real sector variables are no longer treated as exogenous variables, but are now determined simultaneously with all the endogenous financial sector variables. This reduced form M.S. gives the equilibrium stocks of money as a function of the monetary base and other monetary policy instrument variables. This is the natural M.S. function to construct for those who view (M) as passive and responding to real sector developments, and to those who view (M) as an accommodating variable, whose changes may be necessary in order to validate changes in the real economy (15).

This brief review of the four M.S. functions suggests that it is possible to test some of the substantive points that have come up in the recent "control over the money stock" discussions. For example,

(15) The M.S. (IV) function as written implies that an increase in the monetary base will affect the money supply if it induces some real sector changes. A "real bills" proponent might therefore prefer to write it as follows:

$$M = f(Y) \text{ and } X = g(Y);$$

where M and X are both determined by the real sector variables in Y.

M.S. (I) postulates that we can predict the effect of changes in the monetary base (and other instruments) on the money stock, assuming that the public's portfolio adjustments are restricted; M.S. (II) postulates that we can predict the effect of a change in the monetary base (and other instruments) on (M), even allowing the public to adjust their currency and holdings of demand and time deposits; while M.S. (III) postulates that we can predict the money stock response, even allowing the public to adjust their entire portfolios. These three M.S. functions assume that commercial bank free reserve behavior and the public's behavior with respect to currency, demand and time deposits are stable; and that the substitution of intermediary claims and liquid assets for money conforms to behavior that can be incorporated into a stable M.S. function. They therefore provide evidence against those who question the reliability of the (M.B.) — *bank reserve — money stock — linkage* (16).

Those who follow the "real bills" view — that (M) is determined by the real sector variables — or the view in many income models — that (M) is an accommodating or permissive variable, presumably deny the possibility of constructing such functions. In their view these three M.S. functions do not allow any changes in fiscal policy, and in the real sector variables, consider only restricted changes in the financial sector variables, and emphasize the monetary base and the central banks' instrument variables. Accordingly, they should predict that the first three M.S. functions highlighting the instrument variables are unstable, and lack content; indeed, their approach to monetary theory implies that only M.S. (IV), which incorporates changes in the real sector, contains the relevant independent variables.

An analysis of these four M.S. functions has implications for the use of the money stock as an independent and major instrument in stabilization. Those who argue that money is, at least in part, an endogenous variable, and who question the precision with which it can be controlled, assume (implicitly perhaps) that no statistically

(16) A comparison of the three M.S. functions enables us to evaluate the quantitative effects of these portfolio shifts on the money stock. Consider a given change in the monetary base, or any other instrument variable, and compare the money stock response in these three functions. These differences reflect the portfolio adjustments that we introduce as we move from M.S. (I) to M.S. (III) — i. e., shifts among currency, demand and time deposits, and the substitution of intermediary claims for money — and thus provide us with a measure of their effect on the money stock.

significant supply function can be estimated relating the money stock to the monetary base and other instrument variables. Moreover, if such a function is estimated it would have to be a reduced form function, and a variant of the M.S. (IV) concept, incorporating feedbacks from the real sector. Consequently, if our preliminary findings with respect to the short run M.S. (I) and M.S. (II) and M.S. (III) functions are validated, they constitute some evidence supporting the hypothesis that the money stock may be viewed as a policy variable in the short run (17). Our findings also suggest that the money stock behavior could be made to conform to a specified stabilization program.

While this research is far from conclusive it does fit in, and is consistent with, a number of other findings (18). It is difficult to maintain the view that (M) is sufficiently endogenous so that it is outside the *direct* control of the authorities, without getting dangerously close to a "real bills" position. Accordingly, the focus of the "control over the money stock discussion" will shift, in my opinion, to the more interesting question — and the more relevant and less ideological question — concerning the length of the period needed to give the Fed sufficient control to achieve a given money stock guideline. Assume that a "reasonable" degree of precision has been defined, can the particular guideline requirements be achieved in a week? a month? a quarter? Or must we extend the period in order to overcome false signals, "noise, forecasting errors and other disturbances"? It would appear that the degree of precision desired is not independent of the time period required for the execution of policy, and it is reassuring to note that recent discussions have been directed increasingly at these points (19).

(17) The calculated elasticities and multipliers suggest that the short run M.S. functions — such as the M.S. (I) and M.S. (II) — are reasonably stable. These are preliminary findings derived by using the steady-state solutions to simplify the analysis; they are subject to revision and require, in any event, the construction of significance tests. See D. I. FAND, "Some Implications of Money Supply Analysis", *op. cit.*

(18) See the references to Andersen, Brunner, Cagan, Dewald, Friedman and Schwartz, Meigs, and Meltzer in footnotes 1, 8, and 11.

(19) This formulation of the problem has come up in several recent papers. Governor Maisel emphasizes this point as follows:

"The growth of money supply in any period is the result of actions taken by the Federal Reserve, the Treasury, the commercial banks and the public. Over a longer period, the Fed may play a paramount role, but this is definitely not the case in the short run. To the best of my knowledge, the Fed has not and probably would have great difficulties

## II. The Income Theory and the Quantity Theory: Nominal and real Quantities

There is considerable agreement on the proposition in monetary theory that the *real* value of the money stock is an *endogenous* variable, determined by the interaction of the financial and real sectors, and therefore outside the control of the monetary authorities. This is in sharp contrast to the theoretical (and practical) disagreements concerning the extent to which the central bank can control the behavior of the (nominal) money stock. In equilibrium, the stock of real cash balances has a value — analogous to, say, the real wage — which the stabilization authorities cannot readily influence, except in those special cases where nominal and real variables move together. Nevertheless, income theorists in their macroeconomic models often use nominal balances when their analysis requires real balances. This substitution of a nominal quantity (which can be easily changed) for a real quantity (with a determinate equilibrium) has two consequences: it suggests that an increase in nominal balances will always tend to lower market interest rates; it also implies that changes in market rates correspond to, and reflect, changes in real rates. This procedure is sometimes justified by a special interpretation of the demand for money, an interpretation that is often attributed to Keynes' *General Theory*.

It is therefore useful to recall the transformation of the demand for money in Keynes' *General Theory*. Instead of defining a demand for a *quantity* of real balances, the demand for money (or real balances) was transformed into the liquidity preference function and a basic determinant of the interest rate: the liquidity preference function together with the (real) quantity of money determines the interest rate; and since Keynes assumed explicitly that the price level was given, he could move from nominal to real balances to determine the *market* (or nominal) interest rate, the *real* interest

controlling within rather wide limits the growth of the narrowly defined money supply in any week or month".

See SHERMAN J. MAISEL, "Controlling Monetary Aggregates", *op. cit.*

For some other discussions of this issue, see A. J. MUISS, "The Case for Simple Rules", *op. cit.*; L. GRAMLBY, "Guidelines for Monetary Policy - The Case Against Simple Rules", *op. cit.*; the Hearings on Standards for Guiding Monetary Action, *op. cit.*; A. MELTZER, "Controlling Money", *op. cit.* See also L. KALISH, "A Study of Money Stock Control", *Working Paper #11*, Federal Reserve Bank of St. Louis, for an interesting attempt to develop confidence limits for measuring the money managers' success in controlling the money stock.

rate (or return on capital), and the equilibrium quantity of real balances (20). The post-Keynesian income models follow the *General Theory* in treating the demand for money as a liquidity preference function, but they do not determine the equilibrium quantity of real cash balances. The failure to define an equilibrium value for the real money stock opens up the possibility of treating both the real and nominal money stock as policy variables (21), and as close substitutes.

The substitution of nominal balances for real balances in many post-Keynesian income models has extremely important consequences. To assume that nominal and real balances may be interchanged is to assume that the authorities have the power to print real capital and wealth: it exaggerates the control of the authorities over *real* interest rates (and rates of return); and it necessarily abstracts from any *direct* effects of money on prices [note that the link between (M) and prices requires that we distinguish between nominal and real values]. This tendency to abstract from the price level, to freely substitute nominal and real variables, and to equate market interest rates with real rates (of return) reflects the analytical failure to define equilibrium conditions for real balances, and is a striking feature of the post-Keynesian income models.

In sharp contrast to the income theory, we have the following postulates concerning real balances in the post-Keynesian quantity theory: 1) that the money demand function defines the demand for real cash balances; 2) that the quantity of real cash balances is an endogenous variable and not under the control of the monetary authorities (except for the very short run); and 3) that changes in nominal balances will generally have effects on market interest rates,

(20) For an elaboration of this theme see D. I. FAND, "Keynesian Monetary Theories, Stabilization Policy and the Recent Inflation", *op. cit.*, Section II on "The Demand for Money and Liquidity Preference: Real Balances and Interest Rates", which discusses the analytical role of real cash balances in the Keynesian and quantity theories, the shift in emphasis from the price level to the level of employment, and the transformation of the money demand function into a liquidity preference function.

(21) For a penetrating analysis emphasizing the originality and generality of the Keynes theory, in contrast to the rigidities, traps, and elasticity pessimism in many of the post-Keynesian income models, see A. LEIJONHUEVUD, *On Keynesian Economics and the Economics of Keynes* (Oxford, 1968). See also D. I. FAND, "Keynesian Monetary Theories, Stabilization Policy, and the Recent Inflation", *op. cit.*, Section III on "Three Keynesian Liquidity Preference Theories", and J. TOBIN's seminal article on "Money, Capital, and Other Stores of Value", *op. cit.*, for his illuminating analysis of an aggregative model with three assets.

on income, and on prices (22). For the analysis of transition periods it assumes that an increase in nominal balances will have a compound effect on interest rates — including a short run liquidity (Keynes) effect, an income effect, and a longer run (Fisher) price expectation effect (23). The quantity theory also assumes that the demand for money is quite stable, and that a velocity function (derived from the money demand function) may provide a useful link between (changes in) money and (changes in) money income; and, in contrast to the pre-Keynesian Quantity Theory, postulates a stable velocity function, but allows marginal velocity to differ from average velocity.

Taken together, these quantity theory propositions have two important implications. They suggest: (i) that the monetary authorities do not control *real* interest rates or the stock of real balances, even if they always control the stock of nominal (M) and thereby influence nominal or market interest rates; (ii) that (M) is an important variable for explaining changes in (P), since the equilibrium quantity of real balances links changes in nominal (M) with changes in the price level. Accordingly, the modern quantity theory uses the money demand function to predict the level of money income and prices if output is given, or *changes* in money income if output varies with changes in (M).

The post-Keynesian quantity and income theories thus differ sharply in their analysis of the money demand function. In the modern quantity theory it serves as a velocity function relating either money and money income or marginal *changes* in money and money income [if both output and marginal velocity vary with (M)]; in the income theory, it serves as a liquidity preference theory of interest rates, or of *changes* in interest rates (if the price level is given and determined independently of the monetary sector). Accordingly, the

(22) See L. W. MINTS, *Monetary Policy for a Competitive Society* (McGraw-Hill, 1950); M. Friedman (ed.), *Studies in the Quantity Theory of Money* (Chicago, 1958), and *The Optimum Quantity of Money* (Aldine, 1969), especially Chapters 6-9; H. G. JOHNSON, *Essays in Monetary Economics* (Harvard, 1967), Chapters 1-3; and D. PATINKIN, *Money, Interest and Prices*, 2nd ed. (Harper, 1965), Chapter XV.

(23) For a more explicit statement of the relation between changes in the nominal money stock and interest rates see M. FRIEDMAN and A. SCHWARTZ, *Trends in Money, Income and Prices* (forthcoming); M. FRIEDMAN, *Dollars and Deficits* (Prentice Hall, 1968); P. CAGAN and A. GANDOLFI, "The Channels of Monetary Effects on Interest Rates", *American Economic Review*, May 1969; W. GIBSON and G. KAUFMAN, "The Sensitivity of Interest Rates to Changes in Money and Income", *Journal of Political Economy*, May 1968; D. MEISELMAN, "Bond Yields and the Price Level: The Gibson Paradox" in *Banking and Monetary Studies*, and D. I. FAND, "A Monetary Interpretation of the Post-1965 Inflation in the United States", *op. cit.*

quantity theory focusses on discrepancies between actual and desired real balances, distinguishes between (exogenous) nominal balances and (endogenous) real balances, emphasizes monetary aggregates rather than interest rates, and highlights nominal (M) as the operational policy variable; the income theory focusses on discrepancies between actual and full-employment output, abstracts from price level changes, emphasizes an interest rate transmission mechanism, views the monetary aggregates as endogenous variables, and highlights the full-employment surplus as the operational policy variable (24).

Viewed as general theories of income determination, both theories have deficiencies. The quantity theory seeks to explain prices, or money income, but often abstracts from the level of employment; the income theory seeks to explain the levels of employment, but often abstracts from the price level; this difference in focus mirrors the change in the analytical roles of real balances (M/p) and interest rates, (r), in the two theories. The quantity theory emphasis on (M/p) as an endogenous variable implies that the attempt by the authorities to raise (M) may cause (P) to rise, and also cause *nominal* and *real* interest rates to diverge. In contrast, the income theory, by de-emphasizing the endogeneity of real balances, implies that (M/p) and (r) can be controlled (within limits) by the authorities — an impression that is reinforced by their failure to distinguish between nominal and real rates.

(24) This discussion suggests that the controversies over whether money is, or is not, important does not really bring out the essential differences between the income and quantity theories. In some ways the income theory attaches greater significance to money than does the quantity theory. Thus, the income theory assumes that it is often possible to permanently lower interest rates, or rates of return, by an increase in nominal money, while the quantity theory is more inclined to view nominal money changes as having a permanent effect mainly on money income and prices.

Nevertheless, because quantity theorists are often analyzing situations where inappropriate monetary policies may have caused severe difficulties (e.g., in the 1930's), they may foster the impression that errors in monetary policy are always associated with such drastic consequences.

One other paradox may be noted. Many income theorists treat the nominal money stock as an endogenous variable because they believe that this approach assumes less and is therefore more accurate. But while this treatment of the money stock may be the most appropriate in a formal sense, it may apparently also lead to errors in a substantive sense. For example, the large scale econometric models treat the nominal money stock as an endogenous variable, but do not restrict the movements in real balances by well-defined equilibrium conditions. The assumption that an increase in nominal balances will increase real balances may have been responsible for some of the forecasting errors and policy mistakes in 1968. This assumption may involve a more serious error, substantively and analytically, than treating the nominal money stock, formally, as an exogenous variable.



The analysis of money, interest rates, and prices in the post-Keynesian income theories may explain several of the troublesome features of recent stabilization policy: the use of market interest rates as an indicator of monetary policy; the tendency to minimize the price level consequences of excessive monetary growth; the failure to recognize the impact of inflationary expectations on market interest rates; the reluctance to distinguish between nominal and real quantities; and the conviction that the rise in market interest rates since 1966 was due to an increased demand for money, and not the result of excessive growth in the money supply (25).

The failure of income theorists to consider the impact of money supply growth and the expansion of the monetary aggregates on market interest rates, and to distinguish between market and real interest rates, is especially relevant for analyzing the post-1965 inflation and the stabilization difficulties since June 1968. The surprising failure of the *Revenue and Control Act* of June 1968 to cool the economy thus far could be explained by noting that the fiscal "refrigeration" effect was offset by the monetary "boiler" effect. The authorities, while fighting inflation with the surcharge, also wished to lower interest rates and move toward a tighter fiscal, easier money policy during this period, and this led to a very substantial increase in the monetary aggregates.

Many who favored monetary expansion after the June tax package based their case on the desirability (and social necessity) of lowering market interest rates. In retrospect, it seems difficult to suppose that an increase in nominal ( $M$ ) will raise *real* balances, lower interest rates, curtail disintermediation, facilitate residential construction, and somehow not raise prices. But an increase in ( $M$ ) which takes place in the midst of an inflation, will not only raise prices but also raise market interest rates. Nevertheless, if true, it suggests that an incredibly optimistic theory — based on a refusal

(25) For a recent, and very useful, statement of the income theory approach to stabilization, incorporating a commitment to economic growth and viewing it as a key aspect of government policy, see W. W. Heller (ed.), *Perspectives on Economic Growth*. Because the contributors to this volume are outstanding, it may not be inappropriate to mention that the chapters dealing with stabilization policy and monetary theory provide examples illustrating the several questionable tendencies just summarized. Obviously these tendencies are not just limited to those whose understanding of the income theory may be questioned. It is for this reason that I do not regard these characteristics as analytical errors, but think of them as "methodological commitments" that may have become burdensome, and perhaps oppressive, analytically.

to acknowledge the endogeneity of real cash balances and the consequent divergence of nominal and real rates — may have contributed directly to the inflationary pressures which are still continuing (July 1969); and it may also have contributed to our 1966 stabilization difficulties, if the authorities believed that monetary expansion would bring about lower interest rates (26).

The stabilization difficulties that we have experienced since 1965 may be related to two questionable propositions in monetary theory, which are implicit in many income models: 1) that the authorities can affect real balances if they can control the nominal stock of money; and 2) that the authorities can influence *real* rates through central bank operations which change nominal *market* rates. Although both of these propositions are generally accepted, they have only a limited validity, and may lead to serious policy errors when applied to a high-pressure economy such as the post-1965 period in the United States.

In an underemployed economy *nominal* quantities and *nominal* rates may move with *real* quantities and *real* rates, and ( $M/p$ ) may be sufficiently flexible to be treated as a policy variable. But in a high-pressure economy with rising prices, nominal and real quantities no longer coincide; the real value of the money stock cannot be treated as a policy variable, and an increase in ( $M$ ) will not only raise prices but will raise market interest rates as well, similarly with the treatment of interest rates. In a slack economy interest rates and real rates move together; but in a high-employment economy with rising prices, *market* rates and *real* rates may diverge. Indeed, in a period of price inflation, constant *real* rates are necessarily associated with rising *market* rates, so that movements in the market rates cannot always correspond to real rates.

The endogeneity of the real value of the money stock, as indicated by the divergence between nominal and real balances and by the divergence between real and market interest rates, is thus a manifestation of an economy approaching full utilization. And we need to investigate empirically when movements in interest rates and in money balances begin to diverge, and whether the divergence

(26) The fear of *overkill* articulated by influential sources in the summer of 1968 may have served to reconcile the views of those who favored the tax increase primarily as a stabilization measure to cool the inflation, with the views of those who favored the tax increase to shift the policy mix to achieve some social objectives.

between real and nominal interest rates is related to the divergence between real and nominal balances (27).

Many investigators have commented on the monetary lag, and have suggested that because of this lag we would expect very sharp movements in interest rates — as the initial response to changes in the money stock. It is not clear how the monetary lag may be affected by the divergence between *market* and *real* interest rates and between nominal and real balances. Knowledge of the conditions when real and nominal balances diverge, of the process that causes interest rates to diverge, and of the mechanism through which the monetary lag operates, should be useful in improving stabilization policy. It would also help reconcile the income and quantity theories and thus help complete the work initiated by Keynes by providing us with a general theory of employment and output.

### III. The non-Monetary Theories of Price Level and Inflation

It is hardly an exaggeration to say that we do not have a satisfactory theory of the price level or of inflation. The post-Keynesian income and quantity theories provide different income determination models: the income theory emphasizes the consumption function and other income-expenditure relationships; while the quantity theory emphasizes the demand for money and portfolio adjustments (28). As theories of national income both theories have limitations, as we have just noted; and neither theory provides us with an articulated theory of the price level, and a basis for allocating a given change in national income into the fraction due to real output and the fraction due to price level changes.

(27) Somewhere between the slack economy and the inflationary high-pressure economy there is a change in the relation between nominal and real rates. Responsible policy officials must therefore identify and take account of the divergence between nominal and real rates, especially if they follow an interest rate criterion and use money market rates in the implementation of monetary policy decisions.

(28) The capital theoretic orientation of the post-Keynesian quantity theory, emphasizing portfolio choice and the substitutability of money for other assets, has been heavily influenced by the Keynesian Liquidity Preference theory. Unlike the older quantity theory based either on the payments relations of the transactions approach or the store of value relations of the Cambridge approach, it follows the Keynesian theory in treating the demand for money as a problem in capital theory, focussing on the composition of the balance sheet and the selection of assets. See J. TOBIN, "A Dynamic Aggregative Model", *Journal of Political Economy*, April 1955, and "Liquidity Preference as Behavior Toward Risk", *Review of Economic Studies*, February 1958; and M. Friedman (ed.), *Studies in the Quantity Theory of Money*.

The quantity theory, in the absence of an articulated theory of the price level, nevertheless assumes a link between money and prices, and views movements in the absolute price levels and inflationary (or deflationary) pressures as reflecting current and past changes in the money stock. The income theory de-emphasizes any direct link between monetary assets and prices, and highlights non-monetary factors in explaining upward movements in the price level and inflation. This is particularly evident in the recent large scale econometric models (Brookings, Michigan, Wharton, FRB-MIT), which do not incorporate monetary (or fiscal) variables *directly* to explain the price level; they base the prediction equations for the absolute price level on concepts and empirical regularities that may be appropriate for microanalysis and for the determination of relative price movements (29).

As an illustration, consider the recent (preliminary) FRB-MIT model of the price-wage-labor sector which follows the other large scale models in basing prices on unit labor costs, other markup factors, and introduces other variables to pick up the influence of demand shifts or oligopoly pricing (30). This is essentially a non-monetary

(29) In their progress report on the Federal Reserve-MIT model, F. De Leeuw and E. Gramlich summarize the findings of the econometric models as follows:

"The evidence from several of the large econometric models — the Wharton School Model, the Commerce Department Model, the Michigan Model, and to a lesser extent the Brookings Model — is that monetary forces are rather unimportant in influencing total demand".

See F. DE LEEUW and E. GRAMLICH, "The Channels of Monetary Policy", *Federal Reserve Bulletin*, June 1969.

The Brookings model is presented in J. DUSENBERRY, et al., *The Brookings Quarterly Econometric Model of the United States* (Chicago, 1965); the Michigan model is presented each year at a conference and later published in a volume, *The Economic Outlook for 1969* gives the 1969 model presented at the November 1968 conference. The FRB-MIT model is described in F. DE LEEUW and E. GRAMLICH, "The Federal Reserve-MIT Econometric Model", *Federal Reserve Bulletin*, January 1968, and in "The Channels of Monetary Policy", *op. cit.* The Wharton model is presented in M. K. EVANS and L. R. KLEIN, *The Wharton Econometric Forecasting Model* (Pennsylvania, 1967).

(30) F. DE LEEUW and E. GRAMLICH in "The Channels of Monetary Policy", *op. cit.*, describe it as follows:

"Prices are assumed to be a variable markup over wages, with excise taxes completely shifted onto consumers. The variables determining the markup are the productivity trend which allows producers to maintain profit shares even though wages rise faster than prices, farm and import prices which measure other costs, and the ratio of unfilled orders to shipments, which indicates demand shifts".

For a criticism of the price level equations in the Brookings model see Z. GRILICHES, "The Brookings Model Volume: A Review Article", *Review of Economics and Statistics*,

theory of the price level. It seems to suggest that a general excise or uniform sales tax (i.e., 10 per cent on all commodities) would raise prices; yet an income tax, designed to yield the same dollar amount, would presumably lower prices and certainly not cause them to rise. But a conclusion that an uniform excise tax raises the price level, while an income tax of equivalent revenue would lower prices seems paradoxical. Moreover, since there are no explicit specifications given for the money stock we have the following strange results: 1) that an excise tax may be inflationary even when the revenue is impounded and the stock of money is reduced; and 2) that an income tax is deflationary when the stock of money is maintained, or even when allowed to grow at an accelerated rate. This paradox illustrates the difficulties of explaining *absolute* price level movements with concepts that are appropriate for *relative* price analysis, and of using an aggregative theory that does not incorporate any *direct* influence of money on prices (31).

The drift towards non-monetary theories of the absolute price level is not a new development in the 1960's; it has been going on steadily since the end of World War II. And though these theories may have descriptive (or analytical) relevance in suggesting either the initiating factors, or the process in particular price level movements, they are not easily integrated into a coherent set of anti-inflationary policies. Moreover, if the absolute price level is indeed a function of unit labor costs, markup factors, new or unfilled orders, and other non-monetary factors, then it does sharply limit the scope of the traditional stabilization measures which are geared to a demand inflation. In addition, the focus given to the non-monetary aspects by the theorists of the "*new inflation*" may have also diverted attention from the "*classical inflation*" due to expansive monetary-fiscal policies. The conjuncture of all these factors may help explain our inability to identify and deal effectively with the post-1965 inflation in the United States.

May 1968, especially his discussions of prices and wages, pp. 221-223, and the rejoinder by G. Fromm and L. R. Klein, especially pp. 237-238. For a more recent attempt to develop price equations without bringing in monetary factors explicitly see O. ECKSTEIN and G. FROMM, "The Price Equation", *American Economic Review*, December 1968.

(31) For a discussion of this issue see H. G. BROWN, "The Incidence of a General Output or a General Sales Tax" in *AEA Readings in the Economics of Taxation* (Irwin, 1959); E. R. ROLPH, *Theory of Fiscal Economics* (University of California, 1954); R. A. MUSGRAVE, *The Theory of Public Finance* (McGraw-Hill, 1959); and A. MORAE, *On Taxes and Inflation* (Random House, 1965).

The sketch of inflation theory since World War II is intended to illustrate the shift in emphasis from the aggregate demand effects on prices, the focus on costs and aggregate supply effects, and the purging of monetary variables from inflation (and price level) theory. It suggests that more attention needs to be given to the monetary aggregates and their effect on aggregate demand — if we wish to improve our ability to forecast price level developments and deal more effectively with inflation (32).

1) The "inflationary gap" analysis developed by Keynes during World War II focussed on an economy where prices were rising because of an excess of aggregate demand over supply. Unlike the classical quantity theory formulation, it did not assume any particular link from money to aggregate demand, but was intended as an improved theory of an excess-demand inflation. This approach fell into disfavor when the postwar employment forecasts for 1946-1947, based on "inflationary gap" analysis, turned out very badly, and it was widely recognized that the income-expenditure relations were not properly specified in monetary terms. Not surprisingly, this analysis went out of style at the end of the 1940's.

2) Since the early 1950's, the post-Keynesian income models have typically emphasized the role of aggregate demand in employment while de-emphasizing its impact on price level movements. One of the earliest cost inflation theories — the wage-push model — was accepted by many neo-Keynesians as an explanation of the creeping inflation of the 1950's; and it seemed to be a consistent application of the Keynesian doctrine that a cut in the money wage will cause prices to fall (by the same amount) and will not, therefore, stimulate employment in the depressions. The Keynesian view that the real wage is determined independently, and not influenced by changes in the money wage, would also seem to suggest that rising prices are due to rising wages. Later versions of cost inflation models stressed markup pricing, sectoral shifts, and administered (non-market clearing) prices. And since creeping inflation was gener-

(32) Professor G. Haberler is an outstanding exception to this tendency. His *Inflation: Its Causes and Consequences* (Washington, 1966), first published in 1961, emphasized the need for coordinated monetary and fiscal policy in fighting a demand inflation.

For a survey of inflation theory see M. BRONFENBRENNER and F. HOLZMAN, "Survey of Inflation Theory", *American Economic Review*, September 1962; H. G. JOHNSON, *Essays in Monetary Economics*, especially Chapter 3; and S. W. Rousseas (ed.), *Inflation: Its Causes, Consequences and Control* (N.Y.U., 1968).

ally associated with a reduction in aggregate supply due either to rising factor costs or to shifts in demand, it seemed to follow quite naturally that a reduction in aggregate demand was not an appropriate policy for fighting inflation.

The wide acceptance of the thesis that the creeping inflation of the 1950's (viewed as the typical inflation of advanced industrial countries) was basically a supply phenomenon had two important consequences: it rationalized the view that monetary policy should play only a very minor role in fighting inflation; and it also lent support to the view that the stabilization authorities should focus directly on the behavior of wages and prices and explore new stabilization techniques such as incomes policies, wage-price guideposts, and possibly including indicative planning and other techniques of supply management (33).

3) Reinforcing the idea that creeping inflation was an *aggregate supply* phenomenon, and requiring therefore a national wage-guidepost (or incomes) policy, was the growing skepticism about whether monetary policy could play any constructive role in stabilization. First, there was a general concern that a restrictive monetary policy would reduce output but not succeed in lowering prices; second, it was suggested that the monetary authorities may not always be able to control the stock of privately held liquid assets through their control of the money stock; and finally, that aggregate demand was functionally related to the total volume of liquid assets and not to one component of this total — such as the narrow money stock (34).

4) The cost inflation models assume that creeping inflation (unlike galloping inflation) is a *supply* phenomenon and not due to an increase in *aggregate demand*. They differ only in the specific

(33) See the Joint Economic Committee volume on *The Relation of Prices to the Economic Stability and Growth* (Washington, 1958) for a fairly comprehensive compendium of non-monetary inflation theories that were developed to explain the creeping inflation of the 1950's.

(34) For a good example of the growing skepticism about the role of monetary policy in stabilization and the acceptance of the "New Inflation" theory see The Joint Economic Committee Staff Report on *Employment, Growth and Price Level* (Washington, 1959).

See the review by H. P. MINSKY, "Employment, Growth and Price Levels: A Review Article", *The Review of Economics and Statistics*, February 1961, and the analysis of the inflation theory in the "Staff Report", in G. HABERLER, *op. cit.* See also G. KAUFMAN, "Current Issues in Monetary Economics and Policy: A Review", *op. cit.*, for a discussion of the monetary issues.

mechanism that they single out: some focus on unions and wage-push; others on markup pricing; on market power and bargaining strength; and on administered prices. But they all assume an autonomous rise in factor costs, a reduction in aggregate supply, and a rise in prices, even though aggregate demand is stable. Similarly, although the demand-shift inflation model does not initiate the process with an autonomous rise in factor costs, it follows the cost models in explaining the price rise without introducing any notion of excess demand.

5) At the close of the 1950's Samuelson, Solow, and others developed the *trade-off* analysis of creeping inflation. They start with a Phillips Curve — a (U,W) function relating unemployment and percentage changes in money wage rates — and derive from this a *trade-off* function — a (U,I) function relating unemployment and the rate of price change. They suggest that the unemployment rate at a stable price level may be unbearably high and socially unacceptable, and that we may have to accept a given degree of inflation (a specified rise in the price level) if we wish to lower it. If this *trade-off* function, incorporating a dynamic money-illusion effect, applies to the steady-state and is not just a temporary phenomenon, it implies that the degree of inflation is related to the level of unemployment that society will tolerate. It also suggests that we may have inflationary recessions — even substantial unemployment does not necessarily guarantee us a stable price level. From an analytical point of view this theory is a radical departure from traditional analysis in assuming that *real* variables (the level of employment and of output) are not independent of nominal variables (the price level), even in the long run (35).

(35) Although the *trade-off function* between unemployment and inflation is widely accepted, its interpretation does pose several questions for inflation theory: Are the trade-off estimates, interpreted as long-run steady-state relations, consistent with our accumulated experience with inflation? Are the trade-off estimates, which assume a long learning period, consistent with our theories of anticipated inflation and expectational behavior? Does the trade-off analysis suggest any role for monetary policy in avoiding or in combating inflation by shifting the trade-off function? And is such a role consistent with the growing volume of empirical studies of the monetary sector?

The Samuelson and Solow article developing the trade-off analysis by utilizing the Phillips Curve is given in P. S. SAMUELSON and R. M. SOLOW, "Analytical Aspects of Anti-Inflation Policy", *American Economic Review*, May 1960; see the discussion of Phillips Curves in A. F. BURNS and P. A. SAMUELSON, *Full Employment, Guideposts and Economic Stability* (Washington, 1967); and SOLOW's paper, "Recent Controversy on the Theory of Inflation:

6) Finally, some economists have recently attempted to analyze inflation in terms of a disequilibrium model — thus generalizing the earlier Keynesian wage-push theory to cover sellers' inflation and administered (non-equilibrium) prices. In their view actual prices, and especially wage rates, are very often somewhere between the demand and supply price, and do not, therefore, satisfy either the demand function or the supply function. They are determined by market power and bargaining strength. In this model it is possible to have both buyers' and sellers' inflation (36).

This review of inflation theory illustrates the proliferation of non-monetary price level and cost inflation theories since the end of World War II, stressing (i) autonomous increases in factor costs, (ii) shifts in demand, (iii) administered prices and market power, (iv) the (U,I) *trade-off* function between unemployment and price level changes, and (v) markets in disequilibrium. These "new inflation" theories reflect a growing consensus among income theorists, throughout this period, that monetary variables are not the causal, independent, or active factors affecting output, employment, or prices. The widespread acceptance of these "new inflation" theories, both in the academic world and in business circles, seemed to vindicate the monetary views of the income theorists, and help explain the experiments — in the United States and in Western Europe — with the new inflation weapons such as income policies, wage-price guideposts, indicative planning and other elements of supply management.

Nevertheless, the failure to introduce monetary variables in the analysis of the price level and in inflation theory does seem strange. Whatever relevance or validity these non-monetary theories may have had in explaining, or in providing, effective policies for coping with the creeping inflation of the 1950's, they are clearly inappropriate for the inflation of the 1960's. A credible explanation of our recent inflation surely must take account of excess demand and the high rates of monetary expansion since 1965. Whether or not this

An Eclectic View", in S. W. ROUSSEAS, *op. cit.*; see G. HABERLER, "Stability Growth and Inflation", a chapter in a forthcoming volume dealing with these issues, and D. I. FAND, "On Phillips Curves and Trade-off Functions", a paper presented to the Canadian Economics Association meetings, Toronto, Canada, June 5, 1969 for a discussion of the Phillips (U-W) relation and the Samuelson-Solow (U-I) *trade-off* function.

(36) For a statement of this disequilibrium model see A. P. LERNER, "On Generalizing the General Theory", *American Economic Review*, March 1960. For a different interpretation see A. LEIJONHUFVUD, *op. cit.*

rate of monetary expansion was inevitable — given the Vietnam War — it surely played a major and substantial role in our recent inflation.

The tendency to exclude any direct influence of money on prices and to stress real — non-monetary — factors in explaining the absolute price level has generated an intellectual climate in which it is easy to neglect the behavior of the monetary aggregates. And when income theorists highlight the effect of monetary policy on interest rates, they necessarily rule out any effect on prices, for this is implicit in allowing real balances to behave as if it were a policy variable. In consequence, when they were faced with the need to explain the creeping inflation and price level movements of the 1950's, they sought to locate the cause among the aggregate supply variables such as wage-push, markup, sellers' inflation, or in demand shifts. Admittedly, this inflation theory was not designed to serve as the analytical model for analyzing a demand inflation such as that we have experienced since the Vietnam escalation in 1965. Nevertheless, the stressing of real factors in the theory of the price level has made it difficult for many income theorists to see the relevance of the substantial growth in the money stock in the recent inflation, even while freely conceding that it is a classical demand inflation. Our experience since 1965 suggests that we direct our attention to the money stock and its effect on aggregate demand and prices. It also suggests that the emphasis given to real factors in explaining the post-1965 inflation, and to discretionary fiscal policy for coping with it, and the relative neglect of the monetary aggregates, is an inheritance from the past that needs to be re-examined (37).

#### IV. Fiscal Policy: the *Ceteris Paribus* Multiplier and the *Mutatis Mutandis* Multiplier

The theory of fiscal policy highlights the direct income-generating effects of deficits and surpluses and the stabilization aspects of the cumulative multiplier expansion process; but it often ignores the interest rate or capital market effects, and it invariably abstracts from

(37) See D. I. FAND, "The Chain Reaction-Original Sin (CROS) Theory of Inflation", *op. cit.*, and "A Monetary Interpretation of the Post-1965 Inflation in the United States", *op. cit.*

any associated money stock effects. The simplest presentation may be summarized as follows: an increase in government spending is viewed as a *direct* demand for goods and services; changes in tax rates, as *directly* affecting consumer spending, investment, and aggregate demand; and the initial increase in spending, as setting off a cumulative expansion as given by the multiplier process (38). More advanced discussions go beyond the 45° diagram, introduce the Hicksian IS-LM Analysis to account for the capital market effects of changes in fiscal policy; but even this more advanced analysis typically abstracts from the money creation aspects that may be associated with a cumulative expansion.

A widely quoted statement describing the "Workings of the Multiplier" in the *Economic Report of the President for 1963* illustrates this tendency to omit the capital market and money creation aspects (39). The direct income-generating effects of the deficit are stressed, but no indication is given whether the rise in income requires stable interest rates, an elastic monetary policy, or a deficit financed through the banking system. Thus, the case for a discretionary tax cut and a reduction in full-employment surplus, as presented by the Council of Economic Advisers (CEA) in 1963, does not bring in any explicit discussion of the method in which the deficit is financed. Their position is stated as follows:

Tax reduction will directly increase the disposable income and purchasing power of consumers and business, strengthen incentives and expectations, and raise the net returns on new capital investment. This will lead to initial increases in private consumption and investment expenditures. These increases in spending will set off a cumulative expansion, generating further increases in consumption and investment spending and a general rise in production, income and employment.

(38) The volume of readings, *American Fiscal Policy: Experiment for Prosperity* (Prentice-Hall, 1967), edited by L. Thurow, is a good example. With very few exceptions, the individual papers either abstract from, or ignore, monetary factors, and do not cite any empirical evidence to justify the strategic role assigned to discretionary changes in the full-employment surplus. It appears that such justification was not felt necessary, because the very substantial growth in GNP since 1964 was widely interpreted as the result of the 1964 tax cut and reduction in the full-employment surplus.

(39) See the section, "Workings of the Multiplier" in the *Economic Report of the President for 1963*. This is reprinted in A. M. Okun (ed.), *The Battle Against Unemployment* (Norton, 1965), pp. 88-97.

The analysis of the 1964 tax cut presented by Okun in 1965 explicitly justifies the omission of any capital market or monetary effects (40). Although Okun accepts the view that significant changes in the cost or availability of credit would have an important influence on business investment, he does not make allowance for these factors in his quantitative estimates of the multiplier. He rationalizes his procedure as follows:

... in practice, dealing with the period of the last year and a half, I cannot believe that the omission of monetary variables can make a serious difference. By any measure of interest rates or credit conditions I know, there have been no significant monetary changes that would have either stimulated or restrained investment to a major degree.

He does concede that "the maintenance of stable interest rates and stable credit conditions requires monetary action" and that at least to this extent, "monetary policies have made a major contribution to the advance". But in his view, "that contribution is appropriately viewed as permissive rather than causal". Okun's analysis, presented in August 1965, attributing the GNP expansion to the tax-cut multiplier, was a strict fiscal policy interpretation, in contrast to other (monetary and eclectic) interpretations that were presented at that time (41). His analysis was not modified when it was published in 1968 (42).

If the fiscal approach, with its multiplier analysis, emphasizes the deficit or surplus and relegates both the interest rate and the money creation aspects to a secondary role, the monetary approach emphasizes the money stock effects. To the monetarist, the impact

(40) Okun's analysis of the 1964 tax cut was presented at the 1965 meetings of the American Statistical Association. His paper, "Measuring the Impact of the 1964 Tax Reduction" has been published in W. W. Heller (ed.), *Perspectives on Economic Growth*, pp. 25-51.

(41) See D. E. FAND, "Three Views on the Current Expansion" in G. Horwich (ed.), *Monetary Process and Policy: A Symposium* (Irwin, 1967), analyzing the views of the fiscal proponents, the monetary proponents, and those who take an eclectic position. See also A. F. BURNS, *The Management of Prosperity* (Columbia University Press, 1966); M. FRIEDMAN, "The Monetary Studies of the National Bureau", reprinted as Chapter 12 in his *The Optimum Quantity of Money*, pp. 261-284; B. SPRINKEL, "An Evaluation of Recent Federal Reserve Policy" in the *Financial Analysts Journal*, August 1965; and G. MORRISON, "The Influence of Money on Economic Activity", in the 1965 *Proceedings* volume of the American Statistical Association.

(42) Okun in a note added in June 1967 to his 1965 analysis of the tax cut does concede that "Any analysis of fiscal impact that covered the more recent period could no longer treat monetary policy as a passive supporting force, nor could it continue to ignore the influence of higher levels of aggregate demand on prices". See W. W. Heller (ed.), *op. cit.*, pp. 27-28.

of fiscal actions will depend crucially on how the government deficit is financed: expenditures financed either by taxing or borrowing involve a transfer of resources (from the public to the government), with both interest rates and wealth effects on private portfolios, but the net effect on spending may be ambiguous; similarly, the effect of a reduction in taxes on private demand, financed through borrowing, will depend on (i) the extent to which it is viewed as a permanent, or temporary, tax cut, and (ii) its effect on market interest rates. Accordingly, the direct income-generating effects of a deficit — the pure fiscal effect — may be quite small and uncertain. On the other hand, if the deficit is financed through money creation by the banking system — if the deficit is monetized — the effect is unambiguously expansionary.

Many income theorists recognized that the multiplier analysis based on the 45° diagram was inadequate, and modified their analysis to take account of interest rate effects through the Hicksian IS-LM framework. But even this modification, while a step in the right direction, does not really make allowance for the money creation aspects of deficits. What is needed is a macroeconomic model, where the monetary effects of the deficit are taken up by introducing an explicit government budget restraint. Recent studies along these lines suggest that many of the standard propositions about the multiplier need to be revised (43).

Aside from these theoretical reasons, the need to separate out the monetary effects from the fiscal effects has been highlighted by the recent Andersen-Jordan study, testing the relative effectiveness of monetary and fiscal actions in stabilization. Their results, while preliminary and subject to further testing, do suggest that the theory of fiscal policy, with its emphasis on discretionary changes in the full-employment surplus as the key stabilization instrument, may be incorrect or only partially correct. Their findings also suggest that

(43) See L. S. RITTER, "Some Monetary Aspects of Multiplier Theory and Fiscal Policy", *Review of Economic Studies*, February 1956; C. CHRIST, "A Simple Macroeconomic Model with a Government Budget Restraint", *Journal of Political Economy*, January 1968; and J. M. CULBERTSON, *Macroeconomic Theory and Stabilization Policy* (McGraw-Hill, 1968), pp. 462-464.

See also K. M. CARLSON and D. S. KARNOSEY, "The Influence of Fiscal and Monetary Actions on Aggregate Demand: A Quantitative Appraisal", *Working Paper #4*, March 1969, Federal Reserve Bank of St. Louis; and K. M. CARLSON, "Monetary and Fiscal Actions in Macroeconomic Models", *M.S.*, for an interesting attempt to define and estimate the monetary effects of fiscal policy actions.

the tax and expenditure multipliers, as estimated in many income models, tend to confound a *ceteris paribus* fiscal action (excluding money stock effects), with a *mutatis mutandis* fiscal action (incorporating both monetary and fiscal effects) (44).

The need to revise the standard multiplier theory and to develop more discriminating empirical tests of the relative effectiveness of monetary and fiscal actions is recognized even among fiscal policy advocates. Thus, there is a significant modification of the multiplier theory in the *Economic Report for 1969*, stressing two points in particular: (1) that "the results of this multiplier process are affected by the amount of unused resources available in the economy"; and (2) that monetary policy does affect the magnitude of the multiplier (45):

Developments in financial markets may influence the magnitude of the multiplier. Increases in demands for goods and services will tend to enlarge credit demands. Unless monetary policy permits supplies of funds to expand correspondingly, interest rates will rise and credit will become less readily available. In that event, some offsetting reduction is likely to take place in residential construction and other credit-sensitive expenditures. Generally this will be a partial offset, varying according to how much the supply of credit is permitted to expand.

There is therefore a growing consensus that multiplier theory needs to separate out the monetary effects from the pure fiscal effects, in order to develop meaningful tests of the relative contribution of monetary and fiscal policy in stabilization. In particular, we need to define monetary actions so as to separate out exogenous changes in the money stock — resulting from money supply changes — from endogenous changes — reflecting shifts in the demand for money — so as to remove the identification problem in a manner that is acceptable to the income theorists; and we also need to define a pure *ceteris*

(44) The Andersen-Jordan results are presented in their paper, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Stabilization", *op. cit.* See also the *Comments* of De Leeuw and Kalchbrenner, and the *rejoinder* by Andersen and Jordan, *op. cit.*, and R. G. DAVIS, "How Much Does Money Matter: A Look at Some Recent Evidence", *op. cit.*; the earlier study by M. FRIEDMAN and D. MISELMAN on "The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897-1958" in *Stabilization Policies* (Prentice-Hall, 1963), and the subsequent discussion of this study by F. Modigliani and A. Ando, and by T. Mayer and M. De Prano in *American Economic Review*, September 1965.

(45) See *The Economic Report of the President for 1969*.

*paribus* fiscal action with restrictions on the growth rate for the monetary aggregates, that is acceptable to the *monetarists*. A revision of multiplier theory along these lines would enable us to separate out analytically, and estimate, *ceteris paribus* fiscal and monetary multipliers, and thus bridge some of the gap between the income theory and the quantity theory. But it requires that we find an acceptable method for separating out endogenous and exogenous changes in the money stock, and for estimating empirically the money stock effects of deficits and surpluses.

Fiscal deficits are obviously often associated with, if not directly responsible for, substantial increases in the monetary aggregates. Our recent experience reminds us once again that a fiscal deficit, financed by the banking system, will tend to accelerate the growth in the money stock; while a fiscal surplus, whether impounded or used to retire debt, will tend to decelerate the money stock growth. And if the fiscal deficit is financed in part through accelerated monetary expansion, as was the case since Vietnam, the growth in GNP reflects the combined effects of fiscal and monetary action.

Monetary policy, defined with reference to the money stock, typically changes in the same direction as fiscal policy. Accordingly, what we observe in most periods (i.e., like the 1964 tax cut) is the effect of a combined action incorporating both monetary and fiscal elements. It is therefore fortunate for the development of stabilization theory that they were working in opposite directions on two occasions in recent years — thus providing an interesting test case. In 1966 a sharp increase in the deficit was matched by a very substantial tightening in monetary policy; and the crunch in the latter half of 1966 and the mini-recession in early 1967 clearly demonstrate the power of monetary policy. Similarly in 1968 the very substantial increase in the full-employment surplus enacted in the June 1968 *Revenue and Control Act* (and giving rise to widespread fear of *overkill*) was apparently offset by the growth (past and subsequent) in the monetary aggregates. In these cases, the monetary forces seem to have been the stronger ones, and not the relatively minor (or permissive) factors that can only accommodate (or validate) fiscal policy actions. Hence the renewed interest in their relative contribution to stabilization.

This, then, brings us to our first question: How do we define the *ceteris paribus* fiscal action if monetary policy and fiscal policy often move in the same direction? The income theorists define this

as a fiscal action holding interest rates constant, and are consistent with their view of the transmission mechanism. On this definition, a *ceteris paribus* fiscal deficit may require a very substantial increase in the stock of money, and appears to the *monetarist* as a *mutatis mutandis* effect. To the *monetarist*, a *ceteris paribus* deficit requires a given money stock growth rate, which may lead to a rise in the interest rate; to fiscal policy advocates, this appears as an *offsetting action* since the rise in interest rates (which they define as monetary action) is restrictive and offsetting the income-generating effects of the deficit. The *ceteris paribus* effect for deficits or surpluses, as defined by the *monetarists*, will therefore differ from the definition adopted by the fiscal policy advocates.

This difference in concepts helps explain the existence of a fairly pronounced communications gap. What a monetarist regards as a *ceteris paribus* deficit may entail a rise in interest rates, and appear therefore as an *offsetting* action to the fiscal advocate; what a fiscal advocate regards as a *ceteris paribus* deficit may entail accelerated growth in the money stock, and appears therefore as a *mutatis mutandis* effect to the monetarist. This applies especially to the analysis of the 1964 tax cut.

The money stock effects of deficits and surpluses need to be quantified if we are to obtain a realistic formulation of the government budget restraint. Once this is done we may be able to estimate the effects of a non-monetized deficit and a monetized deficit, and obtain acceptable estimates of fiscal multipliers — for the *ceteris paribus* and for the *mutatis mutandis* cases. We would also like to derive such estimates for the *monetarist* who defines monetary policy in terms of the money stock growth, and for the fiscal advocates who define monetary policy in terms of interest rates. Once this is done, we may be able to translate the results obtained in these two frameworks. This should help bridge the communication gap, and it may also help reconcile the two opposing points of view (46).

(46) A technique that enabled us to separate out exogenous changes in the money stock due to monetary policy from endogenous changes induced by the real sector, would also enable us to estimate a *ceteris paribus* fiscal action in terms of exogenous money stock behavior. This approach would, in principle, be acceptable to the fiscal advocates. See K. M. CARLSON and D. S. KARNOSKY, *op. cit.*

The full-employment surplus (or deficit) is generally accepted as the best measure of fiscal policy, in preference to the actual surplus (or deficit) which is affected by the level of activity, and behaves therefore more nearly like an endogenous variable. But the full-



## Conclusion

In this paper we discuss four issues in Monetary Theory which seem central to many of the recent discussions and debates concerning monetary policy.

The first question that we consider is the extent to which the central bank can control the nominal money stock. This issue has been raised by those who find it more natural to formulate Federal Reserve policy in terms of money market and instrument variables, by those who follow the interest rate transmission mechanism of the income theory and prefer an interest rate criterion for policy making, and by those who believe that the money stock is, in part, an endogenous variable and therefore question whether it can serve as an indicator or target variable. We have tried to formulate the different viewpoints in terms of a money supply function, and test them empirically by comparing the short run money supply functions (excluding feedbacks from the real sector) with a longer run, reduced form money supply function (allowing for feedbacks). Our preliminary findings seem to suggest that the central bank has sufficient control of the money stock so that it could be made to conform to a given set of guidelines, but that its control may be weaker (and less precise), the shorter the time period available to achieve a given objective. This would suggest that the degree of precision expected of the authorities is not independent of the time period that they have to achieve the policy guidelines.

The second question that we explore is the relation between nominal and real quantities in the two aggregative theories that we have. The stabilization difficulties that we have experienced in the last several years may be related to two propositions in monetary theory which have been widely accepted in many of the income models. These are: that the authorities can influence real balances if they can control nominal balances; and that the authorities can influence *real* interest rates (and rates of return) by operations which change nominal market rates. Both of these propositions may lead

---

employment surplus is available only for the income and product budget, and is tied to an income-expenditure framework. It may be desirable to experiment with "similar" concepts (separating out endogenous effects) for the cash budget and the new, and comprehensive, liquidity budget, to determine which of these budgets provide the most useful measure of fiscal policy.

to serious policy errors when applied to a high-pressure economy such as the post-1965 period in the United States.

The third question that we consider is the theory of the price level and the analytic framework used to analyze inflation. We find that there has been a tendency since World War II to divorce money from prices, to stress real factors in explaining the absolute price level, and to neglect even substantial movements in the monetary aggregates. Moreover, when income theorists highlight the short run effect of money on interest rates — the liquidity effect — and treat it as a permanent effect, they necessarily minimize the effect on prices. This corresponds to treating real balances as if they were a variable that could be influenced by the authorities. Having ruled out any *direct* link between money and prices, income theorists necessarily explain the post-1965 rise in the price level by bringing in aggregate supply variables, other real sector developments, Vietnam escalation, and inappropriate fiscal policy, but continue to abstract from the very substantial growth in the money stock and other monetary aggregates.

The fourth problem that we consider relates to the analytical problem of defining *ceteris paribus* and *mutatis mutandis* fiscal effects. A deficit with *ceteris paribus* defined in terms of money stock growth appears as an *offsetting* action to a fiscal advocate, while a deficit with *ceteris paribus* defined in terms of interest rates appears as a *mutatis mutandis* effect to the *monetarist*. These concepts need to be defined for the monetarists and the fiscal advocates, in order to translate the results obtained in the two frameworks. This may help bridge some of the communications gap in stabilization theory, and also help reconcile the two points of view.

DAVID I. FAND

Detroit.