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## Monetarism

Thomas Mayer and Patrick Minford

Monetarism is hard to define because it is not the doctrine of a school that is sharply differentiated from the **rival** Keynesian and new classical schools. While some **economists** are clearly monetarists, others take intermediate positions that make it **more** or less arbitrary whether to call them monetarists. The basic theoretical propositions of monetarism, that changes in the quantity of money (defined as currency **plus** at least checkable deposits) play the central **role** in the determination of nominal **income**, differs only in degree from the view held by most Keynesians that changes in **the** quantity of money are a major (and in the long run the dominant) determinant of changes in nominal income. There is little disagreement between Keynesians, **monetarists** and new **classical** economists about long run equilibrium. But while new classical economists think that this equilibrium is reached rapidly, and Keynesians think **it** is reached slowly, monetarists take an intermediate position. That is an important difference because many policy questions relate to this intermediate **run**.

To be sure, much of the monetarist research strategy focuses on changes in the supply of and demand for money, while the Keynesian strategy is to look also at the propensity to consume, the marginal efficiency of investment, government expenditures and net exports. But this difference relates only to the way of proceeding with research, **and** not directly to how the economy functions.

There is greater disagreement on policy. Some monetarists agree with **Keynesians**, that – in principle – fiscal **policy** can have a significant effect on nominal income, but deny that in practice it has a large effect. Others deny that even in principle fiscal policy has a significant effect on income. While **hard-core** monetarists believe that the money supply should grow at a fixed rate, other merely want the growth rate of money to be stable, a position not so different from that of some Keynesians who oppose “**fine-tuning**”.

There are several major sources of monetarism. One is the work of **Milton Friedman** (1912-) (see Friedman, **1956**, **1969**), a leader of the Chicago school, and Anna **Schwartz** (1915-). The other is the work of Karl Brunner (1916-89) and **Allan Meltzer** (1928 -).(See Brunner and Metzger, **1989**; **1993**) Brunner and **Meltzer's** work **tends** to focus somewhat more on theoretical issues than does Friedman's. For a time

work done at the Federal Reserve Bank of St. Louis showing the dominance of monetary policy over fiscal policy also did much to buttress the monetarist case. Other important monetarists are in the U.S. Michael Darby (1945-), Phillip Cagan (1927-), **Robert Hetzel (1944-)**, William **(Poole, 1937-)**, Robert Rasche (1941-) and Clark **Warburton (1896-1979)** (who had anticipated much of Friedman's work; in Canada **David Laidler (1938-)**; in Germany Manfred Neumann (1933-) and in Israel Alex **Cukierman, (1938-)**. In the United Kingdom Alan **Walters (1926-)** is probably the best known.

### Summary of Basic Ideas and History of Monetarism

The term monetarism was coined in 1968 by Karl Brunner, but the core idea of **monetarism**, the quantity theory of money, is much older. This theory, which asserts **that** changes in the supply of money are the dominant determinant of changes in **nominal** income or prices, can be found as far back as antiquity. David Hume (1711-76) presented a remarkably sophisticated version of this theory and also upheld many other **monetarist** views.

Early in this century Irving Fisher's (1867-1947) *The Purchasing Power of Money* (1911) was a landmark in the development of the quantity theory and in its empirical testing. Fisher used what is called the transactions version of the *equation of exchange*,  $MV = PT$ , where M is the money supply, V its velocity, that is the number of times the average unit of money is spent per period (say a year), T the total volume of transactions undertaken with money, and P the average price of the items exchanged in these transactions. These transactions encompass not only final output, i.e., real GDP, but also transactions in intermediate **goods** (such as the iron ore that is used to **make** steel), factor payments and purchases of financial assets. An alternative version, called the income version, defines V as the number of time a unit of money becomes income during the period, T as real GDP and P as the average price of items included in GDP.

The equation of exchange should not be confused with the **quantity** theory. It does not tell us whether most of the change in P is due to changes in M or V or in T, or whether causation runs from money to prices, prices to money or velocity to prices, etc. To establish the quantity theory requires two empirical suppositions, which Fisher tested at length. One is that since the velocity of money depends on customs and **slow-**changing institutions it is stable after adjusting for a secular trend. In particular,

changes in the quantity of money do not produce largely offsetting changes in velocity. **The** other supposition is that changes in the money supply are the cause, and **changes** in prices the effect; for example that new gold discoveries raise the money supply, which then raises real income and prices. On the other hand, suppose that prices rise because of greater union pressures for wage increases, and that the central bank responds to the resulting rise in the demand for nominal money by increasing the money supply. The observed correlation between prices and the money supply would then not be evidence supporting the quantity theory because causation runs in the **wrong** direction.

While Fisher developed his version of the quantity theory Arthur C. Pigou (**1877-1959**) at Cambridge University developed further Alfred Marshall's (**1842-1924**) "Cambridge" version. It states the equation as  $M=KPT$ , where M, P and T have the **same** meanings as before, and K (the reciprocal of V in the income version of Fisher's equation) is the proportion of their incomes that people keep as cash balances. This version has the advantage of relating people's behavior with respect to money holdings **explicitly** to their decisions, and hence to the optimizing behavior, that forms the basis of economic theory.

Modern quantity theorists therefore generally use the Cambridge formulation **rather** than Fischer's formulation. They also use the income version, in part because they are more concerned with the behavior of GDP and the prices of those goods that **are** included in GDP than with the volume of total transactions and its prices. Moreover, **while** GDP data are readily available data on total transactions are not.

In continental Europe the quantity theory was discussed by Albert **Aftalion** (**1874-1956**), Maffeo Pantaleoni (**1857-1924**), Leon Walras (**1834-1910**) and Knut **Wicksell** (**1851-1926**).

In the early part of this century many economists in Britain and the U.S. were quantity theorists. That changed drastically in the 1930s. During the depression velocity in the U.S. and in Britain fell sharply, a development that at the time appeared to invalidate the quantity theory with its assumption of a stable velocity. And the fact that seemingly low interest rates failed to stimulate the economy suggested at the time that **monetary** factors were not an important determinant of income. What was perhaps even more important was the publication in **1936** of *The General Theory of Employment, Interest and Money*, in which Keynes (**1883-1946**) brilliantly presented an

**alternative** approach to income determination based on an analysis of the incentives to spend on consumption and investment. it **soon** swept the field, and at least in the U.S. **and** in **Great** Britain the quantity theory was considered an exploded fallacy. The *General* Theory, along with the depression also initiated a shift in economist's attention from long-run trends to short-run developments, and from changes in prices to **changes** in output and unemployment. Moreover, with expenditures now seen as governed primarily by income rather than by money holdings, monetary policy was **considered** weak, and fiscal policy, which directly changes income, was considered strong.

That situation changed in the 1950s for several reasons. First, quite unexpectedly it turned out that inflation, and not massive unemployment, was the major postwar economic problem. This is a problem on which the quantity theory has a *comparative* advantage. Second, it was intuitively appealing to relate the ongoing inflations to the expansionary monetary policies being followed, thus supporting the quantity theory.

Third, Milton **Friedman** reformulated the quantity theory in a way that appealed to modern economists, shifting the focus of attention from the long-run where it had been in Fisher's work -- Fisher did not apply the quantity theory to the short run -- to **encompass** the short run as well as the long run. This was important because concern about business cycles and unemployment had shifted economists' attention to the short run. In that connection he also shifted the emphasis from explaining the price level (a variable that is more responsive in the long run) to explaining nominal income. This meant that the quantity theory could now explain changes in output as well as in prices, and could no longer be dismissed as arbitrarily assuming full employment. Moreover, instead of treating **velocity** as more or less exogenously given, **Friedman** explained it along the lines of standard portfolio theory, making it a function of income (or wealth) and the interest rate. In this he followed Keynes, though he rejected Keynes' idea that the demand for money, and hence velocity, is highly interest elastic **and** unstable.

Indeed, Don **Patinkin** (1922-1995) (in Gordon, 1974) has strongly argued that Friedman's quantity theory is a further development of Keynesian theory, and not of the traditional quantity theory. **Friedman** (in Gordon, 1974) strongly disagrees. A reasonable solution to this dispute is to say that **Friedman** uses some of Keynes'

theoretical tools to reach traditional quantity-theory results. Whether one calls it a Keynesian or quantity theory therefore depends, in part, on whether one classifies theories by their tools or by their conclusions. But even in the former case **Friedman** differs from Keynes in an important way. He, unlike Keynes, determines aggregate expenditures indirectly, by looking at what is not spent, that is at money holdings.

Friedman's success in restoring the quantity theory to a position where, though it was not accepted by the majority of economists, it was at least a serious competitor, was aided by several factors in addition to Friedman's brilliance. One was that the then prevailing version of Keynesian theory had gone much too far in de-emphasizing the role of changes in the quantity of money, which made it an easy target for monetarist criticism. Second, in part under the influence of other writings of Friedman, a methodological **shift** had occurred in economics. There was now less emphasis on apparently plausible reasoning and more on empirical evidence. Keynesian theory had **benefited** from the previous emphasis on common-sense plausibility because it seems much more plausible that our expenditures are determined by our incomes than by the amount of money we happen to hold. So when **Friedman** and his students, as well as other monetarists, pointed to empirical evidence showing a close correlation between money and nominal income, that is to a stable Cambridge K, economists took notice. Thus someone reading Friedman's theoretical essay on the quantity theory might be **skeptical** about what the theory could accomplish. But that skepticism would be **reduced** by reading the essays by Friedman's students, which successfully applied the theory to specific cases, such as hyperinflation, and velocity in the United States.

At the same time Don **Patinkin** (1956, 1965) reformulated the traditional quantity theory in a much more abstract **way** that provided elegance and rigor, and thus brought the quantity theory into line with recent advances in economic theory. And in the 1970s **Brunner** and **Meltzer** developed a monetarist model of income determination that challenged Keynesian theory in fundamental ways, though it never attained the prominence of either Friedman's or Patinkin's version of the quantity theory.

As a result, during the 1960s and 1970s a substantial part of the work in **monetary** theory dealt with the quantity theory. Much of it consisted of trying to explain the **determinants** of the demand for money, as well as of debates about the **stability** of velocity, and the interest elasticity of the demand for money. (The interest elasticity of the demand for money is the percentage change in the demand for money per 1

percent change in the rate of interest.) Indeed, **Friedman** had labeled the quantity **theory** a theory of the demand for money, because once one has pinned down the demand for money, and knows the (exogenously given) supply of money, one can determine the levels of nominal income and interest rates needed to equilibrate the supply and demand for money.

In the **1980s** the monetarist theory of income determination lost much support. One reason was that the demand for money and velocity became much less stable, so **that** the quantity theory no longer provided such a useful tool for predicting nominal income. Another reason is that starting in the late 1970s economists became interested in a rival theory, new classical theory. The technical challenge of employing the **complex** models of new classical theory, combined with a renewed emphasis on **formal** theory, attracted many younger economists, who otherwise might have become monetarists.

The other main doctrine of monetarism, that central banks should let the money supply grow at a stable rate, has much less of a history. Under the gold standard central banks were not **supposed** to **control** the money supply for domestic objectives. Hence the question whether it is better to let money grow at a stable rate than to undertake countercyclical policies did not become salient until the 1930s when the gold standard collapsed. At that point probably most economists believed that central banks should now focus on **countercyclical** policies. But in 1936 Henry Simons (1899-1946) challenged this view and advocated stable money growth, a **position** which **Friedman** **then** developed much further **and** buttressed by empirical evidence of wrong-headed central bank policies.

The Monetarist Theory of Income of Nominal Income Determination  
 Everyone agrees that since nominal income is equal to aggregate expenditures, to **know** nominal income one must know nominal expenditures. But monetarists, unlike Keynesians, explain aggregate expenditures indirectly. Suppose that everyone spends his or her entire receipts. In **each** period aggregate expenditures would then be equal **to** the receipts – and hence the expenditures and income – of the previous period. But if people try to add to their money holdings or to reduce them, or if additional money is injected into the economy or withdrawn from it, then expenditures will change. Hence, **one** can explain changes in nominal income by looking at changes in the supply of

money and in the demand for money. This is the research strategy of the quantity theory.

This research strategy differs from the Keynesian strategy in several ways. First it focuses on equilibrium in a single market, the market for money. It can do so, since any receipts that are not added to money holdings are spent on goods and securities, so that the market for goods and securities is in equilibrium if, and only if, the market for money is in equilibrium. Such an indirect approach to determining aggregate expenditures has the advantage that analyzing the markets for money is easier than analyzing the market for the various types of expenditures and their interactions. Hence, while Keynesians often use large econometric models to trace the effects of changes in the quantity of money on income, many monetarists avoid such elaborate treatment of the transmission process from money to income, and simply say that if the supply of money rises the public will spend more. They do this, in part, because they believe that capital markets are fluid, so that if, say firms decide to invest less, the funds not used for business investment will readily find their way to other spenders, such as households that want to purchase houses.

Moreover, because they do not estimate GDP by adding demands in various sectors, monetarists make a sharp distinction between macroeconomic and microeconomic phenomena. Assume, for example, that investment opportunities in the trucking industry increase, so that trucking firms invest more. Keynesians recognize that one should not simply add this additional investment to the previous estimate of investment because, by raising interest rates, it will reduce other investment. But they treat this as an indirect effect, and are tempted to treat such indirect effects as secondary. Monetarists, on the other hand, argue that except insofar as the demand for more trucks, by raising interest rates, lowers the Cambridge k or induces the central bank to increase supply of money, it will not change GDP.

This difference between giving a certain effect a direct or an indirect role may seem subtle, and one that should play no role in a comprehensive analysis that takes indirect effects, as well direct effects into account. However, much economic analysis is not comprehensive. Suppose, for example, that a Keynesian economist and a monetarist economist were asked to estimate the effect on the general price level of a 10 percent rise in steel prices. The Keynesian would be tempted to argue as follows: Since steel accounts for x percent of the value of total output, as a first approximation

the price level will rise by 0.1x percent. By **contrast**, the monetarist would be tempted to **say** that since the money supply is constant, as a first approximation only the relative price of steel will rise, while the price level will remain constant. Both would have to concede that their analyses are **not** complete, but incomplete analysis does, of necessity infuse much of our **thinking** and form; the background that often shapes our **more** elaborate analyses.

Another difference in research strategy is that while Keynesians formulate their analysis in terms of changes in the interest rate, monetarists do so in terms of changes in the supply of or demand for money. To a considerable extent that is just a matter of **wording**. Given the demand curve for money, that is the quantity of money demanded **at** each interest rate, one can express any point on the curve equally well by reference to either the Y axis (the interest rate) or the X axis (the money supply.) Monetarists argue that it is better to think in terms of the money supply, because the most relevant **measure** of the interest rate, the expected real rate of interest, is hard to estimate. This is so because price expectations cannot be measured accurately, and also because it is **difficult** to combine the numerous interest rates that exist (some of which are not even recorded by our data) into a single measure. Monetarists therefore focus on the **money** supply instead of the interest rate, not because they somehow think that money can affect income in some mysterious way independently of what is happening to the **yields** on various assets, but because of practical **problems** of measurement. Keynesians respond that, for reasons discussed below it is even more difficult to measure the quantity of money. Moreover, the interest rate provides more information about what will happen to income than does the quantity of money because it combines the effect of changes both in the supply of money and the demand for money.

#### Measuring the Money Supply

**Monetarists** are right when they say that since the price level is the exchange rate between money and goods, an increase in the money supply, **ceteris paribus**, raises prices. But to go from this insight to a theory that can be used for (and tested by) predictions requires that money be defined in a way that can be measured with sufficient accuracy. This has **proved** a major problem for monetarism. There are three main alternative definitions of money. Narrow money, **M<sub>1</sub>**, consists of currency and checkable deposits. A broader definition, **M<sub>2</sub>** adds certain other highly liquid assets to **M<sub>1</sub>** while **M<sub>3</sub>** adds still other liquid assets. The exact definitions of **M<sub>2</sub>** and **M<sub>3</sub>** vary

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among countries. In the U.S., for example,  $M_2$  includes time deposits of \$100,000 or less, overnight repurchase agreements and shares in certain mutual money market funds and overnight Eurodollar holdings, while  $M_3$  adds those time deposits, repurchase agreements and Eurodollar holdings and mutual money market shares that are excluded from  $M_2$ . In the United Kingdom, a related concept, known as  $M_4$  adds to  $M_3$  building society deposits. ( $M_3$  consists of all bank deposits denominated in sterling and held by U.K. residents. Even broader definitions of money than  $M_3$  have been proposed. Another concept that is used, though it is not strictly speaking "money", is  $M_0$ , called the monetary base, which consists of currency and bank reserves.

Suppose that  $M_0$  is falling at a 1 percent rate,  $M_1$  and  $M_2$  are rising at a 1 percent rate and 3 percent rate respectively, while  $M_3$  is constant. Does the quantity theory predict that nominal income will rise, fall, or remain constant? A standard way of dealing with this problem is to use the measure of money that has the best correlation with income. But this procedure has several weaknesses. First, the answer may vary from time to time, and may change in unexpected ways. For example, in the U.S.  $M_1$  had at least as good a correlation with income as  $M_2$  did until the 1980s, but a much worse correlation afterwards. Second, a high correlation between a particular measure of money and income may result, not from money causing income, but from income causing money (the problem of "reverse causation" discussed below), or from a third variable affecting both money and income. Third, if the quantity theory is to be used as a guide to monetary policy it should employ a measure of money that the central bank can control with sufficient accuracy. If quantity theorists demonstrate that a certain broad measure of money has a close relation to income, this is only of limited use to a central bank that can exercise reliable control only over a narrow measure.

A basic problem is that people drive returns on financial assets including deposits to a rate that yields the same expected utility. This proposition is not so important in a world of bank and intermediary regulation, in which legal ceilings limit deposit-rate competition, and other regulations limit the type of deposits and securities that can be provided. Such conditions have been typical for many periods of history, including especially the postwar period. But most recently deregulation has been spreading to finance and the demand for monetary instruments has adjusted to

changes in newly freed deposit rates. There is now intense competition and substitution between "wide" money and other assets.

An additional problem is that residents of one country can hold some of **their** money balances in another country's currency. Suppose that the Lira holdings of Italian residents are constant, but that they now hold more Eurodollars or sterling **balances**. Their ability to purchase Italian goods has gone up just about as much as if they had held these deposits in **Lira**. But their Eurodollars and holdings of sterling do not show up as a change in the **Italian** money supply. It is not just large corporations that hold foreign monies, households do it too by holding currency notes. Since currency notes held outside a country have no effect on its income, they should be excluded from the country's money supply. But the necessary data are not available. Such foreign currency holdings are not trivial. Perhaps three quarters of U.S. currency (and hence almost a quarter of  $M_1$ ) is held abroad. There are also foreign holdings of deutschemark and other currencies.

Moreover, at least in the U.S. the **initially** available money supply data that are used to make policy are subject to substantial subsequent revision. All in all, the difficulty of empirically defining and measuring money is one of the greatest weaknesses of monetarism.

The Demand For Money and the Effect of Changes in the Money Supply  
 Although in their other work leading quantity theorists have also made substantial contributions to explaining what determines the supply of money, for the quantity theory itself they take the money supply as exogenously determined. Hence, it is the determinants of the demand for money that quantity theorists have to investigate. They take the demand for money holdings in nominal terms as depending, like the demand for **any** other good, primarily on the relative price (which in the case of money is the interest rate), on nominal income or wealth and on "tastes", a variable that includes the prevailing payments technology (such as the use of **GIRO** accounts) in addition to the public's preferences. On the assumption that these tastes are stable there is then a **stable** function relating the demand for money to interest rates and nominal income.

Suppose, for example, that the supply of money increases by 10 percent. Equilibrium in the market for money then requires that the demand for money also rise

by 10 percent. This, in turn, requires a particular combination of a decline in interest rates and a rise in nominal income. Suppose for the moment that interest rates are constant. If so, nominal income will have to rise by enough to make the public demand 10 percent more nominal money. Suppose further, that real income and real wealth are also constant, so that only prices rise. With real income and interest rates constant rational behavior ceteris paribus implies that the real quantity of money that the public wants to hold is constant. And to keep the real quantity of money constant prices have to rise in proportion to the increase in the money supply, that is by 10 percent in this example. Only then will the money supply be equal to the amount of money that the public wants to hold. One can therefore say that: (a) the government and the banking system determine the quantity of nominal money in existence, (b) the public determines the real quantity of money it wants to hold, and (c) the price level adjusts to make the nominal quantity of money supplied correspond to the real quantity that the public wants to hold.

But how can quantity theorists assume that the interest rate is constant? Surely, an increase in the quantity of money lowers interest rates as holders of the additional money offer it on the loan market. There are two possible answers. An old-fashioned one is to assume that the demand for money responds only very little, if at all to changes in interest rates, so that even when interest rates change substantially, the demand for money is affected very little, and it is therefore changes in nominal income that have to do nearly all the work to equilibrate the demand and supply of money. This explanation has not survived empirical test.

A much better explanation is to look beyond the first-round effect of an increase in the money supply. Assume, just for ease of exposition, that prices and real income were stable before the money supply increased. At first the interest rate declines, so that expenditures, real income and prices all rise. As a result, the demand for money increases and this drives up the interest rate again. And it has to continue to rise until it is back at its previous level. Since we started out from an equilibrium level of the interest rate at which prices and real income were stable, as long as the interest rate is below that level expenditures are higher than before. That continues to drive up the real income and prices, and hence the interest rate. If one assumes that the economy was operating at full employment at the time the money supply increased, then all of the rise in nominal income that occurred must represent a rise in the price level. Since, with

interest rates back at their previous level, the public wants to hold the same quantity of *real* money as before, to equate the supply and demand for money. the price level must then have risen in proportion to the increase! in the nominal money **supply**.

What is critical here is **how** long it **takes** the interest rate to return to its previous level. Most economists would agree that the **quantity theory** is correct in the sense that an increase in the quantity of money will *eventually* lead to a proportional rise in prices. Keynes did not deny that. What is subject to dispute is how long it takes for this to occur. If it takes, say twenty years, then it is not a very interesting proposition since **policymakers** and others who **want** to forecast **economic** conditions usually have a much shorter horizon, usually **less** than five years. Hence, to a considerable extent one can treat the dispute between quantity **theorists** and Keynesians as a dispute about how **long** it takes for prices to **adjust** fully to changes in the money supply. That is an empirical issue.

#### Other Aspects of the Quantity Theory

Keynesians explain changes in nominal **income**, not only by changes in the money supply that change interest rates, but also by changes in the propensity to consume, the incentives to invest, government expenditures and net exports. In the quantity theory these four variables also affect nominal income, but they do so indirectly. If households want to consume more, or firms want to invest more, or if the government borrows to increase its expenditures, then **the** interest rate rises. **With** the opportunity cost of holding money thus having increased, the public has an incentive to hold less **money** per Lira of income, so that that the Cambridge  $k$  falls and hence nominal income rises.

This does not mean, however, that the quantity theory and Keynesian theory are the same, only that one can state the **p**-positions of one theory in the language of the other. The two theories do **not** differ in rejecting each other's logical chains, but on the **empirical** suppositions that determine what conclusions the logical chains generate. Suppose, for example, that the **interest** elasticity of the demand for money is low, while the interest elasticity of investment is high. Then, if the incentives to invest increase, the demand for funds to invest drives up the interest rate substantially since it takes a **big** rise in interest rates to induce the public to hold significantly less money relative to its **income**. This rise in interest rates then limits substantially the rise in investment, and hence income does not increase much. **Similarly**, under these conditions, if the

government deficit increases nominal **income** is little changed. The quantity theory's prediction that if the money supply is **constant** nominal income does not change much is then valid. By contrast, if the **interest** elasticity of demand for money is high and the interest elasticity of investment is low, then a rise in government expenditures financed by **borrowing** is not **offset** by much of a decline in investment.

As discussed below, the quantity theory and Keynesian theory also differ in their interpretation of history. In Keynesian thinking the incentives to invest (Keynes' "marginal **productivity** of capital") is unstable and is a major factor driving fluctuations in income. In quantity-theory thinking the marginal productivity of capital and other expenditure incentives are fairly stable (or **changes** in them are mutually offsetting), so that most of the fluctuations in **income** that have occurred are due to changes in the money supply. Moreover, in Keynesian thinking an increase in the money supply, when it does occur, has for a long time a substantial part of its effect on interest rates rather than on expenditures and **income**. In quantity-theory thinking it fairly soon has all of its effect on prices. It might seem that these are empirical issues that are easy to resolve; one could, for example, compare past **changes** in the money supply with past changes in the incentives to invest. But the incentives to invest are hard to measure.

Quantity theorists are frequently **criticized** for not having a genuine theory, and for relying on the mere **correlation** of changes in money and income, and thus committing the fallacy of post hoc ergo propter hoc. However, they can respond that they are relying on standard economic **theory** which tells us that if the supply of an item increases, its relative price falls, so that an increase in the supply of money lowers the price of money in terms of goods, that is, it raises prices. While it would certainly be useful to have the steps leading from money to income spelled out in detail, rather than left vague and general, they believe that that this is not a necessary requirement for a coherent theory.

In part the dispute about whether monetarists really have a theory is methodological and relates to the **criteria** for a good theory. A scientific theory should connect a wide set of empirical **observations** to theories we already hold, and should allow us to predict other observations. Monetarists focus on prediction and on a **theory's** ability to encompass a **wide** variety of observations. Some anti-monetarists focus on the rigor and detail with which **the** observations are linked to standard microeconomic theory. For example, a **leading** anti-monetarist, Frank Hahn (1925-)

charges that **Friedman** does not have a theory of money, because he does not explain why people hold money at all. **But** from **Friedman's** point of view what matters is not some deep explanation of why **money** is held, but an explanation of how **much money** the public wants to hold, so that one can predict changes in nominal income from changes in the money supply and from changes in factors, such as income, that determine how much money people want to hold.

If the quantity theory **explains** the price level in a particular country it should **also** be able to explain the world **price** level. Indeed, under firmly fixed exchange rates the quantity theory should be used to explain only the **world** price level, since for any single country the money supply is endogenous. Suppose, for example, that **income**, and hence interest rates rise in country A. **This** induces an inflow of capital. To prevent the exchange rate from appreciating A's central bank then has to buy the resulting excess supply of foreign exchange, that is, it has to increase its own money supply. Causation now runs from a rise in income **to** a rise in the money supply.

Monetarist models have been developed which assume that the "law of one price" equalizes prices in all countries -- an assumption that is much stronger than appears at first glance. They **show** that in the long run exchange rate policy is useless: in changing a country's balance of **payments** "competitiveness": depreciation results in a higher price level, but not in a higher level of exports and employment.

International monetarism interprets movements of the exchange rate as indicating an excess supply of or demand for money in a country. If the residents of a country want to hold more money they **import** it by increasing their net sales of goods and securities to foreigners. Under fixed **exchange** rates this results in the central bank increasing the money supply as it buys up the resulting increase the supply of foreign currency. Under flexible rates the currency appreciates, which by reducing import prices and hence the price level, increases the real stock of domestic money.

#### The Brunner-Meltzer Model

The quantity theory standing alone is not the only theoretical framework used by monetarists. Brunner and **Meltzer** have **provided** a more elaborate framework that investigates the transmission process **from** money to income and prices in much detail. They reject Keynesian theory mainly because it uses an underdeveloped model of the market for assets that does not **distinguish** between the markets for capital and for bonds, and the markets for money and for credit. arbitrarily assumes that money and

bonds are substitutes, and makes insufficient allowance for the effect of changes on expenditures of changes in the stock of wealth and the relative yields of assets. For example, in their formal analysis Brunner and Meltzer treat a government deficit as having a potentially important longer-run effect on aggregate expenditures, because it raises the stock of government securities that the public holds and hence its wealth. As the increased security holdings raise the public's consumption, as well as the investment of the now more liquid firms, expenditures and thus income rise, which then raises tax revenues. Equilibrium is reached when tax revenues have risen enough and certain government expenditures, such as unemployment compensation payments, have fallen enough to eliminate the deficit. Until income has risen sufficiently to balance the budget the economy is not in equilibrium because the public's stock of government debt is increasing.

Some economists have argued that this Brunner-Meltzer model is essentially a modified Keynesian model. Brunner and Meltzer, however, consider their just mentioned criticisms of Keynesian models as indicating a substantial difference. In addition, Brunner and Meltzer look at investment incentives (and the economy as a whole) in the absence of government intervention as being more stable than do Keynesians. Moreover, Brunner and Meltzer argue that the empirical evidence shows values for the critical parameters which support the traditional quantity-theory result that the observed changes in income are largely due to changes in the money supply.

The Brunner-Meltzer model can be cited in reply to the frequent Keynesian charge that monetarists lack a genuine theory and rely on the mere correlation of changes in money and income. This does not mean, of course, that Brunner and Meltzer are able to establish the superiority of the monetarist explanation of economic events over the Keynesian explanation on theoretical grounds alone. Depending upon the values of certain parameters their model can yield Keynesian as well as monetarist results. Brunner and Meltzer therefore devoted much effort to empirical work, that is to correlations. Thus they have contributed notably to estimating demand functions for money.

#### Fiscal Policy

The disagreement about the effect of fiscal policy -- a central issue in the monetarist debate -- illustrates the monetarists' position. Monetarists, both those who use the quantity theory, and those who use the Brunner and Meltzer model, agree with

Keynesians that -- in principle -- a rise in the deficit has an effect that raises nominal income. According to the quantity-theory it raises interest rates, and hence lowers the Cambridge  $k$ . In the **Brunner-Meltzer** model it raises aggregate demand and hence income directly in the short run as the **government** spends more or cuts taxes, and, in the longer run indirectly by raising wealth. But what matters is what the empirical evidence shows, and that, say many monetarists, is that deficits have little effect on income.

This ineffectiveness of **fiscal** policy does not need to be left as an unexplained and **puzzling** observation. First, if the interest elasticity of the demand for money is low relative to the interest elasticity of expenditures, a rise in the interest rate induced by a deficit does not lower the Cambridge  $k$  much and mainly crowds out other expenditures. Second, any decline in the Cambridge  $k$  that does result from lower interest rates could be offset by the public wanting to hold more money as the deficit increases its holdings of **government** securities. Third, there is the Ricardian **equivalence** theorem which (**independently** of monetarism) claims that the public responds to an increase in the deficit by saving more in the expectation that sooner or later taxes will have to be raised to pay the interest on the larger debt, or to repay some the debt. (Friedman, but not Brunner and Meltzer, gives some credence to this theory.) Hence, while the monetarist position that fiscal policy is ineffective is rooted in empirical findings, it is not necessarily **inconsistent** with economic theory.

#### The Statistical Evidence

A major part of the empirical evidence cited by monetarists is the high correlation between the nominal money supply and nominal income that has been amply documented for various countries, in particular the U.S. (Friedman and Schwartz, 1963 and 1982), the United Kingdom (Friedman and Schwartz, 1982 and Waiters, 1970) and Italy (Spinelli, 1996). This correlation exists not only for secular movements, but also for cyclical movements. Hence, **monetarists** argue that business cycles, or at least major business cycles, are the result of an unstable growth rate of money. Comparison of the growth rates of money and inflation rates across countries also support the quantity theory.

Keynesians have no trouble with the long-run correlation; such a finding is consistent with Keynesian theory, though Keynesians would stress the importance of not ignoring the short run. The correlation between cyclical movements in money

growth and income is another **matter**. **Keynesians** do not deny that some business cycles have a monetary origin, but they treat a decline in the growth rate of money as just one of several factors that **can account** for business cycles.

They have therefore challenged the monetarist interpretation of the short-run **correlations**, arguing that there is often "reverse causation", that is, causation running from changes in income to changes in the money supply. Such reverse causation could result from the behavior of the **money multiplier**, that is the relation between changes in the monetary base and the **money supply**. The money multiplier depends on the public's preference for currency relative to bank deposits, and on the ratio of reserves that banks hold against their deposits. Suppose that a sharp drop in profitability causes many firms to fail and raises **fears** that **some** banks will be dragged down. The public then withdraws deposits from banks. To **prevent** their reserve ratios from falling banks respond to this decline in their **reserves by** reducing their loans and **security** holdings, so that their deposits and hence the money supply fall. In addition, banks may **try** to protect themselves by holding a higher reserve ratio, which further reduces deposits and the money supply. Such behavior has played a role in some business cycles, but is unlikely to account for much of the observed correlation of money and income. However, reverse correlation can also result from the behavior of the central bank. Central banks often want to prevent large **swings** in interest rates. They therefore provide banks with more reserves when income, and hence the demand for loans and for money increase, and with fewer **reserves** when income, and with it the demand for loans and for money decrease. In principle, the observed correlation between the growth rates of **money** and **income** could therefore be due to income causing money, not money causing income. Whether that is the correct explanation of the observed correlation is an empirical issue.

**Friedman** and **Schwartz** have dealt with the reverse causation problem in several ways. First, they tried to show that for all the major, i.e. severe, U.S. cycles causation could not have run primarily from income to money, because in each case the change in the money supply was due to some exogenous factor, such as a greater gold supply induced by an innovation in **gold** refining, or a change in central bank policy. However, they admit that they can **demonstrate** this only for the major cycles, and not for the much more numerous **smaller** cycles. Here they rely on the argument that if something can be shown to hold for major cycles, it is also likely to hold for the

minor cycles, whose smaller **amplitude makes** it harder to observe what is going on. Second, if causation runs from income to money one would expect the characteristics of the relation of money to **income** to depend upon the particular transmission mechanism, and hence on the type of **monetary** system. But the relation between money and income has not **changed** much despite substantial changes in the monetary system, such as the abandonment of the gold standard. Third, cyclical turning points in money preceded business cycle turning points. All the same, **Friedman** and **Schwartz** do not claim that causation runs entirely from money to income, **only** that the money to income chain is more important than the income to money chain.

This claim has not gone unchallenged. The argument that one can **generalize** from the observation that in major cycles **money** is causal to money being causal also in minor cycles has not convinced **everyone**. Perhaps most recessions result from Keynesian factors, such as a decline in the profitability of investment, and in some cycles a negative shock to the **money** supply then turns what would otherwise have been a normal recession into a **major** recession. If so, one can hardly argue that because a monetary shock is a dominating factor in major recessions it must also be one in minor recessions. Moreover, while there have been major changes in the monetary system, they need not necessarily have led to noticeable changes in the way in which income affects money. In addition as James Tobin (1918-) and William Brainard (1935) have shown, one can construct models in which income causes money, and yet the turning points of money precedes the turning points of income.

Some economists have explored the causality issue econometrically. Essentially, they first regress **income** in one period on income in previous periods, and on money in the current and previous periods. Then they reverse the procedure and regress money in the current period on money in previous periods, and on income in the current and previous periods. If in the first regression money contributes little to explaining income, while in the second regression income contributes much to explaining money, they take this as evidence that income "causes" money. But the concept of causality used in these tests is **controversial**, and what is worse, the results obtained are sensitive to specific **technique** used, such as the particular set of additional variables that are included in the regressions..

All in all, the causality issue has proved extremely troublesome. It has sometimes led to a confusion between what did happen and what can happen.

Monetarists are right in claiming that if the central bank is determined enough it can control the money supply. But for the question of interpreting the observed correlation of money and income what is relevant is **what** the central bank actually did, not what it has the power to do.

Monetarists have also tried to **show** that there is a stable demand function for money. Suppose the money **demand** function is:  $M^D = a + bY + ci$ , where  $M^D$  is the demand for money,  $Y$  nominal income,  $i$  the interest rate, and  $a, b, c$  are stable coefficients. Since the money **market** brings the supply and demand for money into equality, one can replace  $M^D$  by  $M^S$ , and then solve for  $Y$ . If one takes the interest rate as constant or otherwise known (or else assumes that the coefficient  $c$  is small enough for the term  $ci$  to be ignored), **then** if one knows the change in the money supply, one can predict the change in **nominal** income. This formulation avoids the causality issue because it makes no claim **about** why income changed. All that it claims is that **if** the money supply changes, then **income** will change correspondingly.

Many economists have fitted **variants** of such money demand functions, often containing additional variables, hoping to find one in which the coefficients are stable. Such a function would allow **monetarists** to predict income. But it would not, on its own, validate the quantity theory, because this theory also requires either that the interest rate is stable, or that its coefficient (the interest elasticity in a logarithmic version of the above equation) is low. Otherwise, what **could** be changing income might be not a change in the money supply but, say fiscal policy, operating through a change in the interest rate, and hence a change in the demand for money. This is the causality issue again.

During the 1960s and **early** 1970s **money** demand functions, some of them for long spans of yearly data, some for short spans of quarterly data, gave good **fits** for many countries, though often not as good for other countries as for the United States. In particular, **Friedman** and **Schwartz** (1982) argued that the demand for money had been remarkably stable in the United Kingdom and the United States for over a hundred years.

But starting in the **mid-1970s**, the fit of money demand functions in the United States seriously deteriorated as financial **innovations**, induced by high interest rates and facilitated by the computer revolution, allowed the public to economize on its money holdings. Subsequently, **institutional** changes that permitted the payment of

interest on some types of checkable deposits and eliminated interest-rate ceilings on other deposits led to substantial, additional instability in the demand for money.

At first this did not create a serious problem for monetarists in the United States because, though the demand function for money no longer gave a good fit, velocity was growing at a stable 3 percent rate, so that one could still predict income accurately from a knowledge of the money supply. But in 1982 the velocity of the narrow money supply (currency plus checkable deposits) became highly unstable. This was probably due mainly to changes in institutions, such as the payment of interest on checkable deposits, so that the public now holds as  $M_1$  funds that it does not intend to spend soon.  $M_2$  still had a stable velocity for some time. But in the early 1990s its velocity also became unstable.

Another line of empirical research was initiated in 1960 by Milton Friedman and David Meiselman when they claimed that a regression of consumption on the money supply yields a much better fit than a regression of consumption on more distinctively Keynesian variables. A debate ensued that focused on technical issues, such as the appropriate time periods to be considered, and the problem of reverse causation. A subsequent variant of the Friedman-Meiselman procedure by two economists at the St. Louis Federal Reserve Bank, Leonall Andersen (1924-85) and Jerry Jordan (1941-) addressed the narrower question whether fiscal policy or monetary policy had a stronger, more predictable and faster effect on income. It found that monetary policy did, with the effects of fiscal policy quickly disappearing. Though Andersen and Jordan avoided some of the problems that plagued the Friedman-Meiselman study, their work led to a long debate, much of it again dealing with reverse causation. When, in the early 1980s, the velocity of narrow money became unstable, the Andersen-Jordan equation was no longer able to predict income, and this debate died down.

### Economic History

Monetarists do not share the Keynesian belief that in the absence of stabilization policy a capitalist economy is highly unstable. That does not mean that they attribute all fluctuations to bad monetary policy, but only that they think that if the growth rate of money were kept stable GDP would fluctuate less than it does now. In particular, Brunner and Meltzer in their more recent thinking allow for the possibility that fluctuations in the profitability of investment account for a significant proportion of GDP

fluctuations. All the same, **monetarists** consider the private sector more stable than Keynesians do. Unfortunately, it has proved extremely difficult to bring empirical evidence to bear on this issue.

Monetarists have devoted considerable effort to explaining various inflations as due to an excessive **growth** rate of the money supply, and not to **cost-push** factors, such as union militancy and supply shocks. They stress that a supply shock, such as the quadrupling of oil prices by OPEC, can lead only to a temporary blip in the price level, and not an ongoing higher rate of **inflation** – as long as the central bank does not accommodate the increased **demand** for **money** resulting from the rise in prices. And if it does accommodate it, then **the** inflation should be blamed on the central bank.

It is not surprising that the most **dramatic** instance of instability, the Great Depression of the **1930s**, has drawn much attention. At the time, this depression was treated as demonstrating the instability of the capitalist system, and also as showing the unimportance of monetary policy. **But** in 1963 Friedman and Schwartz published a monetary history of the United States from 1867 to 1960 that explained the behavior of income and prices by changes in the quantity of money, and offered a radical re-interpretation of the Great Depression. They argued that its **severity** and length resulted from the great decline of the quantity of **money** that occurred (nominal  $M_1$  fell by about one quarter), due to the failure of many banks, the public's withdrawal of currency from banks, and the desire of banks for a higher reserve ratio. They blamed the Federal Reserve (Fed) for not increasing bank reserves sufficiently to maintain the **money supply**.

Not only monetarists, but also **many** other economists have found this re-interpretation, wholly or in part, persuasive, though it has also drawn criticism. Thus Peter Temin (1937-) argued that the decline in the money supply resulted not from a downward shift of the **supply curve** of **money**, but from a downward shift of the demand curve for money as income fell., thus raising the familiar issue of reverse causation. **Friedman** and **Schwartz** have also been **criticized** for de-emphasizing the influence of international factors on the American economy, and for ignoring the effect of bank failures on the availability of credit to firms that depended on bank credit. Critics have also argued that the Fed should not be blamed for allowing massive bank failures, because many banks were so weakened by the fall in agricultural prices and by bad banking practices that even a highly expansionary Fed policy would not have saved

them. The debate is still ongoing, but it seems likely that eventually the **Friedman-Schwartz** explanation will be seen as a major part of, but not the entire explanation of this episode.

#### From Nominal Income to Prices and Real Income

**Macroeconomics** has to explain more than just nominal income -- a sustained 5 percent rise in nominal income denotes a good performance if all of it represents a rise in real income, but not if it represents an 8 percent rise in prices and a 3 percent decline in real income. In other words, **one** needs to understand the supply side as well as the demand side of the macro-economy. This has proved difficult. There is little disagreement about the **underlying** idea that the aggregate supply curve slopes upwards, but the nature and slope of this curve has proved controversial. A curve, called the Phillips Curve, **after** A.W. Phillips (1914-75), and shown in Figure 1, relates changes in wages or prices to the level of unemployment. (Alternative versions linking the level of wages and prices to unemployment are not as widely used.) Ideally, the change in wages would be linked to changes in both the supply of and demand for labor, but since the demand for labor is hard to measure, unemployment is used as a proxy for the balance of supply and demand in the labor market.)

In the 1960s many Keynesians **argued** that the Phillips curve provides the government with a menu of policy choices, allowing it to select its preferred combination of unemployment and inflation rates. This optimistic view was soon discredited. It was discredited by the facts when in the 1970s both unemployment and inflation rose in the U.S. More fundamentally, in the late 1960s Edward Phelps (1930-) and **Friedman** challenged the belief that there is a stable and hence usable trade-off between inflation and unemployment. They pointed out that economic theory tells us that the supply of labor depends on real, not nominal wages. While this basic insight cannot be denied, it has been used in different ways by various schools.

The standard response was to relate the change in wages (and hence implicitly also the change in prices) not just to the unemployment rate, but also to the expected inflation rate. Suppose that when the public expects zero inflation it takes a 5 percent unemployment rate to keep wage increases equal to the 2 percent rate at which productivity is growing. But if the public expects, say 6 percent inflation, then nominal wages will rise by 8 percent whenever the unemployment rate is 5 percent. This 8 percent rise in nominal wages will then raise the inflation rate, which, in turn, will raise

the rate of wage increases, so that inflation continually accelerates. There is a certain unemployment rate, called the “natural rate” by Friedman and the non-accelerating inflation rate of unemployment (NAIRU) by Modigliani, that keeps the inflation rate constant. Since this unemployment rate is likely to vary over time it has proved hard to estimate. But there is widespread, though not unanimous, agreement among Keynesians and traditional monetarists that, while the short-run Phillips curve is like SS in Figure 1, so that a short-run inflation-unemployment trade-off exists, the long-run curve is vertical.

Various schools of economics have responded differently to these findings. Post-Keynesians adhere to a low unemployment goal and advocate incomes policy to control inflation. Most mainstream Keynesians nowadays accept that in the long run one cannot maintain an unemployment rate below the NAIRU, but sometimes argue that the long-run is a very long way off, and at one time seemed to argue that inflation expectations would never catch up, so that the Phillips curve would never become vertical. This is no longer a widely maintained position. But since, as discussed below, Keynesians are generally not as opposed to inflation as monetarists are, they have shown a greater willingness to experiment with running the economy at low rates of unemployment.

By contrast, monetarists believe that expectations adjust soon enough to limit the applicability of the short-run Phillips curve to a time span that is too short to be relevant for policy. Thus Friedman has suggested that at a time of low inflation there was a two year lag between changes in the growth rate of money and the resulting change in the inflation rate, and that this lag shrinks as the public becomes more aware of inflation. Moreover, some monetarists have argued that the short-run Phillips curve is highly unstable, which provides another reason for not basing policy on it.

New classical economists offer a radically different interpretation of the Phillips curve. They argue that since expectations are formed rationally the adoption of an inflationary policy will immediately raise expectations of future inflation, and hence the rate of wage increases, so that even the short-run Phillips curve is vertical when the government adopts a visibly expansionary policy. They therefore interpret the observed positive relation between inflation and output (which implies a negative relation between inflation and unemployment) very differently. Instead of an equilibrium in which extra output is voluntarily supplied in response to inflationary

shocks, causation runs from unexpected inflation to output. The supply response **occurs** because suppliers mistake the rise in absolute prices that they observe for their products for a relative price improvement in their product. But that occurs only if the inflation is unexpected and is therefore less likely in countries in which most of the observed changes in prices are **due** to a rise in the price level rather than to a rise in relative prices.

Keynesians and monetarists **respond** that even though the public may on the average predict a change in the inflation rate correctly, institutional rigidities, such as long-run wage contracts prevent the immediate adaptation of money wages, so that in the short run the Phillips curve is not completely inelastic. Terminating an inflation may therefore result in a substantial rise in unemployment that may last a considerable time.

### Monetary Policy

Monetarism is as well known for its strong **policy** implications as for its ideas about the economy's behavior. It is no doubt for this **reason** that it arouses such strong passions, not merely among economists, but in some countries also in the wider political arena. Four issues need to be discussed, the **general** outlook of monetarists, their focus on controlling inflation, their views on the targets and instruments that the central bank should use, and their advocacy of **stable monetary** growth.

### General Outlook

Monetarists generally favor free market **policies**. Thus in the United Kingdom monetarism is the doctrine of the Conservative party, while in the U.S. the leading monetarist, Milton Friedman, is also a **leading** opponent of government intervention. Monetarists have been among the strongest critics of various financial regulations, such as deposit rate ceilings. **There** are **several** links between the monetarist theory of income determination and their preference for market processes. One is that in this theory fluctuations in nominal **income** are **due** largely to fluctuations in the money supply generated by monetary policy, and not to an inherent instability of the private sector that the government needs to offset. Moreover, if the price level is determined by the quantity of money rather than by wage pressures and market power, then another reason for certain government **interventions**, such as price controls, disappears.

All the same, the connection **between** monetarist theory and free market economics is not tight, and a **socialist** could readily accept the quantity theory.

Germany which has followed a much more monetarist policy than the United States has a stronger social safety net than the U.S. Monetary policy has been more monetarist in Austria than in Britain, despite Austria having a much larger public sector and a corporatist policy. Moreover, one can be strong supporter of free markets while rejecting monetarism.

#### Importance of Controlling Inflation

Monetarists are more concerned about inflation than are Keynesians. In part, this is due to their focusing more on the long run. It is also due to their belief that it takes less time than Keynesians think before we reach the long run with its vertical Phillips curve; they are less influenced by a model in which prices are slow to adjust than are many Keynesians. So they are reluctant to tolerate inflation to gain a temporary decline in unemployment. Moreover, since monetarists believe that, given monetary stability, the market system can be trusted to deliver with reasonable rapidity its normal equilibrium of relative prices and real quantities, monetary conditions should be set primarily with the aim of price stability. In addition, while many Keynesians view the economy as operating much of the time at an unemployment rate that is greater than is needed to prevent accelerating inflation monetarists do not share this view. Hence they are less willing to accept expansionary policies whenever unemployment rises. Some Keynesians have accused monetarists of giving preference to price stability because they have greater social sympathy with the well-to-do who lose more from inflation than with the less well-off who lose more from unemployment. But the previously cited reasons suffice to account for monetarists being more concerned about inflation.

The new classical view is more equivocal. Since the economy adapts efficiently and rapidly to any predictable monetary policy, predictable inflation does little damage, except to induce people to hold too little currency. But since it does not do any good, it is better to have stable prices.

#### Targets and Instruments

The central bank controls directly bank reserves, short-term interest rates and the exchange rate, not GDP or the price level. The latter variables are far removed from its tools, and it needs a way of translating its wishes about GDP, etc., into specific operating instructions about its tools. Brunner and Meltzer (see Brunner and Meltzer, 1989) found in 1964 that the Federal Reserve had only vague and often misleading ideas about how its open market operations were affecting GDP, so that it frequently

mistook even the direction of its effects. They therefore developed an analytic framework of targets and instruments that allows a central bank to see the relation between its actions and their effects. It has the central bank select a target variable, such as the money supply or long-term interest rates, that bears a predictable relation to its GDP goal. It then tries to **attain** the appropriate level of this target variable by manipulating the instrumental variables that it controls directly, such as short-term interest rates and bank **reserves**. This systematization of monetary-policy strategy was a major contribution of monetarism, **although** it has by now lost out to a strategy (called GDP targeting) of using not just a single target variable, but many different target variables that are related to GDP. **Bennet McCallum** (1935 -), for example, has advocated a rule for targeting monetary **growth** adjusted for velocity changes by means of a GDP target.

In the 1960s and 1970s there was an extensive debate about what target the central bank should use. **Monetarists** advocated the money supply, while many Keynesians advocated long-term interest rates. though, in principle, a money supply target is also consistent with **Keynesian** theory. The main issues in this debate were the relatedness of the target variable to GDP, its measurability and the extent to which the central bank can control it. If the central bank cannot measure how far away it is from its target, or lacks the tools to attain it with sufficient accuracy, then such a target is useless.

The problems of measuring money and interest rates have already been discussed. The control problem arises because in the short run the relation between bank reserves or short-term interest rates and the money supply is loose, and because the effect of changes in short-term rates on long-term rates is weak.

The relatedness issue is more complex. Suppose that at a time when GDP is at the appropriate level the demand for money increases. Unless the central bank increases the money supply **correspondingly** interest rates rise and expenditures fall, so that GDP declines. Hence, if the **demand** for money changes the central bank should follow a policy of stabilizing interest rates by adjusting the money supply accordingly. But now consider the case in which expenditure incentives, say the **profitability** of investment, rise and the increased expenditures raise interest rates. In this case to keep income constant the central bank should let interest rates rise, and not increase the money supply. If it does increase the money supply it is destabilizing

because it prevents the natural increase in interest rates that would act as an automatic stabilizer. The trouble is that the central bank usually does not know which of these two cases confront it. All it observes is that interest rates rise, and it has to decide whether or not to hold them down by increasing the money supply. If it has an interest rate target it will automatically increase the money supply to keep the interest rate at its target level. If it has a money supply target it will keep the money supply constant and let the interest rate rise.

Since the central bank's tools of open market operations and discount rate changes do not directly set the money supply or the long-term interest rate it needs some instruments also called operating targets that are closer to its tools. One such instrument is the short-term interest rate. It affects the long-term rate through the term structure relationship, and it affects the growth rate of money by influencing the quantity of money that the public wants to hold. Various measures of reserves, such as total reserves, borrowed reserves or unborrowed reserves (that is reserves not borrowed from the central bank) provide alternative instruments. Monetarists favor the use of total reserves because that gives the central bank tighter control over the money supply than do the other reserve measures. For example, if the central bank uses unborrowed reserves then banks can increase their reserves, and hence the money supply, by borrowing reserves from it.

Monetarists advocate not only a money supply target, but also that the central banks keep the money supply growing at a stable rate (which might be zero.) In the hard-core version of monetarism the central bank should keep the money supply or the base growing each month at a fixed rate. Monetarists offer two main reasons for this. First, they claim that the central bank cannot predict GDP and the effects of its actions on GDP sufficiently well to be stabilizing. As Friedman (1953) has shown, a countercyclical policy that is right half the time is actually destabilizing, and the forecasting accuracy required to have a significant stabilizing effect is substantial. For example, to reduce the standard deviation of income by one third, the correlation between the initial fluctuation in income and the change in income induced by countercyclical policy must exceed 0.7, and the policy must be of optimal size. If it is too strong it will destabilize income. Given the long and probably variable lag between changes in monetary policy and the resulting change in GDP, countercyclical policy may easily do more harm than good.

In addition, new classical theory supports the traditional monetarist position by emphasizing the possibility of shifting behavioral responses to activist policies. This **Lucas** critique arises from the optimizing nature of behavior which will adjust to new constraints set by policymakers. By showing that it is uncertain what the effects of activist policy will be this argument reinforces the **standard** monetarist **arguments** about the central bank's ignorance.

The second reason monetarists **give** for opposing countercyclical policy is that the central bank lacks the incentive to pursue an effective stabilization policy. They believe that central banks, like other **government** agencies do not act to maximize the public's welfare, but to maximize the welfare of their political masters or their own welfare. It may, for example, **ease** policy excessively before an election or adopt inflationary policies because they raise **government** revenues. Central banks act also to maximize their own autonomy, power and prestige. Thus, they may **stabilize** the short-term interest rate instead of GDP **because** the public sees them more directly at fault if the interest rates they **control** fluctuate than if GDP, which is also influenced by many other factors, fluctuates. Moreover, since central banks lack sufficient accountability they are under insufficient **pressure** to abandon outworn views. This dispute between monetarists and **Keynesians** deals with topics on which economic theory and econometric testing **provide** only limited help, and the case the monetarists have made is more suggestive than **conclusive**.

In the 1980s another **argument** became prominent. This is that the central bank has an incentive to fool people **into** overestimating the real wage. If they believe that the real wage is higher they will work harder, and thus generate more tax revenue, and also unemployment falls. **The** central bank therefore has an incentive to claim that it will follow a low-inflation policy, so that the nominal wage that employers offer looks like a high real wage. Once people have accepted employment based on their belief in a low inflation rate the central bank raises the inflation rate. What makes this problem worse is that people may **expect** the central bank to do this, so that to protect their real wage they demand a higher nominal **wage**. To prevent this from generating unemployment the central bank then has to validate the higher wage demands by inflationary policies. The result is a higher inflation rate and no increased work or reduction in unemployment. However, since this is a sub-optimal outcome the public may expect that the central bank will not **play** this game, which then gives the central

bank an incentive to do so after all. Game-theoretic analysis has shown that various solutions are possible. A rule **requiring** the central bank to pursue a **fixed** monetary growth rate offer a solution to **this** problem

On the other side, Keynesians **have** largely ignored the monetarist arguments, and **proceeded** as though, .. were **all** but self-evident that central banks act almost entirely in the public interest. Nor have Keynesians provided compelling evidence that central banks can predict sufficiently well **for** countercyclical policy to be effective. To some extent the debate turns **on** the credibility of large econometric models.

The strongest Keynesian argument against a constant monetary growth rate rule was that velocity may **become unstable**. And when the 1980s **M-1 velocity**, and in the 1990s **M<sub>2</sub> velocity** in the U.S., did **become** unstable (as also happened in the U.K. with respect to **M<sub>3</sub>** and **M<sub>4</sub>** in the **1980s**, and to a more modest extent **M<sub>0</sub>** from the late 1980s) belief in a **fixed monetary growth rate** rule in its simple form lost much of its appeal. However, its basic idea has **survived** in the form of feedback rules. These are rules that specify not a fixed growth rate for money, but a fixed response of the monetary growth rate to economic developments. Such a rule might specify that the monetary base grow at a rate **equal** to a 12 quarter moving average of real GDP minus a 12 quarter moving average of the velocity of the base. **Meltzer**, a leading monetarist, has proposed such a rule, which is similar to one proposed by **McCallum**. It meets the monetarists' concern that central banks **cannot** forecast **well** enough and that they cannot be trusted, while meeting the **Keynesian** concern that the growth rates of velocity or of potential GDP may vary.

#### Monetarism in Practice

Monetarism has influenced monetary policy in many countries. Perhaps under the influence of monetarism along with the lessons of experience, all G-7 countries have brought their inflation rates **down** below what they were in the early 1970s before the first oil shock. To do so many **countries** adopted publicly announced monetary targets in the late 1960s and 1970s. But most of **them** abandoned monetary targeting again in the **1980s**, when financial innovations, largely connected with computer technology and deregulation, caused velocity to become unstable.

Yet it can be said that most central banks in industrialized countries are monetarist **converts** in the sense that they regard monetary conditions as the crucial determinant of nominal demand needing to be controlled – if only the money supply

could be properly measured. The problem has been that of finding reliable measures in a deregulated, global world with rapid technological change.

Indeed this conversion of central **banks** is intimately connected with the resurgence of free market ideas that have among other reforms given us this new financial world. Before monetarism it was **fashionable** for policymakers – not merely in the Anglo-Saxon world of the **1960s**, but also in the social democratic countries of continental Europe – to see wage and price controls as a viable instrument for controlling inflation. Monetarism, with its faith in the operations of free markets – would have been favored because it **replaced such** controls along with their distortions of relative prices and their generally debilitating effects on market forces. Thus monetarism can be seen as an important ally of free market forces generally.

The experience of three countries, Germany, the United Kingdom and the U.S. deserve particular attention

#### German Monetarism

Germany is the most monetarist among the large industrialized countries. One characteristic of monetarism, great **concern** about inflation, has a natural appeal in Germany because of its history of hyperinflation. Accordingly, the Bundesbank is legally required to give priority to maintaining the value of the currency, and has generally aimed at an inflation rate of about 2 percent.

German policy is also monetarist in its (at least so far) continued reliance on money supply targeting. The specific measure it used as a target from 1975 through 1987 was essentially similar to the monetary base, and since then it has used  $M_3$ . In fifteen of the twenty years, 1975 to 1994, the Bundesbank succeeded in keeping the actual growth of its targeted monetary aggregate essentially within its target range. All the same, the Bundesbank had to "interpret" the actual growth rate of  $M_3$  growth rate because since 1990 it has **both** undershot and overshot its targets significantly.

It seems plausible to conclude that monetarism has been successful in Germany. The inflation rate has been remarkably low, while its unemployment rate has been fairly stable around a **rising** trend (due to a rising natural rate), which implies that its inflation-oriented policy has not been **costly**. It is therefore not surprising that the German experience has influenced plans for the proposed European central bank. Opponents of monetarism can, of course, argue that the Bundesbank's success has

been due to factors other than its monetarist policies, such as the German aversion to inflation, and its system of labor relations.

#### American Monetarism

On October 5, 1979, in response to a high and rising inflation rate that threatened both domestic and foreign confidence in the dollar, the Fed made a dramatic move towards monetarism. It put much more **emphasis on** lowering the inflation rate, and also gave much greater weight to achieving its targets for the growth rate of money. This policy is therefore usually called the "monetarist experiment". Not surprisingly, interest rates and interest-rate volatility rose sharply. But very surprisingly, the volatility of the monetary growth rate rose instead of falling.

In the autumn of 1982 this policy was abandoned, and monetary **policy** was eased. Although the Fed still **announces monetary** "targets", these "**targets**" play little, if any, role in its policymaking. Similarly, the Fed again uses short-term interest rates as its instrument. But it has by no means returned entirely to its previous policy. It now gives substantially greater weight to **controlling** inflation, and has announced the essentially monetarist goal of bringing the inflation rate down to a level where it will no longer be an important **consideration** in the public's planning. It also **recognized** that, given the lag in the effect of monetary policy, it should tighten as soon as aggregate demand threatens to become **excessive**, even if the inflation rate has not yet risen. Moreover, it now realizes the dangers of **stabilizing** the nominal interest rate in the face of changing conditions.

There were several reasons for the **change** of policy. First, the unexpected decline in  $M_1$  velocity had made monetary **policy** much more restrictive than intended. Moreover, the instability of **velocity** now made targeting the money stock much less appealing. Other reasons were the great **severity** of the recession, fear that the prevailing high interest rates could **generate** a financial crisis, concern about the effect of the high interest rates on LDC debtors, and perhaps congressional threats to the Fed's independence.

The Fed did succeed in greatly lowering the inflation rate, though at the cost of very high unemployment. But on the tactical level of controlling the money supply it was a total failure. Hence Keynesians point to it as demonstrating the infeasibility of **controlling** the money supply **and** the **unrealism** of the whole monetarist program. Monetarists respond by denying that the policy was monetarist, and object to calling it

the "monetarist experiment". They point out that the Fed had not changed its operating procedures in the ways they had recommended. In particular, instead of using total reserves as its instrument the Fed used **unborrowed** reserves. Moreover, it applied the reserve requirement not to the current level of deposits, but to the deposits in an earlier period. Both of these procedures reduced its control over the money supply. Whether the failure of the so-called monetarist experiment on the tactical level of controlling short-term money growth should therefore be counted against monetarism is an open question, particularly since much of the **monthly** variability of  $M_1$  growth originated in a mysterious variability of the ratio of **currency** to deposits.

#### Monetarism in the United Kingdom

Monetarism in Britain differs from **monetarism** in Germany and in the United States not only by the conditions that brought it forth, but also by forming the central part of the program of a political party. In Germany the policies of the Bundesbank have not been a major political issue, and in the United States monetarism was just one of several strands of the Reagan program, and never received much publicity. But in Britain it was the centerpiece of the Mrs. Thatcher's program. The key reason for this was that monetarism was seen as an **effective free market** tool for controlling inflation, whereas before incomes policy was both **interventionist** and ineffective.

In 1979 Mrs. Thatcher **inherited** a monetary mess. Inflation was rising rapidly from an initial rate of 10 percent. The policy of wage controls that had been used to hold it down in 1978 had crumbled in the "winter of discontent" of that year when graves went undug and rubbish piled up in the streets. Large public sector deficits in Britain monetary and fiscal policy are closely linked. The deficit (together with government lending to the private sector) **called** the Public Sector Borrowing Requirement (PSBR), is financed by the Bank of England's purchase of government securities, and thus by the creation of **bank reserves** and money. By contrast, in the United States the Fed is not compelled to purchase additional pay increases were promised by a commission that the previous government had set up. The budget was in crisis; already the deficit was up to 5 percent of **GDP** and it would clearly rise sharply with these pay awards on top of the usual spending pressures. The deficit was seen to be important in conditioning financial confidence, and until spending was reduced the Conservatives could not satisfy their wish to cut taxes.

This was the background to the policies pursued. Little importance was attached to the operating methods used by the central bank, whether monetary base control or interest rate setting in pursuit of **monetary targets**. So what with this and the emphasis on fiscal policy support, the debate on **monetary** policy in Britain took a very different form from that in the U.S. — enough it had perhaps a rather European character.

For monetary policy the key problem was seen to be the lack of long-term credibility of the counter-inflation policy. The previous government had instituted monetary targets in **1976** in **conjunction with** IMF support for sterling. It had also managed a substantial reduction in the budget deficit; the PSBR fell from **10** percent of **GDP** in **1975** to below **4** percent in **1977**. Nevertheless, the policies lacked long-term durability. Incomes policy, which had been emphasized as the key **bulwark** against inflation crumbled, as it was widely predicted it must in a free economy. The money supply target for  $\text{£M}_3$  was **eventually** "achieved", but only by imposing a tax on deposits that are not included in  $\text{£M}_3$ , while other measures of money, such as  $M_0$  rose excessively. And budgetary discipline was based on cuts without any long-term strategy for reducing the size of the public sector; so that they were seen as a temporary pain to be reversed once the pressure from the IMF was off.

Thus, the problem of a credibly **durable** monetary restraint on prices was one of fundamental political economy, and not merely a technical matter of the central bank setting appropriate **targets**. (See Minford (1995) (1943-) To achieve durability, and it was hoped to convince people rapidly of that durability, policy was cast in the form of a Medium Term Financial Strategy or **MTFS**. This consisted first of a **commitment** to a five-year rolling target for gradually decelerating  $\text{£M}_{3+}$ . Second, controls were removed, including incomes policy, exchange controls, and the special reserve requirement on excessive growth in interest-yielding deposits. Third, the monetary commitment was backed up by parallel reductions in the PSBR/GDP ratio. The MTFS carried the full authority of the Prime Minister and notionally of the Cabinet, so that future deviations should be seen as a seriously embarrassing breach of promise to the electorate. On the optimistic view that it should be totally credible, market expectations of both short and long term inflation should drop, interest rates should fall rapidly, and any recession should be short-lived, possibly non-existent, as the falling monetary growth was offset by a falling inflation rate, so maintaining real money balances and consumer purchasing power.

In spite of apparently impeccable logic, the MTFP not only failed to command credibility, fully or even to a significant extent. It also failed to be carried out in its own literal terms. Yet policy turned **out** to be **more** fiercely contractionary than the gradualism intended; it was **closer** to shock tactics than gradualism – a paradoxical outcome. The trouble came from two **directions**: technical design and politics. Technically, the choice of  $\text{£M}_3$  **was** an error, because after deregulation of the banks (including off-shore ones with **no** exchange controls) high-interest rate deposits became the major weapon in the banks' battle for **market** share. As the banks' fortunes ebbed and flowed, so did  $\text{£M}_3$ . In **1980-81**  $\text{£M}_3$  overshot its target massively. Yet  $M_0$  was unaffected by deregulation and **told** a quite different story of sharply tightening monetary conditions. Its growth rate **halved** in the twelve months to mid **1980** and halved again in the next twelve. It is obvious from the behavior of the economy which story is the true one; the sharp recession in **1980-81**, the rapid fall in inflation and the strong exchange rate, all confirm  $M_0$  as the accurate indicator.  $M_4$ , a broader aggregate than  $\text{£M}_3$ , roughly equivalent to U.S.  $M_3$ , **also** supports  $M_0$  for this period when the main intermediary competition was between the banks and the building societies (equivalent to U.S. savings and loans) whose deposits are included in  $M_4$ . Naturally, with hindsight enthusiasts for broad money redefined it in terms of  $M_4$ , but too late (and who could tell when the next **twist** of intermediary competition would destabilize  $M_4$  in turn?)

Politically, the pain of recession, especially in the manufacturing sector, undermined the already insecure position of the monetarists in the Conservative party, and Mrs. Thatcher faced substantial internal opposition. The days of the MTFP and perhaps even of Mrs. Thatcher herself seemed numbered.

So the MTFP was widely written off at this time as a failure because its targets had not been achieved. and as a temporary interlude before traditional politics returned.

In early **1981** the technical **problems** concerning  $M_3$  began to be appreciated largely due to the arrival in Britain and Downing Street of Sir Alan **Walters**. The decision was taken to loosen **monetary** policy in order to weaken the exchange rate, to stabilize  $M_0$  at a growth rate around 5 percent, and to permit output to recover. To enhance credibility, the budget of **1981** **increased** taxes by 2 percent of GDP to **cut** the PSBR even though the recession still had not ended. This cut was crucial in finally

creating market confidence in **the** policies' durability. Long-term interest rates which had fluctuated around 14 **percent** for two years began to fall at last. Output also started to recover. The policy emphasis thus switched towards fiscal and away from monetary tightness. But overall policy remained extremely tight throughout.

Policies close to shock **tactics** were implemented by these means, **perhaps** mainly by accident, but to some degree surely by intuitive **survival** instinct: that is given that recession was connected in popular debate with the monetarist policies, it was vital to get results on inflation in **short** order as justification. In the end, the rapid fall in inflation -- down to 5 percent by end-1982 -- restored the fortunes of Mrs. Thatcher and her supporters.

### Evaluation

As the century draws to a close a **critic** of monetarism might say that it is in a crisis. Given the disappearance of a stable demand function for money and stable velocity, monetarism provides **no** reliable way of predicting GDP. And this is serious for a theory that puts its emphasis on practicality rather than on elegance. But one should avoid overemphasizing this problem. The quantity theory can still predict fairly accurately by how much an **increase** in the money supply will raise income. **Moreover**, it is possible that velocity will **again** become predictable, either due to institutional changes or to more sophisticated econometric techniques.

A second problem is that while monetarists have raised cogent questions about the ability and good intentions of central banks, they have not really established **that** countercyclical monetary policy cannot **succeed**. But what they have done is to raise a question that is **difficult** for their opponent to answer: what evidence is there that stabilization policy actually stabilizes rather destabilizes the economy?

The third problem for monetarists is internal to the economics profession. **The** simple, **empirically-oriented theory** that monetarism represents, has now lost **popularity** as the economics profession has been caught up in the intellectual excitement of **new** classical theory. Perhaps for this reason relatively few young economists are monetarists, and economists are now much less occupied than [previously with debating monetarism.

But that is much too gloomy a picture. To a **considerable** extent monetarism is the victim of its own success; some of its basic ideas have become so widely accepted that they are now no longer labeled monetarist. Keynesians have moved substantially

in the monetarist direction. They **now** consider the money supply and monetary policy much more important than they did in the **1950s**. Many, probably most Keynesians accept that the Phillips curve is **vertical** in **the** long run, and have ceased to treat the long run as a never-never land. A major growth point of Keynesian theory, New Keynesian theory, that defends the price **stickiness** proposition of both Keynesians and monetarists, might just as **well** be called New Monetarist as New Keynesian. New classical theory is essentially monetarist **theory** minus the proposition of price stickiness.

There is also considerable support for making price stability the central goal of monetary policy, though this is **due** in part to the development of time-inconsistency theory, which is more closely associated with the work of new classical than with monetarist economists. But that is essentially an accident of history: substantively **time-inconsistency** theory fits in as **well** with monetarism as with new classical theory. Moreover, while the instability of velocity has greatly reduced support for a fixed monetary growth rate, its basic idea lives on in proposals for feedback rules.

To be sure, one might argue that the changed way economists think about monetary policy are due more to the pressure of brute facts than to the teachings of monetarists, but if this is the case, then monetarists should be credited with having seen important truths ahead of others. **Monetarism** as a distinct school is in decline, **but** monetarist ideas are flourishing.

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