

A PRIMER ON THE IMPORTANCE OF THE MONEY SUPPLY

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The money supply is a widely watched statistic today. Its weekly and monthly behavior is watched by financial analysts interested in the cost of credit in the money market. Its semiannual and annual behavior is watched by business analysts concerned about the aggregate flow of goods and services from the nation's economy. Its annual and quinquennial behavior is watched by bond holders forecasting future rates of inflation. This article contains a monetarist explanation of why the behavior of the money supply is considered to be important. The first section reviews the post-World War II behavior of the money supply. Subsequent sections discuss the relation between money and the business cycle, money and inflation, and money and interest rates.

Behavior of Money Since World War II The behavior of the nominal quantity of money, that is, the amount of money held by the public expressed in dollars, is shown in Charts 1 and 2. Chart 1 plots for successive quarters from 1946 to the present the rate of growth of M_1 over the preceding eight quarter

interval.¹ The rate of growth of M_1 decelerated sharply after World War II, but accelerated during the Korean War. From 1954 to 1964 M_1 exhibited a trend rate of growth of approximately 2 percent. For this period, the cyclical behavior of M_1 superimposed on the trend rate of growth is clearly visible. The trend rate of growth of M_1 rose beginning in 1964. From 1964 to 1976 the annualized rate of growth of M_1 was 5.3 percent. Again, the cyclical behavior of the money supply is clearly evident. Recent data do not indicate any change in the trend rate of growth of M_1 . As of the first quarter of 1973, the rate of growth of M_1 over the preceding eight quarters was 7.1 percent. By the first quarter of 1976, this figure had been reduced to 4.3 percent. It has risen since then, however, and was 5.1 percent as of the second quarter of 1977.

¹ Using data beginning in 1944 I, a regression was run for each consecutive quarter employing the M_1 figure for that quarter and the eight following quarters. The regressions were of the form $\log(M_1) = a + bT + u$, where T is a time trend. T is the set of numbers 0, 1/4, 2/4, . . . 8/4. The average percentage change of M_1 over an eight quarter period is then the coefficient b multiplied by 100. All rates of change in this article will employ continuous compounding. Data for this and all other charts were obtained from a database maintained by the National Bureau of Economic Research.

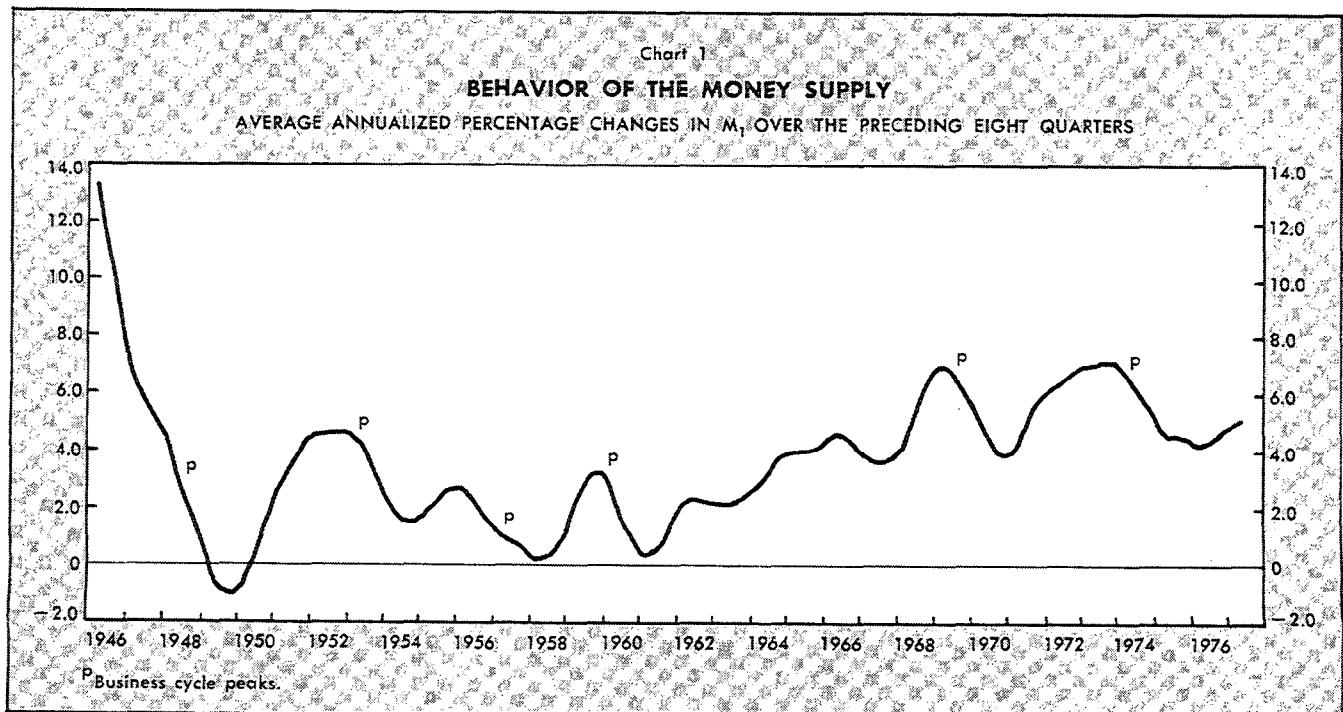
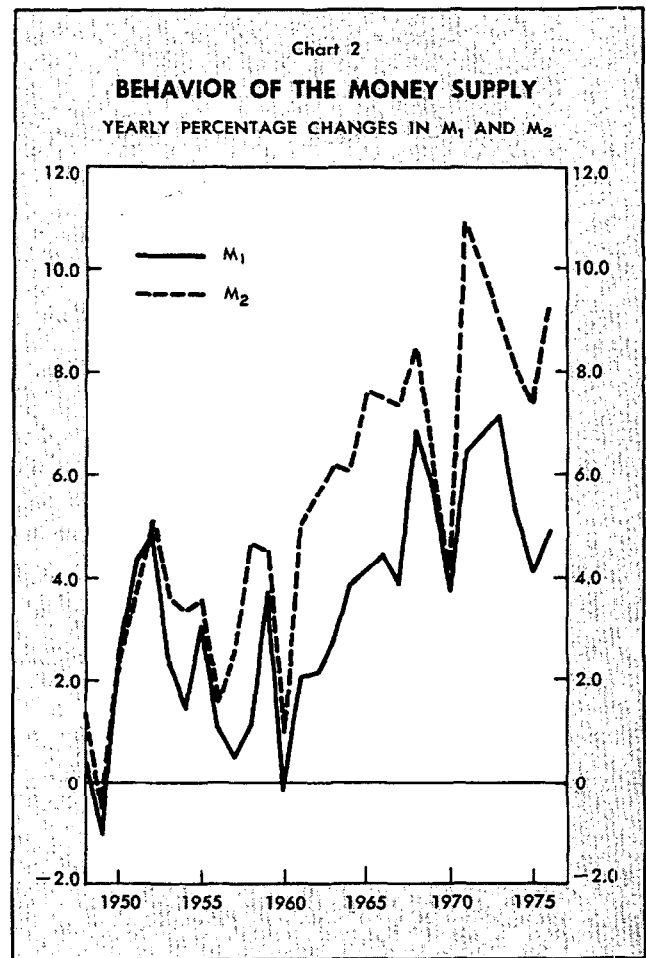


Chart 2 shows year to year growth rates for M_1 and M_2 beginning in 1948. Like Chart 1, it is useful for identifying trend rates of growth in money. M_1 and M_2 possessed the same trend rate of growth until the beginning of the 1960's. The trend rate of growth of M_2 increased in 1961, about three years earlier than for M_1 . Since then, the average annual rate of growth of M_2 has exceeded that for M_1 by 2.9 percentage points.

What is of concern to individuals is not the nominal quantity of money they hold, but rather the real quantity. Real, as opposed to nominal cash balances, are measured in terms of command over resources. One way of expressing this figure for the public is the fraction of GNP which its money holdings equal. Chart 3 shows the ratio of M_1 to GNP and M_2 to GNP using annual averages for the years 1948 to 1976.² Both ratios declined rapidly in the decade after World War II. The ratio for M_2 , however, appears trendless since the end of the 1950's. In 1976, the public held M_1 balances amounting to 18 percent of GNP (about 9 weeks income); the comparable figure for M_2 was 42 percent (about 22 weeks income).

Discrepancies Between Actual and Desired Real Cash Balances Discrepancies between the actual and desired real cash balances of the public are important because they cause changes in the spending behavior of the public. What causes such discrepancies to arise? Monetarists employ the empirical generalization that the real quantity of money individuals desire to hold depends in a predictable fashion on a small number of variables. These variables include such things as interest rates, the amount of uncertainty that characterizes economic relationships, and wealth. Furthermore, it is hypothesized that changes in desired holdings of real cash balances occur slowly. Relative to the amount of variability that generally characterizes macroeconomic variables, the ratio of M_2 to GNP shown in Chart 3 is stable. The corresponding ratio for M_1 is also stable after allowance is made for trend. From 1960 to 1976, the M_2 ratio and the trend adjusted M_1 ratio varied only

² In Chart 3, the real quantity of money is expressed as the ratio of money to GNP (nominal income). GNP is the value for the particular year. M_1 and M_2 are average figures for the first six months of the particular year and the last six months of the preceding year. The ratio of money lagged six months to GNP is stabler than the ratio employing contemporaneous figures. The reason, which is discussed in the text, is that in adjusting the ratio of money to nominal income the public can only affect the denominator (nominal income). When something causes the numerator (money) to change, however, the public's spending behavior only affects the denominator after some time has passed, generally about six months.



about one percent from year to year.³ The stability of the data on real cash balances supports the monetarist contention that the demand for real cash balances is stable.

The supply of money, on the other hand, is considered by monetarists historically to have been less stable than the demand for money. Discrepancies between the public's actual and desired holdings of real cash balances are viewed as arising from changes in the supply, not the demand for money. More specifically, it is decreases in the rate of growth of the money supply relative to trend rates of growth that cause the public's actual real cash balances to be less than its desired real cash balances.⁴ As ex-

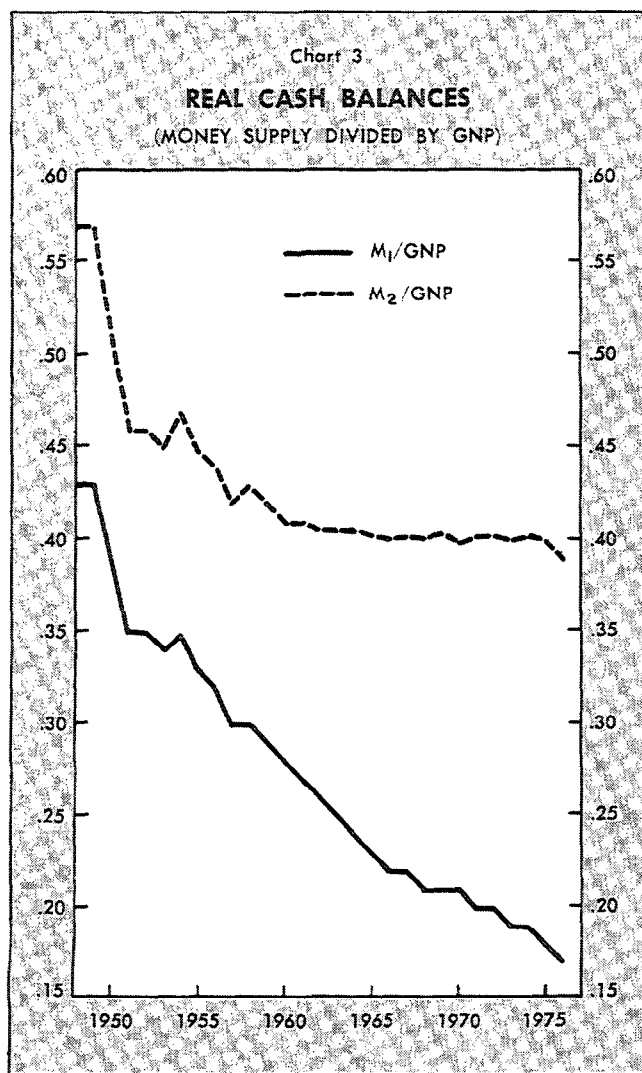
³ Expressing these ratios as percentage changes removes the trend contained in them. From 1960 to 1976, the standard deviations of the percentage changes in real M_1 and real M_2 balances, calculated as described in footnote 2, were 1.4 and 1.1 percent, respectively.

⁴ Real cash balances are the ratio of money to nominal income. Nominal income may be expressed as the product of the price level times real output. When the public has adjusted to a given rate of growth of the money supply, the growth in the price level will match the growth in money. For a given level of wealth, real cash balances, the ratio of money to nominal income, will remain constant. A reduction in the rate of growth of the money supply causes real cash balances of the public to decline because, initially, money (in the numerator), but not prices (in the denominator), are affected.

plained below, this discrepancy causes the public to reduce the rate at which it spends and produces a recession.

Adjustment of Actual to Desired Real Cash Balances The public alters its spending in response to discrepancies between its actual and desired real cash balances. For example, if the real quantity of money people actually hold is less than what they desire to hold, they reduce the rate at which they spend in an attempt to increase their money holdings. As a result, the typical producer (employer) faces a reduction in the demand for his product, which, if sustained, causes him to reduce output. He also perceives a decline in the price at which he will be able to sell his product in the future.⁵ This anticipated decline in the future price of his product causes

⁵ A starting point of price stability is assumed in this section. If the starting point had been a positive rate of inflation, phrases like "a fall in prices" should be replaced by "a reduction in the rate of growth of prices."



the producer to expect less revenue from the future sale of a given amount of product. At the then existing nominal (dollar-denominated) wage rate, the total wages paid to employees for the production of this given amount of product will remain unchanged. Consequently, real wages as perceived by the employer rise in the sense that at the current nominal wage rate, he will in the future have to turn over a greater share of the proceeds to employees from the sale of a given amount of product. Employers will be willing to employ the same number of employees as before only if nominal wage rates are lowered.

Employees will resist any reduction in nominal wage rates, even though what matters to them is real wage rates and relative wage rates. Real wages are a measure of wages in terms of their purchasing power. This measure depends on the prices of the large number of goods and services purchased by employees. Relative wages measure a wage in one job relative to wages in other jobs. Again, this measure depends on a large number of observations. For the individual employee, real and relative wages are imperfectly calculable by using general price indices, which only partially reflect his patterns of consumption and the occupational opportunities available to him. The employee is only able to gather the information necessary to evaluate his real and relative wage rate over a period of time. Even if prices and wage rates are falling elsewhere in the economy as a result of the reduction in the rate at which the public is spending, the individual employee will only gradually become aware of this information. He will initially interpret any decline in his nominal wage rate as a decline in his real and relative wage rate.

Note the contrast with the employer. The profitability of his production and, therefore, the real wage relevant to him can be determined by comparing the nominal wage to a single price, that of his own product. The real wage relevant to the employee is determined by comparing his nominal wage to many prices, and time is required to gather the information on prices. Both the employer and employee are guided by the real wage, but their perception of the real wage will differ at the onset of a recession. At the nominal wage rate existing prior to the reduction in the aggregate spending by the public, employers will want to reduce employment. If employers do cut nominal wage rates, employees are more likely to quit in order to look for a job offering the previously existing higher nominal wage rate. Job seekers, hoping to find a job paying the old nominal wage rate, are more likely to refuse a

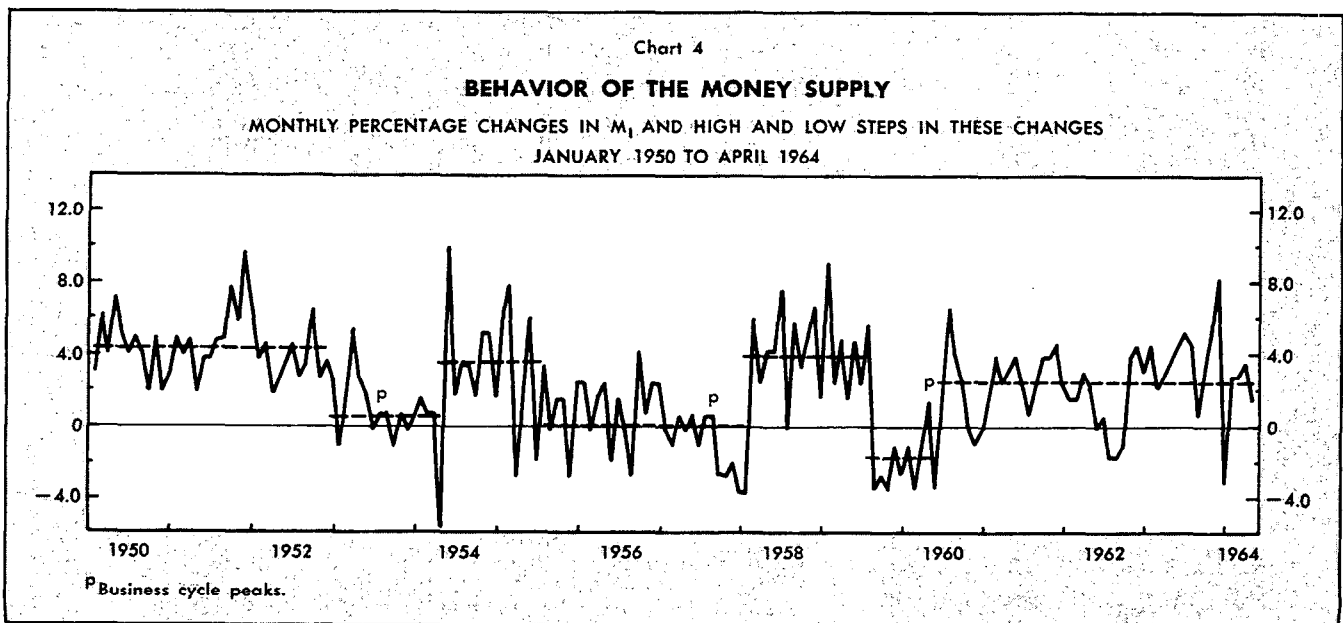
job offer at a reduced nominal wage rate. As a result, unemployment rises.

It is an observable fact that a decrease in the aggregate spending of the public initially affects quantities, output and unemployment, to a greater extent than prices. Individual producers view the reduction in the demand for their product as in part particular to them. As a result, they will anticipate having to continue paying current wage rates and current prices for other factors of production since these are determined for them elsewhere in the economy. Also, as explained above, employees will resist reductions in their nominal wage rates even if producers are lowering the prices of the goods the employees buy. With per unit costs of production fixed, producers will reduce output and use less labor and material inputs in response to a generalized reduction in demand. (In economic jargon, producers move down their marginal cost curves.) The relative speeds of adjustment of quantities and prices are discussed further in the Appendix.

The effects of a sustained change in the rate of growth of the money supply are felt on the economy only with a long lag. Consider a decrease in the rate of growth of money relative to its trend rate of growth. People hold cash balances in order to buffer discrepancies between receipts and expenditures. As a result their individual cash balances always exhibit volatility. It thus requires some time for them to realize that their cash balances are more than just temporarily below the desired average level. The same situation exists for producers with regard to inventories. When people do begin to slow their

purchases in an attempt to rebuild their cash balances, the inventories of producers accumulate. Inventories are in general volatile, and it requires time for producers to realize that their inventories are above the desired average level more than just temporarily. The decision by producers to reduce output will come only after the realization that inventories will not return to the desired average level except through a reduction in output.

The lag is not only long, but also variable. There are many reasons. The rate of growth of money may deviate from trend in many ways, for example, the deviation may be abrupt or gradual. The particular pattern will affect the amount of time that must elapse after a change in the rate of growth of money in order for the public to become aware of a discrepancy between its actual and desired real cash balances. Also, the public evaluates the desirability of its money holdings not only with respect to the current price level, but also with respect to the anticipated future intertemporal movement in the price level. (The price level affects the denominator of the definition of real cash balances used above, i.e., the ratio of money to nominal income, because nominal income is the price level times real output.) For example, the speed with which a change in the rate of growth of money produces discrepancies between actual and desired real cash balances may depend on the extent to which the change is in the same or opposite direction as any change in the rate of inflation that the public expects to occur. When such a discrepancy appears, the public may try to eliminate a variable fraction of it over a given time period



depending on other conditions in the economy. Furthermore, the public may assign different importance at different times to the many alternative ways of eliminating the discrepancy. It may change its indebtedness, its holdings of financial assets, its stock of consumer durables, or its rate of consumption. Finally, the effect on spending due to monetary forces can initially be either offset or reinforced by real forces in the economy.

Chart 1 illustrates the statements made in the preceding sections. The points labeled P date peaks in the business cycle. The peaks are preceded by declines in the rate of growth of the money supply. The length of time between the peak in the rate of growth of the money supply and the peak in business activity is, however, quite variable. Chart 4 depicts the lagged relationship between money and output in a different way. It plots the monthly rates of growth of M_1 . These growth rates occur at either relatively high or relatively low levels for extended periods. These periods were isolated visually and a step function was plotted with the height of the step equal to the annualized rate of growth from the last month of the preceding step to the last month of the particular step. As can be seen, in general, a drop in the step function is followed by a peak in business cycle activity.⁶

It is interesting to note the dramatic decline in the

trend rate of growth of M_1 after World War II shown on Chart 1. The associated recession was of very modest proportions considering the size of this decline. The public expected prices to fall after the war. Prices had fallen after every major war and many anticipated a return to depression conditions. In Chart 3 the real quantity of money is expressed as a ratio of the quantity of money to nominal GNP. If money and prices decline simultaneously, this ratio is unaffected as the numerator and denominator both decline. In this case, if the demand for money is stable, a decrease in the rate of growth of the money supply does not produce a discrepancy between actual and desired real cash balances. If the government is going to effect a reduction in the rate of growth of the money supply, it can reduce the cost to the economy by fostering a belief that the price level will fall, thereby avoiding the emergence of a discrepancy between the actual and desired real cash balances of the public.⁷

It should be noted that the evidence summarized in Charts 1 and 4 on the effect of money on the economy refers to significant deviations from trend in the rate of growth of money. There is little evidence on the question of how short-run movements in the rate of growth of the money supply affect the real sector. Chart 5 plots variability in real GNP and in

⁶ The last business cycle peak marked on the chart is September 1974. It is assumed that an earlier peak in the business cycle occurred in October 1973 as a result of the oil embargo and energy price rises. The sharp decline in business activity which began in September 1974 is assumed to have resulted from the prior reduction in the trend rate of growth of the money supply, which is shown on Chart 4.

⁷ The best way to affect price expectations will depend on the particular circumstances. For example, France in January 1960 required the public to turn in "old" francs for "new" francs in the ratio of 100 to 1. It was an accounting change only, but it affected expectations about prices. A monetary authority might also induce deflationary price expectations by announcing the time path over which it intends to reduce the rate of growth of the money supply and then proving its credibility by sticking to the announced time path. At least the financially sophisticated public might then alter their price expectations and price setting behavior.

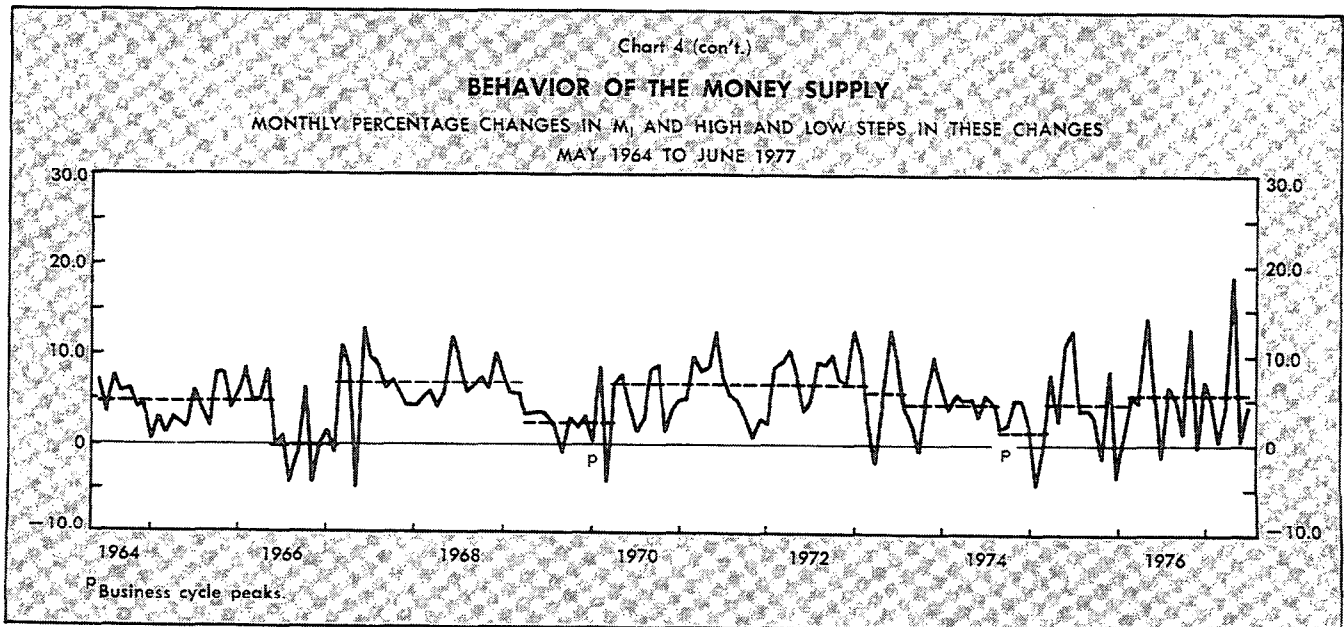
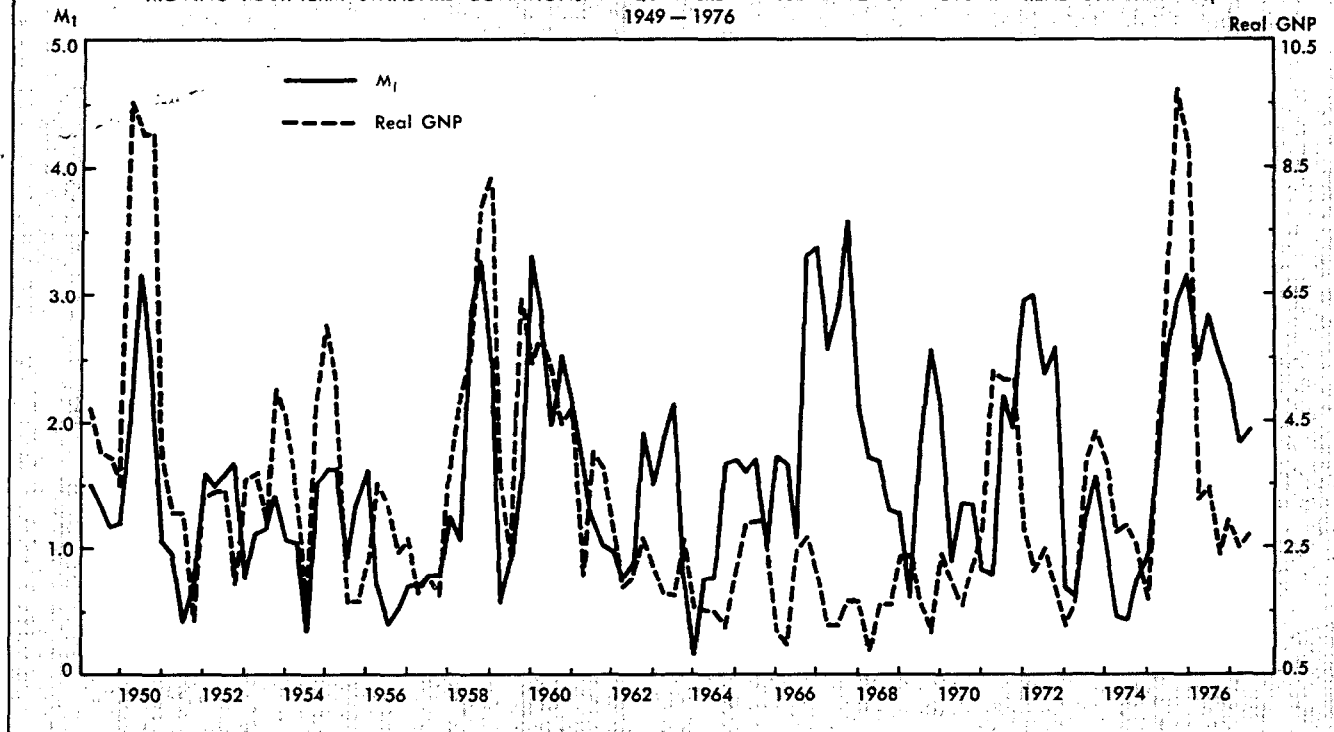


Chart 5

VARIABILITY IN MONEY AND OUTPUT

MOVING FOUR-TERM STANDARD DEVIATIONS OF QUARTERLY PERCENTAGE CHANGES IN REAL GNP AND M_1
1949 - 1976

the rate of growth of M_1 .⁸ If the M_1 series had exhibited no variability over the period shown in the chart, it is impossible to say, apart from recessions, whether the variability in the real GNP series would have decreased, remained the same, or increased.⁹

Price Behavior The spending the public undertakes in order to eliminate a discrepancy between its actual and desired real cash balances does not in itself eliminate the discrepancy. Consider a closed economy that is not growing and that has adapted to a constant money supply. The public's demand for real cash balances and the price level will be constant. The money supply is now increased once and

for all; and, as a result, the public holds real cash balances in excess of what it desires to hold. Individuals will try to run down their cash balances by spending more than they receive. Collectively, however, these individuals cannot reduce their nominal money balances by spending at a higher rate because one individual's expenditure is another individual's receipt.

The increased spending does increase the demand for the economy's output. As a result, output will rise initially; and if the increased demand is sustained, producers will raise prices. The rise in the price level eliminates the excess holdings of real cash balances. In terms of Chart 3, the ratio of money to GNP rises at first above its equilibrium value because of an increase in money. As the price level rises, nominal income or GNP rises, and the ratio of money to GNP falls. Prices rise and real cash balances fall until the latter are returned to their equilibrium value.

If the quantity of money had been decreased rather than increased, equilibrium would have been restored with a fall in the price level. The recession analyzed above would come to an end after resources were unemployed for a sufficient length of time to cause prices to fall by enough to restore equality between

⁸ Chart 5 plots moving four-term standard deviations of quarterly annualized percentage changes in M_1 and in real GNP.

⁹ Over most of the period shown on Chart 5, the Fed followed a policy of trying to stabilize conditions in the money market as opposed to a policy of trying to control the rate of growth of the monetary aggregates. Changes in the demand for bank credit were, therefore, able to influence changes in the money supply. If the former changes were in the main unrelated to changes in the demand for money, such changes would cause discrepancies between the public's actual and desired holdings of real cash balances. If arrangements for eliminating short-run discrepancies are costly, the effects of short-run variability in money are transmitted to the real sector. On the other hand, if changes in the demand for bank credit were in the main caused by changes in the demand for money, the variability in the money series reflects variability in the demand for money. If shifts in the demand for money had not been accommodated, discrepancies between the public's actual and desired holdings of real cash balances would have developed. If the growth of the money supply had been kept stable over short time periods, the result might have been to produce a more variable output series.

the public's actual and desired real cash balances. The public's spending then returns to its normal level.

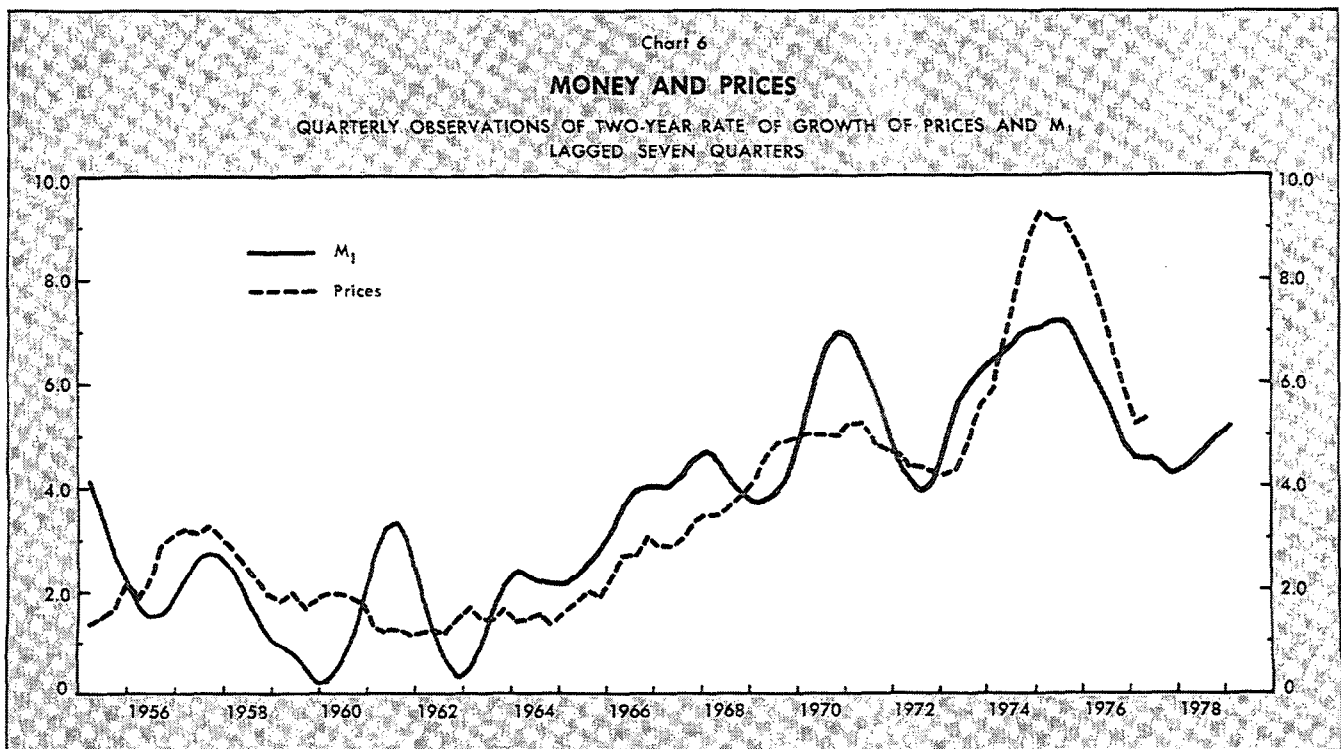
The above example describing the consequences of an increase in the money supply may be retold in terms of an increase in the rate of growth of the money supply. The resultant increase in the price level is replaced by an increase in the rate of growth of prices. Making use of the monetarist assumption that the demand for money is stable, the rate of inflation should be explainable by past rates of growth of money. The relationship between the rate of growth of money and prices need only hold as an average taken over long time periods. Also, money will affect prices after a long lag because money affects output with a lag and because many prices appear to be set, implicitly or explicitly, in contracts of long duration. Chart 6 plots the annualized rate of change of the GNP price deflator between the current quarter and the quarter two years ago. The plot of the two year average rate of growth of M_1 is the same one shown in Chart 1 except that the observation on a given date is for the quarter seven quarters ago (money is lagged by seven quarters). The similarity between the rate of change of prices and past money is striking. Since money is plotted with a lag of seven quarters, its plot extends seven quarters into the future.

Interest Rates and the Quantity of Money The distinction between the nominal and the real quantity

of money and the relationship between the rate of change of the money supply and inflation provides a basis for analyzing the popular belief that the Federal Reserve System can control market interest rates.

The real rate of interest measures the amount of resources one must promise to deliver in the future in order to obtain a given amount of resources in the present. It induces savers to forego consumption of currently available resources and constrains investors in the use of currently available resources for production of commodities in the future. The equilibrium real rate of interest equates the supply of resources by the first group to the demand for resources by the second group. The interest paid to savers must include this real return plus compensation for the depreciation in the value of the dollars used to pay interest. The equilibrium nominal interest rate is then the equilibrium real rate of interest plus the anticipated rate of inflation.

The Fed funds rate is the rate of interest commercial banks charge on overnight loans of reserves among themselves. By buying and selling government securities, the Fed changes the amount of reserves banks hold, in the process pushing this rate up or down. Such actions do not directly affect the equilibrium nominal interest rate. They do not affect the real rate of interest because they do not affect the determinants of saving, such as the thriftiness of the population, or the determinants of investment,



such as the availability of productive opportunities; and in themselves they do not directly affect the public's inflationary anticipations.

Can the Federal Reserve System control market interest rates by controlling the funds rate? To take a particular case, can it lower market interest rates by lowering the funds rate? An independent lowering of the funds rate means lowering it relative to the equilibrium nominal rate of interest. The cost of funds to banks is lowered, and it becomes profitable for banks to extend additional credit. As banks make additional loans, the derivative deposits of the banking system increase. The required reserves of the banking system also increase, but the Federal Reserve must supply these reserves in order to preserve the low level of the funds rate. Both the increase in credit and in the money supply act to lower market interest rates.

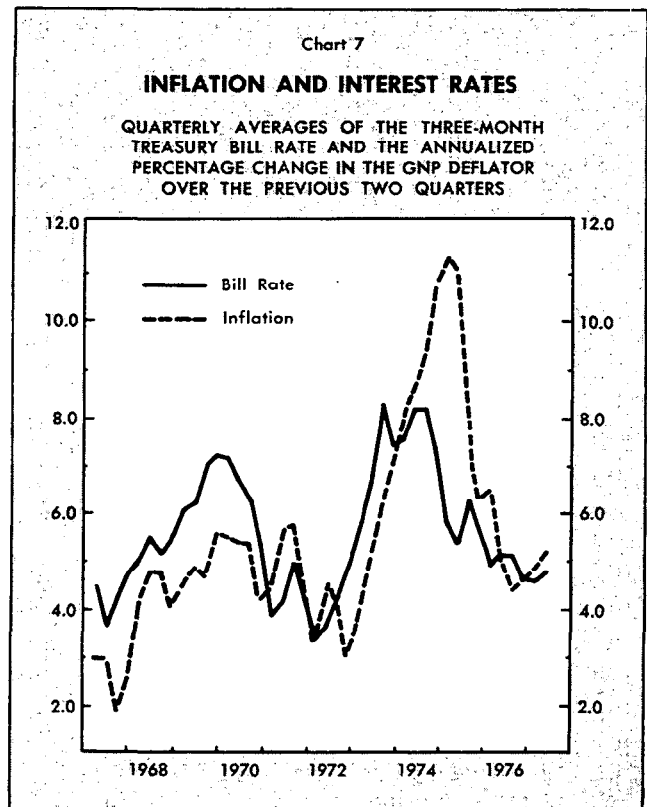
At this point the public holds real cash balances in excess of what it desires to hold. As just described, this disequilibrium is resolved only by a rise in the general price level. If the low value of the funds rate is maintained, the increase in the money supply will be maintained, and inflation will persist. As the public comes to anticipate this inflation, lenders and borrowers will incorporate a corresponding inflation premium in interest rates, and the equilibrium nominal rate of interest will rise. The discrepancy between this rate and the funds rate, the cost of credit to banks, therefore increases. As a result, banks have even more incentive to extend loans, the money supply increases even faster, and the rate of inflation rises even further. This process will cause the rate of inflation to accelerate until either the monetary system breaks down or until the funds rate is allowed to rise to a level determined by the market, not the Federal Reserve.

The Federal Reserve can lower market interest rates in the short run by lowering the funds rate and allowing the rate of growth of the money supply and bank credit to increase because in the short run it can control the real quantity of money and bank credit. The effect is temporary, however, because in the long run the Federal Reserve can control only the nominal quantity of money and bank credit. In the long run, the public controls the real quantity of money and bank credit.

The length of the short run referred to above depends on how rapidly the public revises its inflationary anticipations. Chart 7 plots quarterly averages of the rate on newly issued three-month Treasury bills and the annualized percentage change in the GNP deflator over the previous two quarters. The public definitely did adjust interest rates over this

period in response to the behavior of inflation. Chart 8 plots quarterly averages for the rate on newly issued three-month Treasury bills minus the annualized percentage change in the GNP deflator between the current and the following quarter. This variable measures the actual rate of return realized by investors in Treasury bills after allowance is made for inflation. In only 3 out of the last 18 quarters have investors earned a positive rate of return on these securities. Since the last half of 1972, interest rates have, in this sense, been at unsustainably low levels.

The evidence just cited suggests that although investors are slow in adjusting their anticipations of future inflation, they do adjust these anticipations. How does an independent decrease in the funds rate affect market interest rates when investors are concerned about the stability of the purchasing power of the dollar? In the short run, short-term interest rates will decrease. The funds rate, however, is the interest rate on a loan of a maturity of one day. What is relevant to the holder of, say, a ten year security is the succession of one day funds rates over the next 3,650 days. The current funds rate offers little information on funds rates for more than a short time in the future. The welfare of the holder of a long-term security is affected by the rate of inflation over the life of the security. If the decrease in the funds rate is viewed as leading to an increase in the



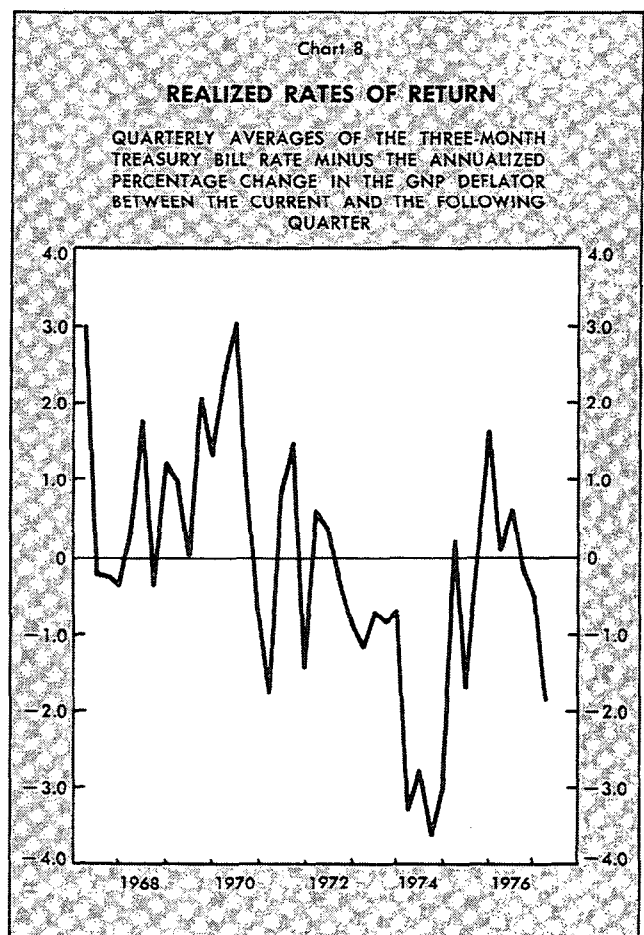
rate of growth of the money supply and, consequently, to a higher future rate of inflation, the decrease will lead to an immediate increase in interest rates on long-term securities. In the long run, short-term and long-term interest rates will increase.

Differing Behavior of the Monetary Aggregates

The final section departs from the analysis of the rest of the paper, that is, the analysis of the relation of money to output, prices, and interest rates. It discusses briefly the question of which of the several available money supply series one should watch. If one is interested in predicting the behavior of GNP, the answer depends on which money series is most stably related to GNP. M_1 and M_2 are generally the series watched most carefully currently, but in the future it is possible that a more inclusive aggregate will come to be more stably related to GNP than either M_1 or M_2 . The discussion below is confined to the differing behavior of M_1 and M_2 .

As noted earlier, the trend rate of growth of M_2 exceeds the trend rate of growth of M_1 by about three percentage points. One reason is that explicit interest payments are forbidden on demand deposits, but permitted on time deposits. (Time deposits, excluding certificates of deposits of \$100,000 or more, are included in M_2 , but not M_1 .) Banks pay implicit interest on demand deposits to business customers by tying compensating balances to reduced rates on loans. They pay implicit interest on demand deposits to individuals by reduced service charges for check clearing. Payment of interest in these forms, however, is costlier to the bank and of less value to the consumer than would be payment of the equivalent explicit interest. Furthermore, individuals who maintain large checking balances relative to the number of checks they write subsidize individuals in the opposite position. For these reasons, banks and their customers (and particularly the group just referred to) have an incentive to substitute time for demand deposits. Banks, and customers of banks, that belong to the Federal Reserve System have an additional incentive to make this substitution because they must hold noninterest bearing reserves to a greater extent against demand than against time deposits. A continuing incentive exists for banks and their customers to substitute time for demand deposits.

Apart from differing trend rates of growth, the rate of growth of M_1 and M_2 differ over shorter periods because of the phenomena known as disintermediation and reintermediation. Disintermediation occurs when market rates rise relative to ceiling rates on time deposits. The difference between



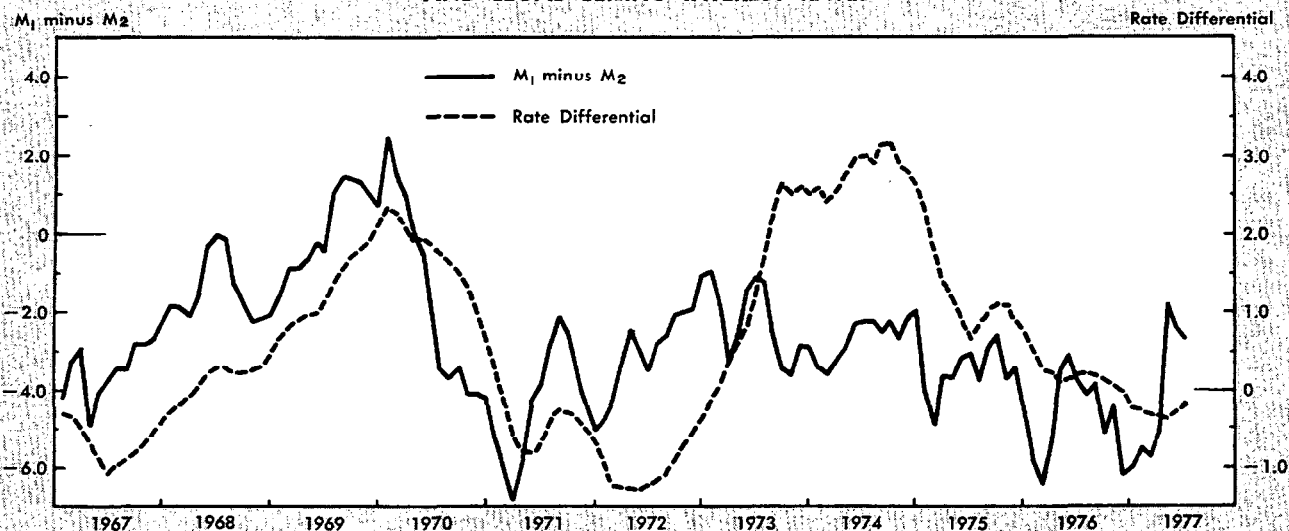
market and ceiling rates causes holders of time deposits to transfer funds to money market instruments. The transferred time deposits return to the banking system partly in the form of demand deposits and partly in the form of time deposits. The result is to raise the rate of growth of M_1 relative to M_2 . The reverse process, reintermediation, occurs when market rates fall relative to ceiling rates. The rate of growth of M_2 then rises relative to the rate of growth of M_1 .

Chart 9 plots monthly the difference between the 90-day Treasury bill rate and the ceiling rate on single maturity time deposits of less than \$100,000 and the difference between the rate of growth of M_1 and M_2 .¹⁰ In general, as the Treasury bill rate rises, the rate of growth of M_1 rises relative to M_2 , and conversely. The period from January 1973 to September 1974 is an exception; the rise in interest rates is not matched by a rise in the rate of growth of M_1 relative to M_2 . Apparently, during this period the effects of disintermediation were offset by the

¹⁰ The data are smoothed exponentially as follows: the plotted value equals .3 times the actually observed monthly value plus .7 times the previously plotted value.

Chart 9

**EXCESS OF M_1 OVER M_2 GROWTH AND THE DIFFERENTIAL BETWEEN MARKET
AND LEGAL CEILING INTEREST RATES**



Note: Annualized monthly percentage changes in M_1 minus annualized monthly percentage changes in M_2 and the differential between the three-month Treasury bill rate and the ceiling rate on time deposits of less than \$100,000.

historically high level of interest rates. The high level of interest rates reinforced those factors that depress the trend rate of growth of M_1 relative to M_2 , offsetting the usual effect of disintermediation.

After allowance is made for differing trend rates of growth and for disintermediation and reintermediation, over periods as long as six months, the rates of growth of M_1 and M_2 are similar. Taking account of these factors permits one to use either M_1 or M_2 as an indicator of the thrust of monetary policy.

Conclusion The theory and empirical assumptions discussed above constitute a monetarist explanation of the importance of the money supply. A variety of policy implications follow from these ideas. If the demand for the quantity of money is stable, stable growth rates of money will eliminate or reduce business cycle fluctuations. If money affects output with a long and variable lag, a countercyclical monetary policy can destabilize the economy. The only way to reduce the rate of inflation is to reduce the

rate of growth of the money supply. Low growth rates of the money supply produce low nominal rates of interest, and vice versa.

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APPENDIX

In the text, employees are described as unwilling to accept reductions in their real wage rates at the onset of a recession. Because they obtain information on prices in the rest of the economy only slowly, they are also unwilling to accept reductions in their nominal wage rates. In effect, employees and employers enter into contracts that set the nominal wage rate, but not the amount of employment.

The total earnings of an employee equal the wage rate times the number of hours worked. The employer, because of uncertain demand for his product, cannot guarantee in advance to the employee what the total earnings of the employee will be. This much seems obvious, but it is not obvious why employees enter into implicit or explicit employment contracts that allow quantities (hours worked) more flexibility than prices (wage rates).

A contract may guarantee the wage rate, but not the total number of hours to be worked. If an unanticipated reduction in the demand for the employer's product occurs, he can reduce output by laying off workers. Because his wage costs per unit of output are fixed, he reacts to a decline in the demand for his product by reducing output, not prices. With this kind of contract, the employee's total wages are uncertain in advance. He knows the wage rate with certainty, but not the number of hours he will work. The automobile industry furnishes an example of this kind of contract.

Alternatively, a contract may guarantee the number of hours to be worked, but leave the wage rate dependent on the demand for the employer's product. If an unanticipated reduction in the demand for the employer's product occurs, he can stabilize output by reducing the price of his product, and the wage rate paid employees. Because the employer's wage costs per unit of output are variable, he can react to a decline in the demand for his product by reducing prices, not output. With this kind of contract, the employee's total wages are uncertain in advance. He knows the number of hours he will work with certainty, but not the wage rate. Salesmen and others who work on a commission basis furnish an example of this kind of contract.

The fact that changes in aggregate spending by the public affect output before prices indicates that the first kind of contract is more prevalent than the second. Why individuals deal with uncertainty in the first, rather than the second way, however, is unknown. Perhaps the unemployment associated with the first kind of contract, which is produced by unforeseen declines in product demand, gives employees time to engage in job search for alternative sources of employment. For a particular firm the variability in the demand for its product caused by forces other than recessions may be the dominant form of variability. Laid off workers will then generally not expect to have to engage in the relatively expensive job search associated with recessions.

The behavior of labor unions may also furnish a clue to the reason for the prevalence of the first kind of contract. When confronted with the dilemma of either reducing wage rates and preserving jobs and union members or maintaining wage rates and losing jobs and union members, unions have generally chosen the latter alternative. The reasoning imputed to union leaders is that with a general wage reduction all union members are unhappy. With a maintenance of wage rates and a reduction in jobs, only those workers who lose their jobs are unhappy, but they are no longer members of the union, so their dissatisfaction does not count.

The same logic may perhaps be applied to non-unionized work forces. With the first kind of contract, a reduction in the demand for an employer's product leads to a loss of jobs. However, those workers who are retained are still paid the previous wage rate and their morale and productivity is maintained. With the second kind of contract, a reduction in demand for an employer's product leads to a reduction in wages, not jobs. Although this possibility was foreseen by workers when they entered into their employment contracts they will still feel disappointed by a "bad roll of the dice." Worker morale will suffer and so will productivity. The differing effect on workers' productivity under the two forms of contracts may make the former kind of contract preferable.

TWO VIEWS OF MONETARY POLICY: The Attwood-Mill Debate Revisited

Thomas M. Humphrey

I beg to be understood as . . . recommending that the Bank . . . be obligated or otherwise be induced, to increase the circulation of their notes as far as the national interests may require, that is to say, until all the labourers in the kingdom are again in full employment at ample wages.

THOMAS ATTWOOD (1819)

Mr. Attwood opines, that the multiplication of the circulating medium, and the consequent diminution of its value, do not merely diminish the pressure of taxes and debts, and other fixed charges, but give employment to labor, and that to an indefinite extent . . . Mr. Attwood's error is that of supposing that a depreciation of the currency really increases the demand for all articles, and consequently their production, because, under some circumstances, it may create a false opinion of an increase of demand; which false opinion leads, as the reality would do, to an increase of production, followed, however, by a fatal revulsion as soon as the delusion ceases.

JOHN STUART MILL (1833)

Accompanying the current recovery, now well into its third year, is a heated debate over the role of monetary policy in restoring and maintaining economic stability. Two groups of participants dominate the debate, namely advocates of activist expansionary policies at one extreme and proponents of steady monetary growth at the other. The policy views of these competing groups have been conveniently summarized by Professor Karl Brunner [13], himself a member of the stable money group.

According to Brunner, the activist group (1) assigns top priority to the speedy return to full employment, (2) urges rapid money growth to help achieve that objective, (3) prescribes monetary fine-tuning to maintain full employment once it is reached, and (4) recommends acceptance of inherited inflation on the grounds that the cost of accepting it is far less than the cost of eradicating it. The stable money group, by contrast, (1) attaches top priority to the elimination of inflation on the grounds that

price stability is an essential prerequisite for an efficiently functioning economy and a sustained high average level of employment, (2) recommends that the monetary authority gradually approach and thereafter permanently adhere to a target path of money growth consistent with a zero rate of inflation, (3) prescribes that discretionary fine-tuning be replaced by fixed monetary rules, in particular the noninflationary constant money growth rate rule, and (4) warns that the social cost of accepting inherited inflation far exceeds the cost of eradicating it.

The debate between policy activists and stable money proponents is not new. The essentials of the debate can be traced back more than 140 years to a celebrated controversy between Thomas Attwood and John Stuart Mill over gold versus paper monetary standards in post-Napoleonic war Britain. This debate occurred during a long deflationary period that abruptly succeeded a wartime inflationary boom. The postwar deflation brought severe unemployment, industrial stagnation, and economic distress. Attwood, a Birmingham banker and political reformer, sought to relieve the distress by replacing the existing gold-based currency with an inconvertible paper currency geared to the level of employment. He was opposed by Mill, the famous philosopher-economist who, as a leading member of the orthodox British Classical school, defended the gold standard and dismissed all paper currency schemes as purely inflationary. The debate centered on such modern policy issues as unemployment versus inflation, rules versus discretion, and the benefits and costs of accepting and eliminating inflation. This article examines the Attwood-Mill controversy and shows how similar it is in essentials to the current policy debate.¹

Attwood's Views Thomas Attwood was the policy activist of his day. He advocated full employment and gently rising prices, both to be achieved by monetary fine-tuning. He stated these views in more

¹ The literature on the Attwood-Mill debate includes the references listed at the end of the article. Regarding Attwood's views, see Checkland [14], Corry [15, pp. 81-95], Fetter [12, pp. vii-xxviii], Link [16, pp. 6-35], O'Brien [19, pp. 164-5], and Viner [22, pp. 173, 186-7, 195, 199, 212-14, 239]. On Mill, see Link [16, pp. 148-61, 168-72, 177-9]. The present article draws heavily from these sources.

than a dozen pamphlets, in numerous letters to the press as well as in private correspondence, in testimony before three Parliamentary committees, and in several speeches before the House of Commons where he served as representative for the district of Birmingham from 1832 to 1839. His views can be organized under five headings corresponding to the central themes of his analysis. These include (1) full employment as the policy goal, (2) primacy of monetary policy, (3) feasibility of monetary fine-tuning, (4) benefits of price inflation, and (5) costs of price deflation.

Full Employment as Policy Goal To Attwood, full employment was the overriding policy goal. "Employment," he said, "is a right which a good citizen may claim of his country without any kind of degradation or obligation" [4, pp. 45-6, cited in 16, p. 20]. He reiterated this view in 1832 in his testimony before the Parliamentary *Bank Charter Committee*. When asked the question:

Do you consider that as long as there exists a labourer in the country not fully employed, an increased issue of currency may be made with advantage, whatever it be?

Attwood replied:

As a general principle, I think, unquestionably, that so long as any number of industrious honest workmen in the Kingdom are out of employment, supposing such deficiency of employment not to be local but general, I should think it the duty, and certainly the interest, of Government, to continue the depreciation of the currency until full employment is obtained and general prosperity [9, p. 467, cited in 15, p. 86].

Elsewhere he stated that "the first and most important duty for the Legislature to attend to, is to take care that an ample demand for labor is restored and maintained throughout the country" [11, p. 17].

Attwood defined full employment as an excess of vacant jobs over unemployed people, or, as he put it, "a greater demand for labor, than labor can possibly supply" [4, p. 39, cited in 16, p. 34]. This excess vacancy measure also provided *the* criterion of an appropriate quantity of money, as can be seen from Attwood's statement that money creation "cannot be said to be carried to too great an extent, until the general demand for labor, in all the great departments of industry, becomes permanently greater than its supply. There is no other correct measure of a redundant, or deficient, circulating medium" [10, cited in 14, p. 10]. Thus if labor is in excess supply, the money stock is too small and should be expanded. Its expansion should be continued until excess demand just begins to develop in the labor market. At this point the correct amount of money is in existence and expansion should therefore cease. Note that he

explicitly puts an upper as well as a lower bound on the appropriate quantity of money. Thus he states that "Whenever . . . the money of a country is sufficient to call every laborer into action, upon the system and trade best suited to his habits and his powers, the benefits of an increased circulation can go no farther. . . ." Beyond that point, further increase is "nugatory or injurious" [2, p. 68, cited in 22, p. 213n.]. In short, he specified a unique ideal money stock target consistent with full employment.

In specifying his full employment target, Attwood was confronted with a measurement problem created by the lack of employment or unemployment statistics. He tried to solve this problem by suggesting three proxy measures of full employment. These included the price of wheat (a crude index of the cost of living), the wages of agricultural labor (Attwood's "par of labor") and the rate of interest, respectively. He assumed that full employment existed when these variables reached certain levels. Specifically, wheat prices at 15 shillings a bushel, weekly wages at 18 shillings, and interest rates at 5 percent spelled the existence of full employment. Departures from these norms indicated corresponding departures from full employment and the need for monetary action. Thus lower prices and wages and higher interest rates signaled unemployment and the need for monetary expansion. Deviations in the opposite direction meant overfull employment and the need for monetary contraction. Attwood assumed that these proxies were mutually consistent and would not produce conflicting signals for the authorities. He also assumed, in effect, that employment could be maintained at the desired level by pegging nominal wage, price, and interest rate variables.

Attwood's association of given wage and price levels with a given level of employment corresponds to present-day use of Phillips curve relationships between inflation and unemployment. Likewise, as will be shown later, John Stuart Mill's criticism of Attwood on this point is similar to modern criticisms of the Phillips curve. Like modern critics of the Phillips curve, Mill argued that one could not peg real economic variables by pegging nominal variables (whether wages, prices, interest rates, or the money stock) since there exists no permanent relation between the two kinds of variables, i.e., they are independent of each other in the long run. Note also that Attwood's version of the Phillips curve referred to wage and price *levels* rather than to the rate of inflation. In his time it was natural to think in terms of a stable long-run price level, with low or high prices corresponding to low or high rates of inflation today.

The preceding has documented Attwood's concern with full employment. Further proof that full employment was for him the desideratum of monetary policy is contained in his discussion of conflicts between the goals of internal and external equilibrium under the gold standard. Regarding the objectives of full employment and convertibility of the currency into gold at a fixed price, Attwood's view was that the former should prevail. In fact, if full employment proved to be incompatible with convertibility and the maintenance of fixed exchange rates, then Attwood was prepared to sacrifice the latter even if it meant the complete cessation of foreign trade. That is, Attwood was quite willing to replace the existing gold standard monetary system of convertible paper currency and fixed exchange rates with an alternative system of nonconvertible paper and flexible exchange rates if full employment so required. Attwood was one of the first to argue that floating exchange rates could provide a nation with the autonomy necessary to control its own money stock and achieve its domestic objectives independent of the rest of the world. By abandoning fixed exchange rates for floating ones, the authorities could pursue domestic employment targets free of an external constraint. As he put it, under floating exchange rates the nation would be "Self-existent, self-dependent, liable to no foreign actions, entirely under our own control; contracting, expanding, or remaining fixed, according as the wants and exigencies of the community may require" [7, p. 34].

Primacy of Money Attwood constantly stressed the importance of money in the achievement of full employment. His analysis invariably linked changes in the level of economic activity to changes in the money supply, implying that the latter variable is the dominant determinant of the former. Prosperity, he said, "is indeed to be attributed to one cause only, and that cause is the general increase of the Circulating Medium" [7, p. 12]. Similarly, a "contraction of the Currency" is "the sole cause of the distress of Agriculture, and of all other distress" [7, p. 91]. It follows, therefore, that "it is the deficiency of money, and not its excess, which ought most to be guarded against, which produces want of employment, poverty, misery, and discontent in nations" [11, p. 18].

In line with the foregoing precept, he prescribed monetary injection via government loans and open market operations or, as he put it, "a forced creation of additional currency" as the sole remedy for unemployment [1, p. 9]. He specifically rejected two non-monetary remedies, namely David Ricardo's capital

levy plan and William Cobbett's "equitable adjustment of contracts," both designed to stimulate economic activity by reducing the burden of fixed costs. To Attwood, nothing but monetary expansion would restore prosperity. "Nothing," he wrote, "can feed the labourers, nothing can serve the country, unless it has the effect of *creating*, or *bringing into action*, an additional quantity of the currency" [1, p. 48]. He also viewed money growth as the key to maintaining prosperity once it was restored. He argued that sustained full employment required a money growth rate sufficiently rapid to accommodate the trend growth rate of capacity output. Gold, he thought, could not grow at the required pace, which is one reason he advocated paper over gold. With paper, there would be no shortage of money to limit economic growth. To summarize, Attwood stressed monetary growth as the solution to two problems: that of moving onto the full employment path (i.e., the short-run problem of eliminating cyclical unemployment), and that of staying on the path (the long-run problem of maintaining adequate growth).

Monetary Fine-Tuning Like his modern activist counterparts, Attwood believed in the efficacy of monetary fine-tuning. He advocated the assignment of monetary management to a legislative commission. This body would regulate the quantity of money not by adhering to rigid "laws of maximum and minimum but by judicious legislative operations upon the issue of bank notes, or other national paper" [3, p. 163, cited in 22, p. 213]. The economy needed to be stabilized and effective stabilization called for discretion, not rules. For example, wise and skillful monetary management could nullify shocks to full employment arising from sudden shifts in the demand for money.

In case of any sudden panic occurring, so as to occasion an unusual demand for money . . . the *nonconvertible Paper* instantly expands itself to meet the demand, and the demand is satisfied and the mischief stayed [7, p. 34].

Similarly, discretionary fine-tuning would prevent the overissue of money and the acceleration of inflation at full employment.

When public confidence runs high and the instruments of credit have a tendency to expand themselves into *excess*, the slightest *touch* upon the *non-convertibility basis* of the Circulation instantly reduces the whole [7, p. 34].

In sum, discretion should prevail and the economy would be kept on an even keel by "a judicious issuing and withdrawing of the banknote circulation" around the full employment level [3, p. 150, cited in 14, p. 10].

Benefits of Inflation A central theme in Attwood's writings is the necessity of price inflation. Price increases were an essential ingredient in his full employment program. "The great object of currency legislation," he said, "should therefore be to secure and promote this gradual depreciation" of the currency [3, p. 101n., cited in 14, p. 8]. To this end he extolled the benefits of gently rising prices.

Restore the depreciated state of the currency and you restore the reward of industry, you restore confidence, you restore production, you restore consumption, you restore everything that constitutes the commercial prosperity of the nation [1, p. 66].

This passage shows that, for Attwood, inflation is desirable precisely because it stimulates economic activity. The rise in the level of income, output, and employment constitutes the benefits of inflation. But what is the mechanism or linkage involved, i.e., *how* does the stimulus work? According to Attwood, it does so by reducing the burden of real fixed costs thereby raising profits and profit expectations that provide the means and the inducement for business expansion. Specifically, a money-induced increase in aggregate spending bids up product prices while fixed costs remain constant in nominal terms. The resulting spread between prices and costs increases current profits and leads to the formation of optimistic expectations of future profits. These profits, actual and expected, spur production and employment. Profits are clearly the key to increased economic activity and inflation raises profits by generating a gap between prices and fixed costs. In brief, "there is no difficulty in employing and maintaining labourers, so long as the prices of the products . . . are *kept above the range of the fixed charges and monied expenses*," i.e., so long as business is profitable [7, p. 42. Italics in original.]. This point is further emphasized in Attwood's summary of the money-price-profit-employment nexus. "Prosperity," he says, has occurred whenever the government has

filled the Country with what is called *Money*; and this *plenty of Money* has necessarily produced a general elevation of prices; and this general elevation of prices has necessarily produced a general increase of *profit* in all occupations; and this general increase of *profit* has, as a matter of course, given activity to every trade in the kingdom; and whilst the workmen, in one branch of trade, are *producing* one set of articles, they are inevitably *consuming* an equal amount of all other articles. This is the *prosperity of the Country*, and there is no other prosperity which has ever been enjoyed, or ever can be enjoyed [7, pp. 11-12].

Costs of Price Deflation Finally, Attwood continually warned against the evils of falling prices. In doing so, he used much the same arguments as modern policy activists. The only difference is that

modern analysts have gone one derivative beyond Attwood. He worried about the harm done by falling *prices*. They worry about the costs of a falling *rate of inflation*.

Like his current activist counterparts, Attwood saw the harmful effects of deflation as stemming from institutional, contractual, and expectational rigidities built into the structure of product and factor prices. These rigidities, he thought, worked in two ways.

First, they prevent prices from adjusting swiftly in response to deflationary pressures. It took a long time, he believed, for deflation to work its way through the price structure. During this time, quantities (output and employment), not prices, had to bear the main burden of adjustment. As he put it, to engage in deflationary contractions of the money supply in an economy in which "the whole machinery of society is worked through the medium of monetary debts and contracts, is to arrest the movement of that vast and complicated machinery [and] to destroy the beneficial employment of labor" [11, p. 2].

Second, rigidities produce distortions in cost-price relationships. These occur because rigidities are not uniform across the price structure, i.e., different prices have different speeds of adjustment. Specifically, wages and other contractually fixed costs ("all the monied incumbrances") adjust sluggishly relative to product prices. Thus, when general prices fall, product prices fall relatively to wages and fixed costs. This reduces profits which constitute the means and the incentive to produce. As a result economic activity slackens and unemployment rises. These effects are clearly outlined by Attwood in the following passage.

If prices were to fall suddenly, and generally, and equally, in all things, and if it was well understood, that the amount of debts and obligations were to fall in the same proportion, at the same time, it is possible that such a fall might take place without arresting consumption and production, and in that case it would neither be injurious or beneficial in any great degree, but when a fall of this kind takes place in an obscure and unknown way, first upon one article and then upon another, without any correspondent fall taking place upon debts and obligations, it has the effect of destroying all confidence in property, and all inducements to its production, or to the employment of laborers in any way [3, pp. 78-9, cited in 22, p. 186. Italics in original.].

Elsewhere he states that when "the prices of commodities are suffered to fall . . . within the level of the *fixed charges and expenses* . . . the industry of the country dies" [7, p. 42. Italics in original.].

In short, owing to rigid cost elements, deflation leads to recession. And once started, a recession in-

evitably worsens, or so Attwood thought. He believed the economy to be unstable in a downward direction. Falling prices depress profits and profit expectations and cause an unloading of stocks. This puts further downward pressure on prices, profits, and expectations causing another unloading of stocks, etc. A downward multiplier effect takes hold and the cyclical trough is not reached until stocks are exhausted and prices start to rise because of shortages. This sequence brings great suffering to unemployed workers and hardship to businessmen. For these reasons, price deflation should be avoided at all costs.

Policy Views of the Classical School Attwood was not a member of the Classical school. His policy views were unorthodox in his time. But his analytical tools were largely the same as those of his Classical school contemporaries. From them he obtained the quantity theory of money, which he used in expounding the relationship between money and prices. And his treatment of the economic effects of inflation derived straight from David Hume, whose analysis likewise formed the central core of the Classical doctrine of *forced saving* according to which inflation temporarily stimulates activity by transferring wealth from unproductive fixed-income recipients to productive capitalist entrepreneurs. The clash between Attwood and the Classical school was not over economic analysis or theory. Instead it was over immediate objectives of policy, Attwood focusing on instant full employment and the Classical economists focusing on external and internal stability of the value of money, which they associated with the gold standard.²

The Classicists attached great importance to stability in the value of money, regarding it as an essential prerequisite for justice in contracts and for economic growth and efficiency. Without this stability, parties to contracts would be exposed to arbitrary and capricious transfers of income and wealth arising from unforeseen changes in the value of money. Such transfers constituted unjust violations of contracts. Likewise, without the monetary stability provided by the gold standard, producers, who are already heir to numerous real business risks, would face additional risks arising from unanticipated changes in the value of money. These additional risks discourage production and inhibit real economic

² The Classicists thought that gold, for all its vicissitudes, was a more stable standard of value than the alternatives, especially paper. On this point, see Robbins [21, pp. 69-73]. They maintained that, given the world gold stock, reasonable national price stability would be assured under the gold standard by the operation of the *price-specie-flow mechanism*. That is, a temporary rise in domestic prices relative to foreign prices would induce a balance of payments deficit and a corresponding gold outflow that would reverse the price increase and restore prices to their initial level.

growth. Moreover, they cause real resources—effort, time, knowledge—to be diverted from productive pursuits into forecasting and risk-bearing activities that would be totally unnecessary if money's value were stable and predictable. This represents a wasteful and inefficient use of resources that results in a lower level of output than the economy is capable of producing.

As the preceding suggests, the Classical economists were not oblivious to the desirability of full employment. On the contrary, they were very much concerned that economic resources, including labor, be utilized as fully and efficiently as possible. But they believed that efficient resource utilization (full employment) could best be achieved not by making it the main target of monetary policy but by establishing a framework of preconditions within which it could flourish. One of these essential preconditions was stability (i.e., predictability and reliability) of the value of money. If monetary stability prevailed, they thought, then full employment would tend to take care of itself.³

This attitude helps explain their opposition to Attwood. In a nutshell, they feared that his schemes, by making full employment the desideratum of monetary policy, would in the end lead to conditions opposite to those he intended. They foresaw the following gloomy sequence as the natural consequence of his proposals: internal inflation, external disequilibrium and gold drains, exhaustion of the nation's gold reserves, abandonment of the gold standard and of convertibility of the currency (the sole check to overissue), hyperinflation, and eventually economic breakdown and stagnation. In short, they felt that his inflationist schemes constituted a formula for disaster.

Mill's Critique of Attwood Nowhere is the Classical school's opposition to Attwood more strongly expressed than in the writings of John Stuart Mill. Mill, of course, was a leading Classical economist and an uncompromising defender of the gold standard. His comments on Attwood appeared first in an 1833 article entitled "The Currency Juggle" and later in Chapter 13 of his famous treatise *Principles of Political Economy* (1848).

In these writings he attacked Attwood's full employment proposals on at least three grounds. First, he questioned the feasibility of attempts to peg employment at arbitrarily high levels via inflation. Second, he argued that even if inflation could stimu-

³ This point is stressed most forcefully by O'Brien [19, p. 165] and Robbins [20, p. 137 and 21, p. 7].

late the economy such stimulus was undesirable in terms of its effects on efficiency and equity. Third, he asserted that monetary policy should be conducted on the basis of rules, not discretion. Mill's analysis of these issues is remarkably modern and is described in some detail in the following paragraphs.

Pegging Output and Employment Regarding the feasibility of stimulating activity via inflationary money growth, Mill argued as follows. First, such stimulus is at best temporary. Second, it occurs only when inflation is unanticipated and catches people by surprise. Being unexpected, the inflation fools or deludes people into increased activity under the mistaken belief that real profits and wages have risen. As Mill put it, inflation

could only succeed in winning people on to these unwonted exertions by a prolongation of what would in fact be a delusion; contriving matters so, that by a progressive rise of money prices, every producer shall always seem to be in the very act of obtaining an increased remuneration which he never, in reality, does obtain [18, p. 550].

For example, suppose there occurs an unanticipated increase in nominal aggregate demand that drives up general prices. To each producer, the inflation appears as an unexpected rise in the demand for his product. In an environment in which changes are always occurring in the relative demand for different goods, he will not know whether this change is special to him or pervasive. But if inflation has not occurred for some time, he will likely interpret the demand shift as special to himself and so expand output. Surprised by inflation, he will misinterpret the general price increase as a rise in the relative price of his own product. In this way each producer will be led to think that the demand for his product has increased relative to the demand for other products. Consequently, each will tend to expand production and aggregate output will rise.

That this was Mill's interpretation is clear from his statement that a general rise in nominal demand "produced a rise of prices, which, *not* being supposed to be connected with a depreciation of the currency [i.e., not perceived as being connected with general inflation], each merchant or manufacturer considered to arise from an increase of the effectual demand for his article, and fancied there was a ready and permanent market for almost any quantity of the article which he could produce." In short, an unexpected inflation, "may create a *false opinion* of an increase of demand; which false opinion leads, as the reality would do, to an increase of production" [17, p. 79].

The increase in output of course requires extra labor which employers obtain by offering higher

nominal wages. The labor is willingly supplied by workers who mistake the rise in nominal wages for real wage increases. In Mill's words, "the inducement which . . . excited this unusual ardor in all persons engaged in production, must have been the expectation of *getting more commodities generally*, more real wealth, in exchange for the produce of their labor, and not merely more pieces of paper" [18, p. 550]. Owing to inflation, however, these expectations, Mill noted, will be disappointed and subsequently revised downward. In this way expectations will adjust to reality, i.e., the inflation eventually will be accurately perceived and fully anticipated.

The third point in Mill's argument is that the inflationary stimulus vanishes when perceptions adjust to reality, i.e., when producers correctly perceive demand increases as nominal rather than real and workers realize that real wages have not risen. When this happens, economic activity reverts to its original (preinflation) level, but only after undergoing a temporary recession to correct for the excesses of the inflationary period. In other words, the return to equilibrium involves some overshooting and a period of below-normal activity. Here is Mill's conclusion that, when people are fooled by inflation, economic activity is affected both at the time of the misperception and also when the misperception is corrected. As Mill expressed it, the "increase of production" is "followed . . . by a fatal revulsion as soon as the delusion ceases" [17, p. 79].

Finally, Mill argued that Attwood's proposal to peg employment via inflationary money growth assumed the existence of permanent money illusion, an assumption patently at odds with the facts. Attwood's scheme, he says, "calculates on finding the whole world persisting for ever in the belief that more pieces of paper are more riches and never discovering that, with all their paper, they cannot buy more of anything than they could before. No such mistake was made during any of the periods of high prices, on the experience of which [Attwood] lays so much stress" [18, p. 550]. In sum, inflation stimulates activity only if people are fooled into believing that nominal gains are real. But you cannot fool all the people all the time. Money illusion is not permanent. Therefore attempts to peg output and employment at above-average levels are bound to be futile. Inflation cannot permanently stimulate economic activity.

Costs and Benefits of Inflation Contrary to Attwood, Mill contended that the costs of inflation far exceed the benefits. He based his contention on three arguments.

First, inflation-induced rises in economic activity are harmful because they put undue strain on scarce resources and productive capacity. Attwood's concept of absolute full employment is actually overfull and unsustainable employment. It implies a forced draft economy in which resources are used inefficiently and workers are tricked into overexerting themselves under the mistaken belief that their real wages will be higher than they actually prove to be. A reasonable definition of full employment would allow for some normal slack capacity and unemployment consistent with the inevitable frictions and resource reallocations that continually occur in a dynamic economy. As Mill put it, "the healthy working of the social economy requires, that, in some channels, capital should be in full, while in others it should be in slack, employment" [17, p. 79]. In other words, some slack is necessary for peak efficiency. Here Mill was obviously identifying full employment with what analysts now call the natural rate of unemployment, i.e., the rate that, given the frictions and structural characteristics of the economy, is just consistent with demand-supply equilibrium in labor and product markets. Moreover, he was also specifying the costs in terms of exertion and reduced efficiency of forcing activity to exceed its natural or equilibrium level.

Second, inflation produces costly downward as well as upward deviations from the natural or equilibrium level of activity. Inflationary booms breed corrective periods of recession—or "revulsion" in Mill's words—involving painful losses of output and employment. These losses must be taken into account in any reckoning of the costs of inflation.

Third, unanticipated inflation has noneconomic social costs. People are deceived into increased activity. Contracts are unjustly violated. Income and wealth are arbitrarily and unfairly transferred from creditors to debtors and from money holders to money issuers. True, for every loser there is a corresponding winner so that one might conclude that the net redistribution effects are zero. But this argument would be valid only "if integrity and good faith were of no importance to the world" [18, p. 552]. In a word, inflation is "a form of robbery" or "a gigantic plan of confiscation" [17, p. 69].

Rules Versus Discretion On the issue of rules versus discretion, Mill was diametrically opposed to Attwood. Mill argued that a money stock regulated by fixed rules has the virtues of reasonable predictability, stability of value, and freedom from alteration by design. Discretionary monetary control, on the other hand, has certain inherent disadvantages. The

most basic is that men simply cannot be trusted with discretionary powers. This is particularly true of "issuers . . . of a government paper" who "always have a direct interest in lowering the value of the currency, because it is the medium in which their own debts are computed" [18, p. 544]. Even when the monetary authorities have the best of intentions, they are still susceptible to pressures to expand the money stock excessively. "The temptation to over-issue, in certain financial emergencies, is so strong, that nothing is admissible which can tend, in however slight a degree, to weaken the barriers that restrain it" [18, p. 546]. Being subject to alteration by design or human error, a discretion-controlled money stock is bound to be unpredictable and extremely unstable in value.

Among alternative monetary arrangements, Mill considered a discretionary-controlled inconvertible paper system to be the worst of the lot. There being no automatic check to the overissue of such currency, its purchasing power, he said, could be depreciated "without limit" [18, p. 544]. Much better would be an inconvertible paper money stock subject "to strict rules, one rule being that whenever bullion rose above the Mint price, the issue should be contracted until the market price of bullion and the Mint price were again in accordance" [18, p. 545]. Regulated by the price of gold, this currency "would not be subject to any of the evils usually deemed inherent in an inconvertible paper" [18, p. 545]. The trouble with this rule, however, was that it did not have the public support necessary to enforce its rigid adherence. The gold standard did not suffer from this defect and therefore constituted the best monetary system. Under the gold standard, currency was freely convertible into gold at a fixed price. This convertibility rule was definite, simple, easily understood, and had the strong public support required to enforce the authorities' compliance [18, p. 546].

Classical School's View of Deflation The preceding paragraphs have described J. S. Mill's views on (1) full employment versus convertibility as policy goals, (2) rules versus discretion in the conduct of monetary policy, and (3) the benefits and costs of inflation. Mill did not address a fourth issue raised by Attwood, namely the costs of price deflation. But other Classical economists, including Thomas Malthus, John Wheatley, Robert Torrens, and above all, John Ramsay McCulloch, did address this very issue. Their position has recently been summarized by Professor Denis P. O'Brien, himself a leading authority on the Classical school. According to O'Brien, the Classical economists "took from

Hume not only the analysis of [the stimulating effects of] inflation but also a view that deflation had the reverse effect" [19, p. 163]. Like Attwood, they recognized and deplored the painful effects of deflation on output and employment.

They too were strongly opposed to deflation; they saw the hardship that this could produce and they saw too that increases in the money supply could offset this hardship and raise the level of activity. But they believed that Attwood's inflationism, containing within itself the dangers of hyperinflation . . . had the potentiality of producing, through the destruction of not only convertibility but the currency itself, far more suffering even than was entailed in bouts of deflation under convertibility. Rather . . . their approach was to try to make a convertible system work more gently [19, p. 165].

In other words, the Classical economists thought that the costs of accepting inflation exceeded the costs of eliminating it.

The Current Debate The Attwood-Mill debate ended with the mid-nineteenth century Australian and Californian gold discoveries that provided the monetary expansion long sought by proponents of a paper standard. But the issues and viewpoints of the debate survive and flourish to this very day, as Karl Brunner's recent Congressional testimony confirms [13].

According to Brunner, present-day policy activists stress the persistent slack in resource utilization and urge speedy recovery facilitated by rapid monetary growth. Moreover they argue that continuous fine-tuning is needed to maintain full employment in the face of autonomous shocks. To this end they contend that money growth should be rapidly adjusted to the shifting state of the economy. Finally, they are willing to tolerate inherited inflation on at least three grounds. First, the unemployment costs of fighting inflation are too high to make anti-inflationary policy feasible. Second, inflation, if unanticipated, will exert a beneficial stimulus to output and employment. Third, if the inflation is fully anticipated it will have no permanent effect on resource allocation or income distribution and so will be virtually painless. Thus at best inflation is beneficial, and at worst it is harmless. On the basis of this cost-benefit calculus, activists conclude that a policy of accepting inflation is superior to one of combating it. All this is very reminiscent of Thomas Attwood's analysis.

On the other side of the debate, arguments similar to those of John Stuart Mill and the Classical school are still very much in force. Like Mill, current proponents of stable monetary growth argue that activists tend to overestimate the amount of slack capacity existing in the economy and underestimate the

economy's ability to generate high average levels of employment when undisturbed by monetary shocks. Like Mill, they believe that attempts to peg unemployment at arbitrarily low levels through monetary management are futile and counterproductive. Like him they maintain that economic activity flourishes best in an environment of price stability. For this reason they assign top priority to moving to a zero target rate of inflation even if it means slowing the pace of the recovery during the transition. Moreover, like Mill, they advocate rules rather than discretion in the conduct of monetary policy. The rule they prescribe calls for a constant rate of money growth equal to the trend growth rate of output. This rule is consistent with full capacity utilization and the zero target rate of inflation.

Finally, just as the Classical school agreed with Attwood on the adverse side effects of deflation, so do stable money proponents concur with activists on the costs of removing inflation. In fact, the reason they propose a gradual descent to a zero inflation target is to minimize the unemployment costs during the transition. What they dispute is the activists' estimate of the costs of accepting inherited inflation. They believe the activists seriously underestimate these costs. They contend that any publicly-announced willingness to accommodate inherited inflation will lead to accelerating and highly erratic (variable) inflation involving great social harm. Not only will there be repeated falls in output and employment whenever the inflation rate drops, but the very unpredictability of volatile inflation will increase business uncertainty, will make capital investment decisions riskier, will divert energies and skills from industry to speculation, and will reduce the information content of market prices thereby making the price system a less efficient mechanism for coordinating economic activity. The end result will be slower economic growth, lower productivity, and higher average unemployment. Mill would have agreed completely with this diagnosis.

Conclusion If the foregoing is at all an accurate account of the current debate then it follows that the roots of that debate lie in the earlier Attwood-Mill controversy. That the issues and arguments of an ancient controversy would survive virtually intact to form the core of a key policy debate almost 150 years later is indeed a remarkable fact. At least three conclusions can be drawn from this fact. First, modern economists, for all their sophisticated econometric models and high-speed computers, have advanced little beyond their nineteenth century prede-

cessors in understanding and knowledge of the costs and control of inflation and unemployment. Second, neither side has yet convinced the other, otherwise the debate would have long since been laid to rest. In other words, neither side has been proven con-

clusively right or wrong, suggesting that neither has a monopoly on the truth. Third, if this is indeed the case, the debate is likely to continue as long as inflation and unemployment remain major unresolved problems.

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"FARM CREDIT CONDITIONS IN THE FIFTH DISTRICT"

Fifth District farmers' demand for credit was unusually strong in the second quarter of 1977. Supplies of loanable funds at commercial banks were generally ample, however, although not as much so as in other recent periods. Loan-to-deposit ratios of participating banks were higher, but loan referral activity continued to be weak. Some loan repayment problems were prevalent in areas hit hard by drought, and loan renewals or extensions were greater in some of these areas. These are some of the more significant findings of the Quarterly Survey of Agricultural Credit Conditions conducted by the Federal Reserve Bank of Richmond for the second quarter of 1977. The complete report is available in mimeographed form. Copies may be obtained by writing to the Research Department, Federal Reserve Bank of Richmond, P. O. Box 27622, Richmond, Virginia 23261.