A PRIMER ON THE IMPORTANCE OF THE MONEY SUPPLY

Robert L. Hetzel

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.

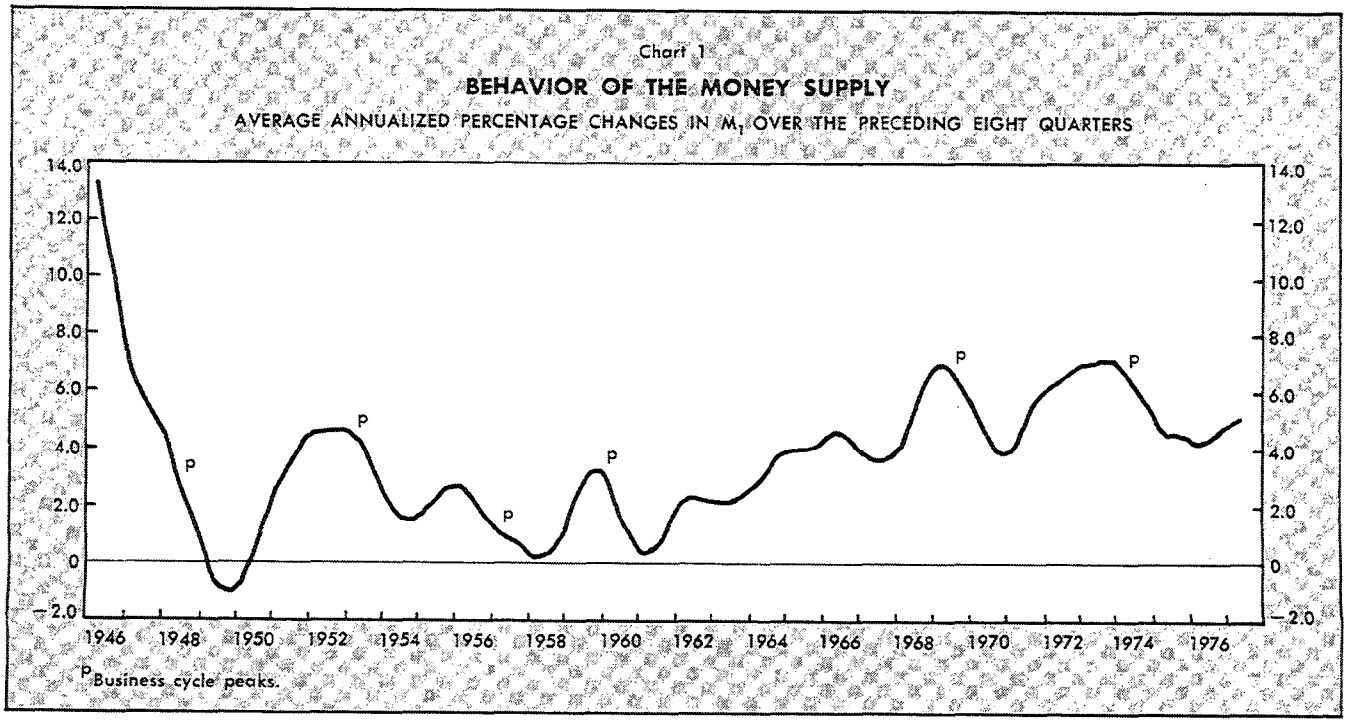
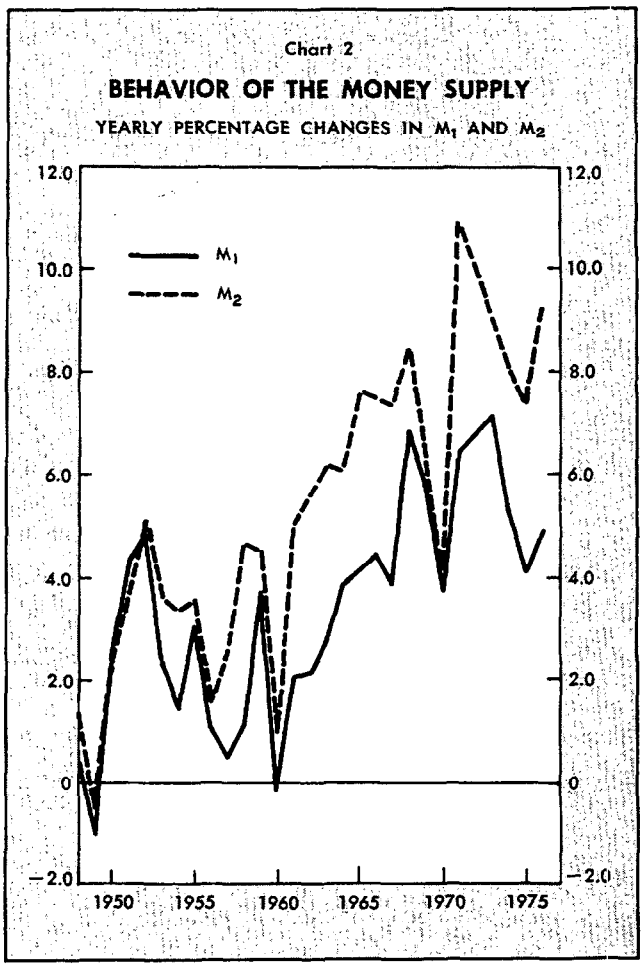


Chart 2 shows year to year growth rates for M_1 and M_2 beginning in 1948. Like Chart 1, it is useful for identifying trend rates of growth in money. M_1 and M_2 possessed the same trend rate of growth until the beginning of the 1960's. The trend rate of growth of M_2 increased in 1961, about three years 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 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-

[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.

[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.

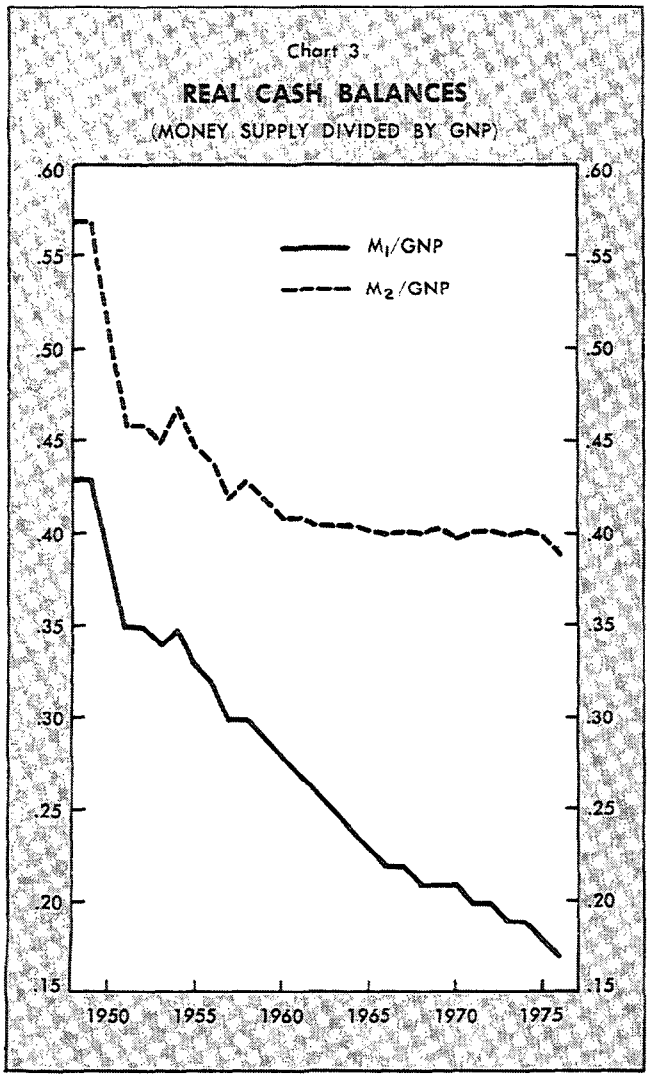
plained below, this discrepancy causes the public to reduce the rate at which it spends and produces a recession.

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 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

[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."



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.

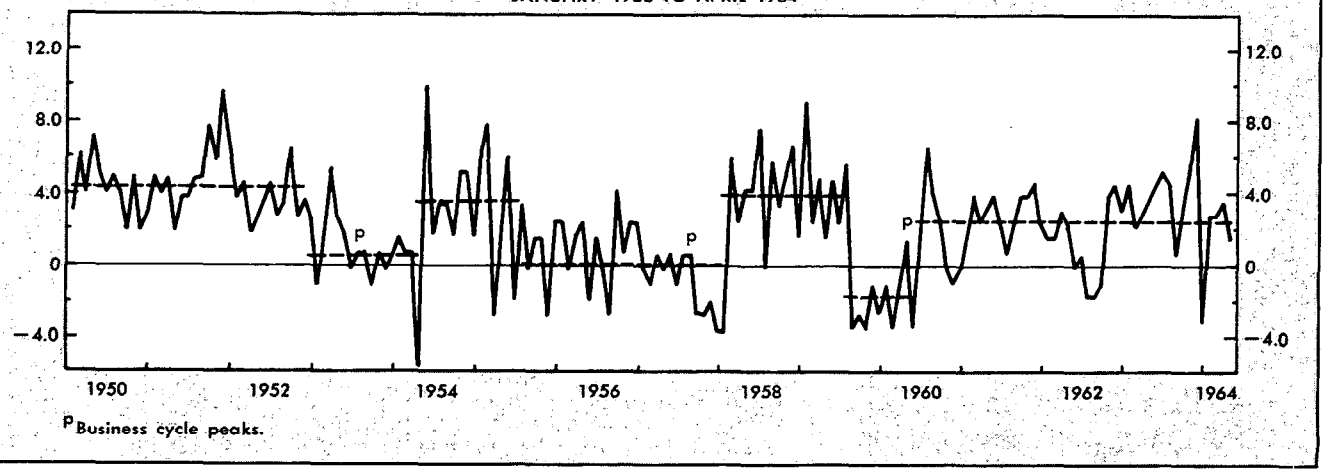
The effects of a sustained change in the rate of growth of the money supply are felt on the economy only with a long lag. Consider a decrease in the rate of growth of money relative to its trend rate of growth. People hold cash balances in order to buffer discrepancies between receipts and expenditures. 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

Chart 4

BEHAVIOR OF THE MONEY SUPPLY

MONTHLY PERCENTAGE CHANGES IN M_1 AND HIGH AND LOW STEPS IN THESE CHANGES
JANUARY 1950 TO APRIL 1964



PBusiness cycle peaks.

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

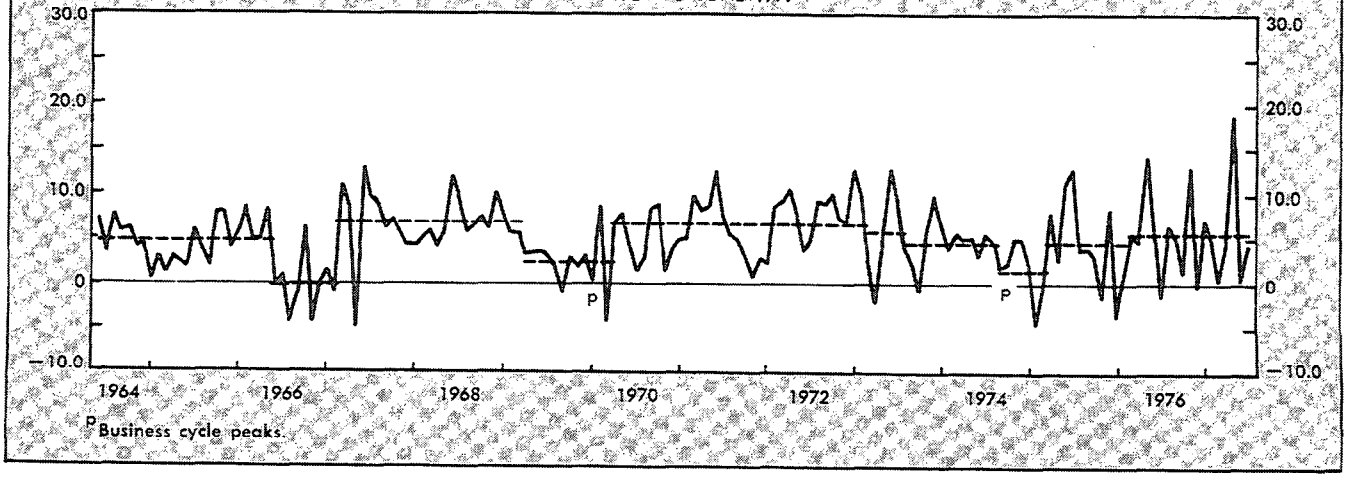
[6] The last business cycle peak marked on the chart is September 1974. It is assumed that an earlier peak in the business cycle occurred in October 1973 as a result of the oil embargo and energy price rises. The sharp decline in business activity which began in September 1974 is assumed to have resulted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

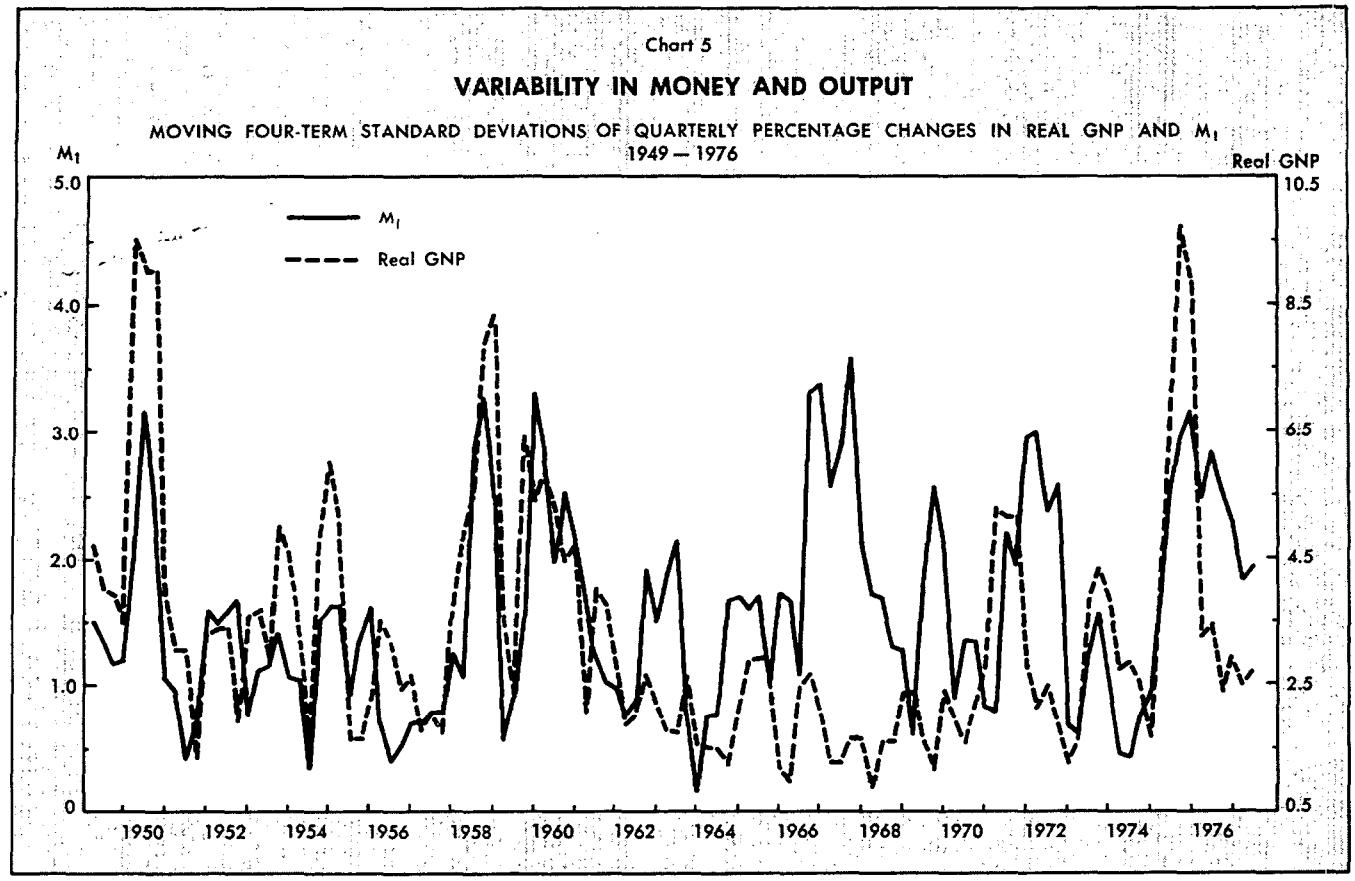
[7] The best way to affect price expectations will depend on the particular circumstances. For example, France in January 1960 required the public to turn in "old" francs for "new" francs in the ratio of 100 to 1. It was an accounting change only, but it affected expectations about prices. A monetary 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 4 (con't.)

BEHAVIOR OF THE MONEY SUPPLY

MONTHLY PERCENTAGE CHANGES IN M_1 AND HIGH AND LOW STEPS IN THESE CHANGES
MAY 1964 TO JUNE 1977





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 M1 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.

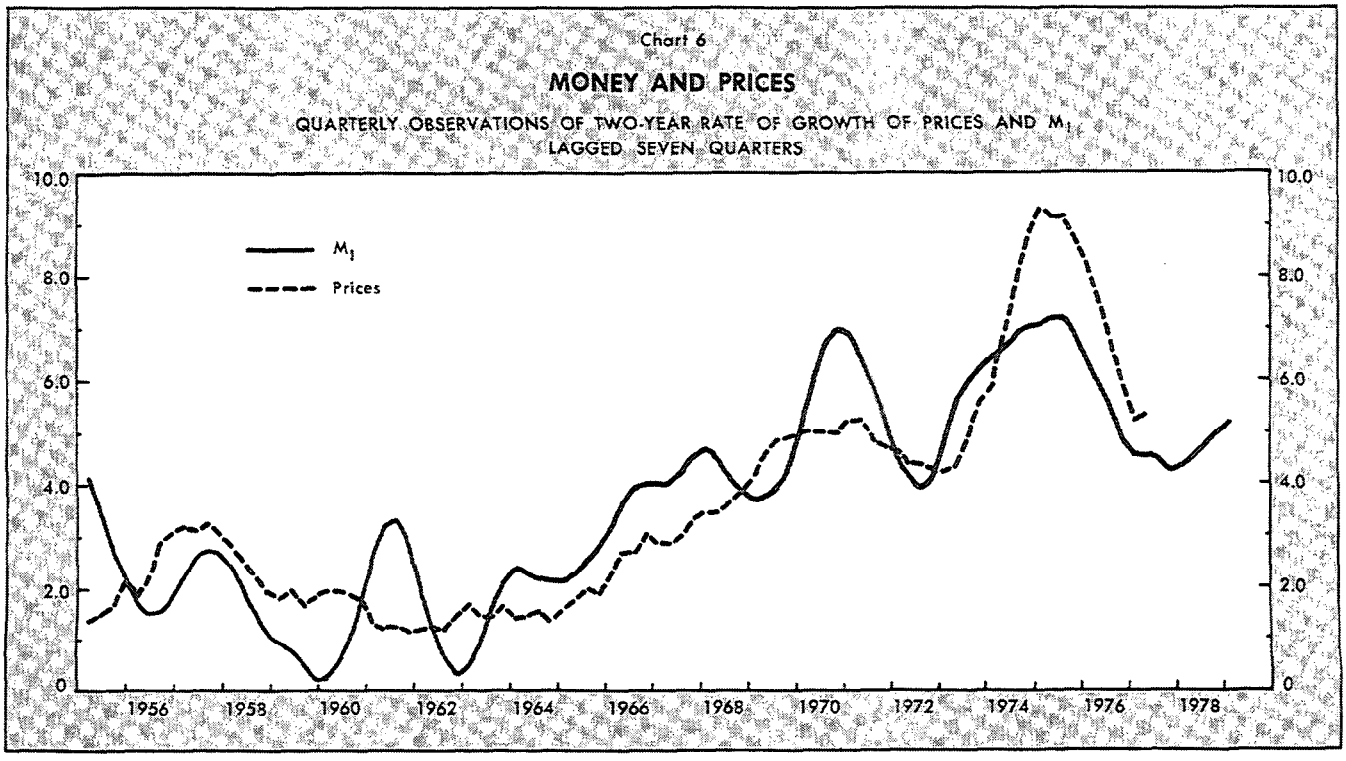
the public's actual and desired real cash balances. The public's spending then returns to its normal level

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.

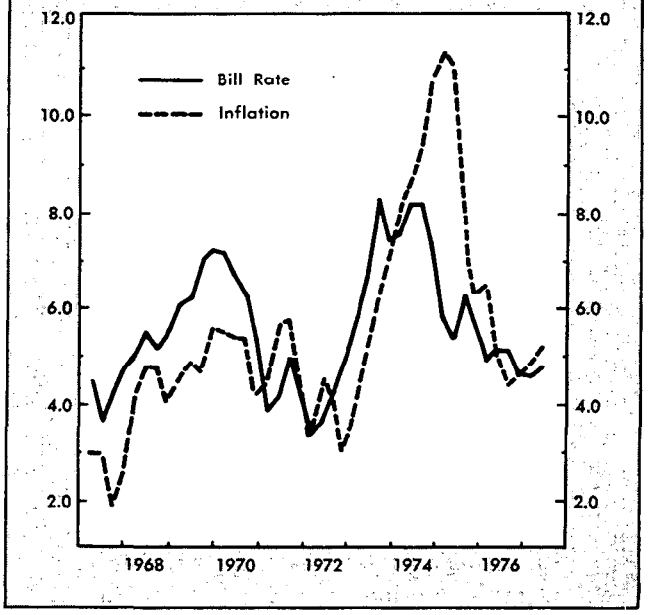
The length of the short run referred to above depends on how rapidly the public revises its inflationary anticipations. Chart 7 plots quarterly averages of the rate on newly issued three-month Treasury bills and the annualized percentage change in the GNP deflator over the previous two quarters. The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

Chart 7

INFLATION AND INTEREST RATES

QUARTERLY AVERAGES OF THE THREE-MONTH TREASURY BILL RATE AND THE ANNUALIZED PERCENTAGE CHANGE IN THE GNP DEFLATOR OVER THE PREVIOUS TWO QUARTERS



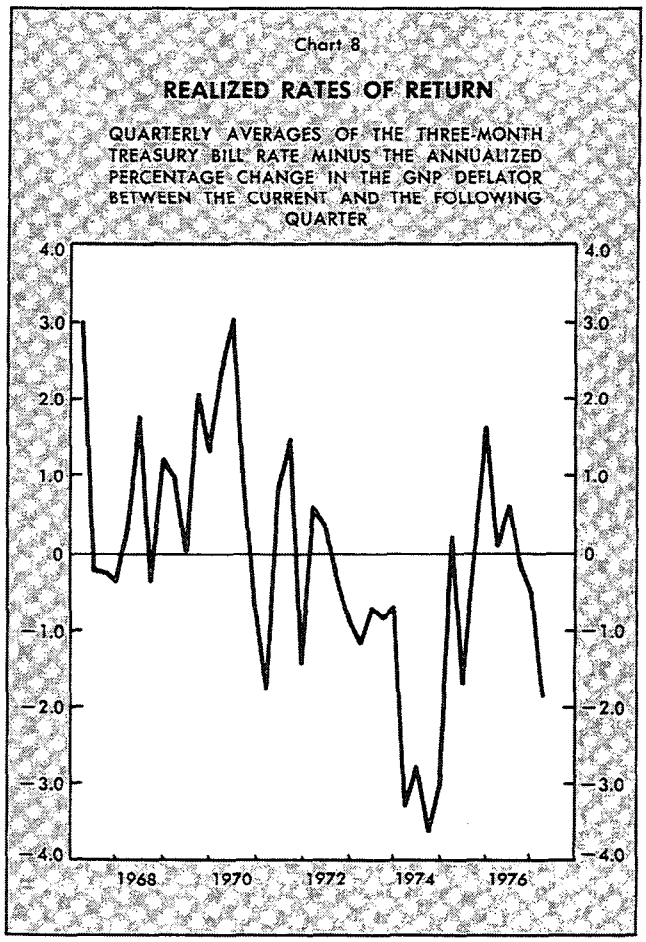
rate of growth of the money supply and, consequently, to a higher future rate of inflation, the decrease will lead to an immediate increase in interest rates on long-term securities. In the long run, short-term and long-term interest rates will increase.

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



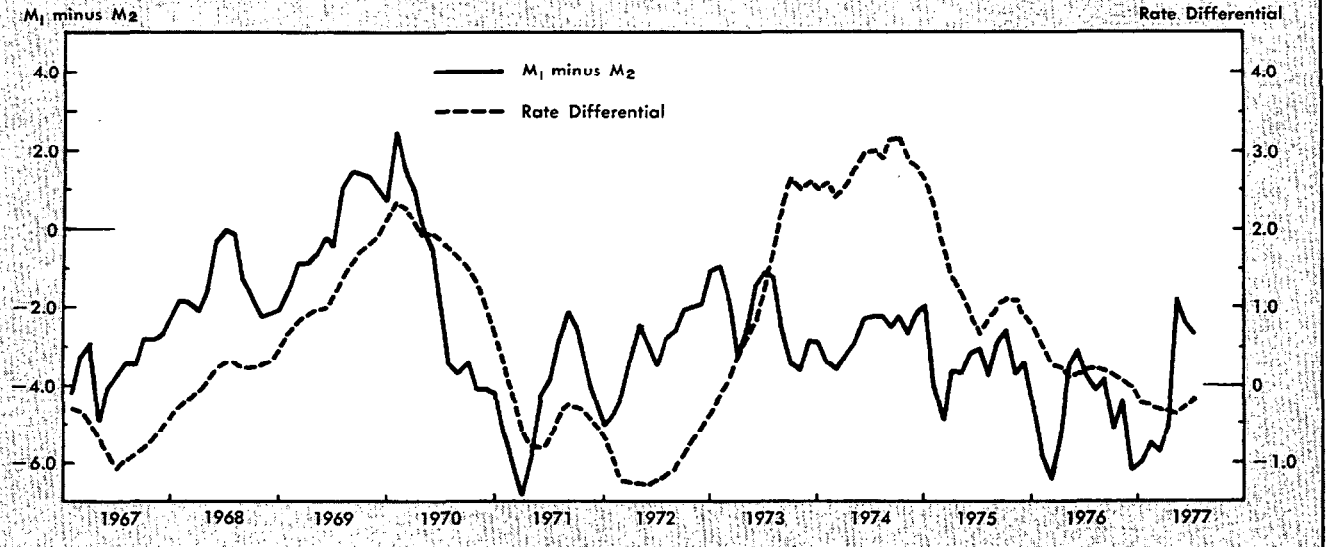
market and ceiling rates causes holders of time deposits to transfer funds to money market instruments. The transferred time deposits return to the banking system partly in the form of demand deposits and partly in the form of time deposits. The result is to raise the rate of growth of M_1 relative to 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 nonunionized 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.