

Deficits and Inflation

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THIRTY state legislatures have now approved, and more are considering, resolutions petitioning for a constitutional convention that would require a balanced federal budget on a fiscal year basis. The U.S. Congress is also considering a similar resolution and appears mindful, especially in deliberations on President Reagan's proposed tax and budget cuts, of widespread public demand to eliminate federal government deficits.

Many discussions of federal government deficits maintain that deficits cause inflation. The 1979 Missouri State Senate Resolution No. 13, for example, states, ". . . it is widely held that fiscal irresponsibility at the federal level, and the *resulting inflation* is the greatest threat which faces our Nation today" (italics added). This article explicitly investigates the linkage between deficits and inflation to analyze whether government deficits cause inflation. This linkage is discussed within a framework in which inflation is a monetary phenomenon. In this framework, there are two separate channels through which deficits are linked to inflation—through their impacts on the stock of money in the economy, and on an individual's desire to hold money balances.

THE CAUSE OF INFLATION

On the simplest level, inflation results from "too much money chasing too few goods." While this theory has been widely cited, a number of specifics must be explained. First, as used here, "money" refers to a set of assets that can generally be used as a means of payment. In the United States, money is usually measured as the coin and currency circulating in the economy plus deposits held in transaction or checking accounts.¹ This definition of money differs considerably

¹The measure of money that most closely corresponds to this definition is M1B, recently developed by the Federal Reserve Board of Governors. For a description of this measure as well as other newly developed measures, see R. W. Hafer, "The New Monetary Aggregates," this *Review* (February 1980), pp. 25-32.

from the common conception of money as a synonym for wealth or affluence. An individual can be wealthy (owning vast amounts of real estate, stocks, bonds, antiques, etc.), yet at the same time hold little wealth in the form of money as defined here.²

The total amount of money in the economy is determined primarily by monetary authorities—in the United States, this is the Federal Reserve System. Since all commercial banks and thrift institutions that issue transaction or checking deposits are required to hold a specific fraction of these deposits as reserves, the Federal Reserve can cause changes in the amount of these deposits either by changing reserve requirements on these deposits or by directly changing the level of reserves. The Federal Reserve most often uses the latter technique in controlling the money stock. This is accomplished by changing the level of reserves through "open market operations," that is, buying government securities in financial markets to increase reserves or selling securities to decrease reserves.

When the Federal Reserve wants to increase bank reserves, for example, it contacts dealers or financial institutions that are willing to sell their government securities. In exchange for the securities, the Federal Reserve credits the financial institution's commercial bank with additional bank reserves equal to the value of the securities. The commercial bank, in turn, credits the institution's account. The net result is that the

²Anecdote has it that the Diners Club credit card originated when some wealthy individuals went to dinner at a posh restaurant and, upon receiving the bill, discovered that collectively they lacked sufficient *money* to pay the tab. Luckily for the group, they were recognized and their *credit* was accepted. Some member of the group, recognizing that a formalized credit line would be preferable, thus started the Diners Club.

While this anecdote clearly points out the difference between money and wealth, it should also be noted that credit cards themselves are not money. This is not to say that credit cards are not generally used to initiate the purchase of goods and services. Rather, it recognizes that the use of credit cards simply *postpones* the exchange of money for the goods and services obtained; individuals still pay for goods and services with money.

Federal Reserve has more government securities, the commercial bank has larger reserves, and the dealer has larger deposits with the commercial bank. Both bank reserves and the money stock have increased. In addition, the commercial bank finds that it is holding reserves in excess of what it is required to hold. Thus, the bank can lend this excess to borrowers, further increasing the money stock.

Although the Federal Reserve affects the money supply by buying or selling government securities (federal debt), there is *no direct link* between federal government deficits (financed by issuing federal debt) and Federal Reserve open market operations. Since a 1951 accord between the Federal Reserve and the Treasury, the Federal Reserve is no longer directly responsible for stabilizing government security prices or for purchasing any given portion of the public debt. Consequently, federal deficits do not *require* that the Federal Reserve purchase more government securities; therefore, federal deficits, per se, need not lead to increases in bank reserves or the money supply.

While growth in the stock of money in the economy is a major determinant of inflation, it represents only one side of the money market. To determine whether there is "too much" money in the economy, the other side of the market — the demand for money — must also be considered. "Too much" money results only when the amount of money people have exceeds the amount they want to hold.

The demand for money is a demand *to hold* money balances. Everyone, of course, would like to have more money — to buy more goods and services or other assets. This is not the demand for money as used in this article. For our purposes, individuals demand money only to the extent they desire *to hold* a portion of their wealth in the form of monetary assets, that is, currency in their pockets and balances in their transaction accounts.

In the aggregate, the desire to hold money balances is determined primarily by four things: individuals' wealth, the total amount of goods and services produced, the average price of goods and services, and market interest rates. The first three factors are positively related to desired money holdings. Thus, to the extent that each of these factors grows over time, desired money balances also grow. The fourth factor, market interest rates, when higher, induce individuals and firms to reduce their money holdings to take advantage of higher earnings. In this regard, the rising interest rates of the last two decades have worked to

reduce the quantity of money demanded.³

If the stock of money in the economy exceeds the quantity of money demanded, there is an excess supply or "too much" money in the economy. This means that individuals would rather own more goods and services than hold the "extra" money. The excess supply of money and the excess demand for goods and services are two sides of the same problem. The excess demand for goods and services indicates that individuals would like to purchase more goods and services than are presently available at current prices. With output essentially fixed by the technology in place, the imbalance shown by the excess supply of money and the excess demand for goods can be eliminated only if the average price of goods and services rises enough to remove both the excess demand for goods and services and the corresponding excess supply of money.

Thus, an excess supply of money naturally leads to an increase in the average price of goods and services. If, over an extended period, the money stock grows at a faster rate than the quantity of money demanded, the average price of goods and services will continue to increase, and the economy will experience inflation. Inflation can be avoided if the growth in the money stock is held equal to the growth in the quantity of money demanded. This does not mean, however, that money stock growth must be zero to eliminate inflation. As the economy grows, with more goods and services being produced and consumed, and with individuals becoming wealthier, the desire to hold money balances will naturally grow. If the money stock grows at the same rate as desired money balances, there will be no inflation.

In summary, inflation results only when, over a considerable period of time, the money supply grows faster than the desire to hold money balances. According to this view, federal deficits can cause inflation only if they lead to continual increases in the money supply or to continual decreases in money demand. Both of these alternatives are examined below.

³Market interest rates, which determine the desire to hold money balances, can be broken into two components. The first component is a real rate of return, which measures the increased command over goods and services that results from postponing present consumption. The second component is a compensation required for expected inflation. If individuals expect a greater rate of inflation in the future, they require that they be compensated for the deterioration in the purchasing power of money, thus driving up the market rate of return and reducing the desire to hold money balances. In periods of hyperinflation, the latter component dominates the decision to hold money and results in a "flight" from the domestic money. See Thomas J. Sargent, "The Ends of Four Big Inflation," Working Paper #158, Federal Reserve Bank of Minneapolis (December 1980).

DEFICITS AND THE MONEY SUPPLY PROCESS

As indicated before, federal government deficits do not directly cause money growth. As a practical matter, however, government deficits can have an important indirect effect on money supply growth.

When the federal government spends more than it takes in as revenue, the Treasury must finance the deficit by borrowing in the private marketplace (selling government securities). The increased demand for credit in financial markets, if not offset by a reduction in credit demand elsewhere or an increase in credit supply, naturally puts upward pressure on all market interest rates.⁴ Monetary authorities may then attempt to prevent the rise in interest rates from taking place.⁵

To do this, the Federal Reserve will buy government securities, thus monetizing part of the public debt by increasing the level of reserves. The increase in bank reserves, as explained above, will result in a larger money stock and, other things equal, a subsequently higher rate of inflation. Consequently, there is an indirect channel — via the response of monetary authorities to higher interest rates — by which deficits can influence the inflation rate.

However, the existence of this indirect channel does not indicate that deficits cause inflation. The deficits

themselves do not increase the money stock; only monetary authorities can do this. Only when monetary authorities attempt to prevent market interest rates from rising will deficits produce a larger money supply. If deficits persist over an extended period of time, Federal Reserve attempts to prevent market interest rates from rising will result in continual increases in the money stock. Viewed in this fashion, inflation represents the cost associated with trying to prevent market interest rates from rising.

Many have argued that such attempts to prevent interest rates from rising are self-defeating because market interest rates cannot be controlled over extended periods of time.⁶ At best, as this argument goes, the Federal Reserve can keep interest rates from rising for only a short period of time by increasing bank reserves and money growth. The inflation that results from excessive money growth will itself soon put upward pressure on interest rates. For the purposes of this analysis, however, it is irrelevant whether or not the Federal Reserve is "successful" even in the short run. If they attempt to prevent interest rates from rising at all, they will have established a link between deficits and money growth, and consequently, between deficits and inflation.

DEFICITS AND THE DEMAND FOR MONEY

Inflation can also be associated with government deficits if such deficits induce reductions in the public's desired money balances. There appear to be two possible channels through which this might occur. The first channel operates through the effect of changes in interest rates on the public's demand for money balances. A higher level of interest rates will reduce desired money balances, causing an excess supply of money.

As a practical matter, this effect is minor. While the demand for money is sensitive to changes in interest rates, quantitatively the effect is small. It would take a substantial rise in interest rates to reduce desired money balances enough to actually produce a measurable increase in inflation. One estimate indicates that interest rates would have to increase 500 percent (for example, from 5 percent to 25 percent) to induce the same amount of inflation associated

⁴What is clear in circumstances like these, when efforts to restrain monetary growth confront strong private credit demands, is that inevitably large new borrowings by the federal government, whether to finance budgetary deficits or off-budget programs, strongly aggravate pressures on interest rates." Paul A. Volcker, Chairman, Board of Governors of the Federal Reserve System, before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate, January 7, 1981.

The extent of this upward pressure will depend, in large part, on the size of deficit relative to total savings. The larger the deficit in comparison to the savings pool, the greater the upward pressure on market interest rates. Thus, to the extent that the tax cuts proposed by the Reagan administration lead to increased savings, some of the pressure on interest rates resulting from the anticipated deficits will be mitigated. For an analysis of the effect of deficits on interest rates, see Richard W. Lang, "The 1975-76 Federal Deficits and the Credit Market," this *Review* (January 1977), pp. 9-16; and Michael J. Hamburger and Burton Zwick, "Checking Inflation in Spite of a Deficit," *Business Week* (March 23, 1981), pp. 12-15.

The reader is also referred to Adrian W. Throop, "Inflation Premiums, Budget Deficits," *Federal Reserve Bank of San Francisco Weekly Letter* (March 14, 1980), pp. 1-3, for an interesting discussion of measuring the size of the deficit in inflationary times.

⁵Such attempts can occur either as a technical means of achieving a given money growth rate, or because monetary authorities simply don't want to see interest rates rise. While the motivating factors behind the desire to stabilize interest rates are not always clear, the impact of rising real government borrowing on monetary policy will always be the same.

⁶See "Fed Cannot Control Interest Rates Because That Is Not Agency's Role," *American Banker* (January 26, 1981), text of speech, "Why Can't the Fed Control Interest Rates?" by Lawrence K. Roos.

with a permanent one percentage-point increase in money supply growth.⁷

A second channel through which federal deficits can affect desired money holdings — and the inflation rate — is changing individuals' wealth holdings. Desired money balances are positively related to an individual's wealth. Thus, if individuals observe their wealth falling over an extended period of time, their desired money balances will also fall, and higher inflation will result despite the fact that the growth of the money stock remains unchanged.

Can deficits themselves cause wealth to decline? On an individual level, the answer is clearly no. When the federal government spends more than its direct receipts, some individuals must reduce their current consumption of goods and services. In our country, this reduction is made willingly in exchange for government securities — promises to repay the loan in the future that are backed by the taxing authority of the federal government. Thus, those individuals who forsake current expenditure to hold government debt should not be worse off or poorer, because they are doing so voluntarily.

Even though each individual holding government debt is at least as well off as before, it is entirely possible that economic participants, on an aggregate level, feel worse off. This could happen, for example, if the public feels that the federal government is inefficiently using the resources it has acquired through deficit financing.⁸ Such perceptions could have significant wealth effects if it were commonly perceived that the government was taking away from ("crowding out") private investment, which would have added to the capital structure of the economy, without adding anything significant by way of public spend-

ing in return. People would perceive future private production capabilities as lower and, if this were not offset by an equivalent benefit from public spending, would feel poorer as a result.

While such adverse wealth effects are possible, they are the direct result of fiscal mismanagement, not deficit financing. The public could be made to feel equally worse off, if the federal government were to raise taxes to finance spending programs that the public deemed worthless. As long as the federal government allocates resources inefficiently, the public will be poorer. This is true regardless of how the resources are obtained, that is, through taxation or debt issuance. On the other hand, if the public approves of the federal government expenditures, it makes little difference whether the resources are obtained from current taxes or from the issuance of debt which will be paid off by future taxes.⁹

Federal deficits are associated with declining wealth only to the extent that they are symptomatic of a governmental misallocation of resources. In this respect, efforts to legislate a balanced federal budget are attacking the symptom of the problem (whether real or imaginary) instead of the problem itself. If the public perceives that its wealth is falling, it is the result of mismanagement of fiscal responsibilities, *not* deficit spending.

In summary, it appears that deficits have little effect on the desire to hold money balances. As a result, inflation is not significantly linked to deficits through their impact on money demand.

DEFICITS, MONEY AND INFLATION: EXAMINING THE THEORY

The analysis of this article suggests that inflation is a result of an excess growth of money in the economy. Deficits are associated with inflation only to the extent that they lead to increases in the money stock. To examine this theory in relation to the experience of the last 25 years, let's consider the popular alternative explanation of inflation, namely, that federal government deficits directly cause inflation.

⁷R. W. Hafer and Scott E. Hein, "Evidence on the Temporal Stability of the Demand for Money Relationship in the United States," this *Review* (December 1979), pp. 3-14.

Some would argue that the size of the federal deficit is closely watched and figures importantly in the formation of individuals' inflationary expectations. If deficits grow in size, individuals will expect more inflation (driving market interest rates up) and, as such, will reduce their desired money balances. However, this article argues that there is no direct link between deficits and inflation. Thus, individuals who expect more inflation as a result of larger deficits alone are acting irrationally. The crucial question regarding future inflation is the extent to which the deficits are monetized. If the deficit is not monetized, future inflation will not result. Deficits, per se, are not inflationary; thus, the proposition that individuals will form inflation expectations based on the size of the deficit alone is not viable as a long-run proposition.

⁸This effect seems to have been important in European cases of hyperinflation following World War I, as many defeated countries ran sizable deficits to make reparations to the World War I victors. See Sargent, "The Ends of Four Big Inflation."

⁹This argument presumes that the public recognizes the "pay me now or pay me later" choice between a current tax hike and the issuance of debt. In other words, when the public sees the federal government issue debt, it recognizes that future taxes must be raised to pay off the increase in debt. See Neil A. Stevens, "Government Debt Financing — Its Effects in View of Tax Discounting," this *Review* (July 1979), pp. 11-19.

First, consider the relationship between federal deficits and money stock growth. Chart 1 shows the relationship between the federal government debt (which rises when the government runs deficits and falls when it runs surpluses) and the money stock over the last 25 years. From 1955 through 1974, growth rates of the federal debt and the money stock move in tandem, generally accelerating through early 1973. This accelerating pattern is then broken, as the growth of both debt and money stock slows somewhat from early 1973 through early 1975 — ironically enough, a period of recession in which one would anticipate an increase in debt.

The growth rate of the money stock always exceeds the growth rate of the federal debt from 1955 through early 1975, as the Federal Reserve increased the portion of the federal debt it held (see the third tier in chart 1). Over this period, the Federal Reserve purchased federal debt at a *faster* rate than the federal government issued it. This means that bank reserves grew at faster rates than the federal debt and, thus, the money supply expanded faster than the debt.¹⁰ The experience over this period is fully consistent with the notion that the Federal Reserve was attempting to offset the upward pressure on market interest rates that resulted from the accelerating issuance of federal debt; acceleration in the growth of the federal debt was paralleled by an acceleration in money stock growth.

In 1975, however, there was a clear break in the prevailing relationship between the federal debt and the money stock. From 1975 through 1980, the federal debt grew at a 13.0 percent rate, more than twice its growth rate from 1967 to 1974. Money growth did not accelerate to this extent, rising at a 7.1 percent rate from 1975 through 1980, only slightly above the 6.1 percent rate from 1967 to 1974.

Thus, the period 1975-80 was the first sustained period since the accord in which the money stock grew at a slower rate than the federal debt. This drastic change occurred because the Federal Reserve did not continue its past practice of increasing the proportion of the federal debt that it held. In fact, the Federal Reserve did just the opposite. The proportion of the federal debt held by the Federal Reserve fell from almost 24 percent in 1974 to less than

18 percent in 1980. Either the increase in the federal debt over this period did not put auxiliary upward pressure on market interest rates or the Federal Reserve became less concerned with keeping interest rates down and more directly concerned with money growth itself. In either case, the close correlation between debt and money growth was broken.

With this relationship between the federal debt and the money stock in mind, consider the two alternative causes of inflation: (1) excess money growth and (2) federal deficits. If the first alternative is correct, growth in the federal debt should generally underpredict inflation over the 1955-74 period and overpredict inflation thereafter compared to the relationship between money growth and inflation. This should occur because debt grew slower than money over the early period and faster than money thereafter. If the second alternative is correct, the relationship between inflation and growth of the federal debt should be closer than that between inflation and money growth.

Chart 2 shows the relationship between inflation, money growth and the growth in the federal debt over the last 25 years. All rates are measured on a compounded annual rate basis. Inflation is measured by the four-quarter rate of change in the implicit GNP deflator. Money growth is measured by the 12-quarter rate of change in M1B. This extended period accounts for the fact that only sustained periods of excess money growth result in inflation.¹¹ These observations were lagged two quarters because money growth has little or no immediate effect on inflation. Debt growth is similarly measured on a 12-quarter basis. Lagging the debt measure did not appreciably improve its relationship with inflation, so it is charted on a contemporaneous basis.

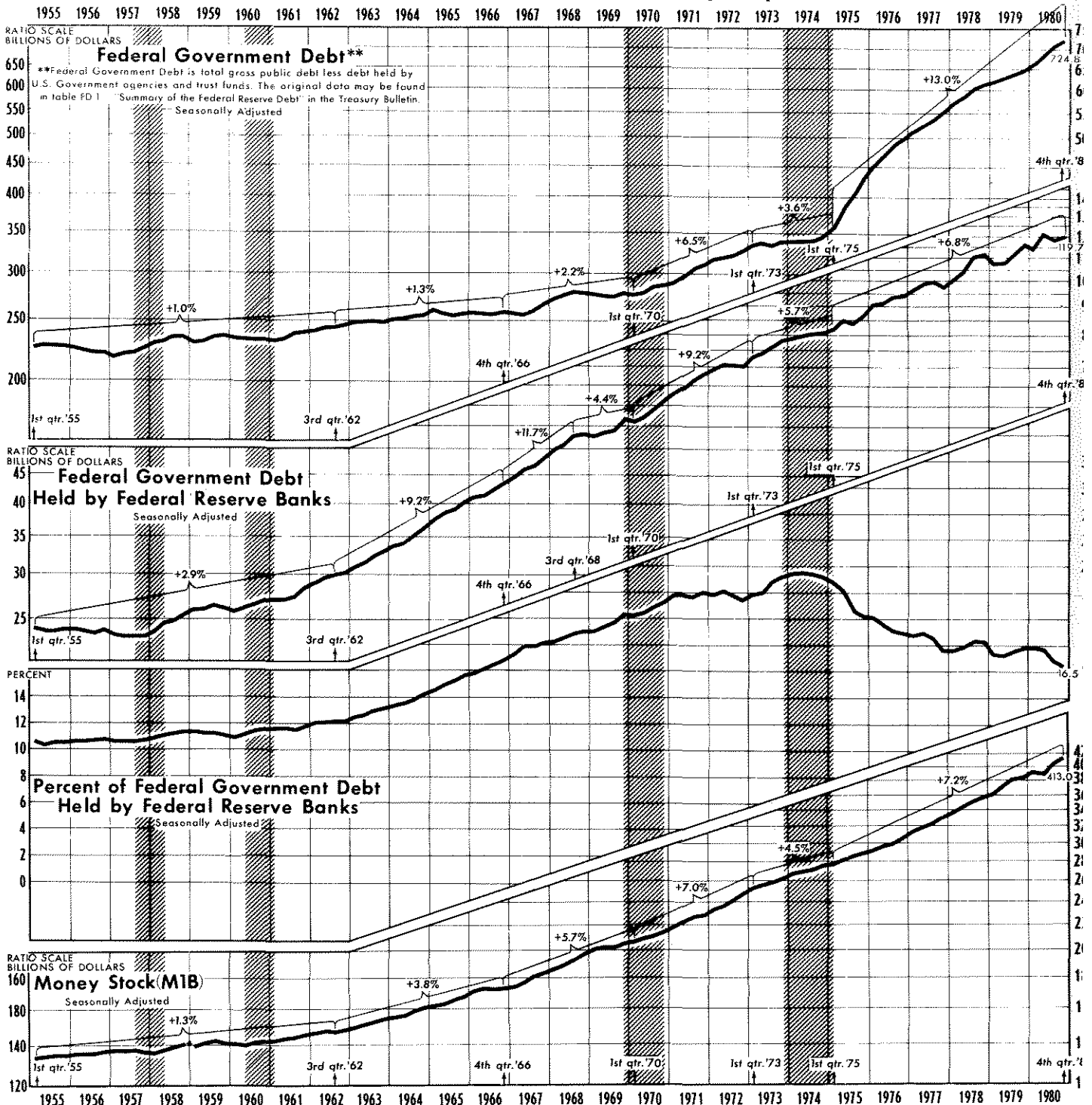
The chart shows clearly that money growth is more closely related to inflation than is the growth in the federal debt. More important, the two propositions from our theory are borne out. Specifically, relative to money growth, the growth in the federal debt underpredicts inflation over the period 1955-74 and overpredicts inflation over the period 1975-80. Over the early period, inflation averaged 3.4 percent, the money growth measure averaged 3.5 percent and the debt growth measure averaged 2.1 percent. Over the latter period, inflation averaged 7.5 percent, money

¹⁰The relationship between federal debt held by the Federal Reserve and money growth is not necessarily a perfectly stable one. To the extent that the Federal Reserve changes reserve requirements, a given stock of bank reserves results in a different money stock.

¹¹For a more technical analysis of this lag, see Keith M. Carlson, "The Lag From Money to Prices," this *Review* (October 1980), pp. 3-10.

Chart 1

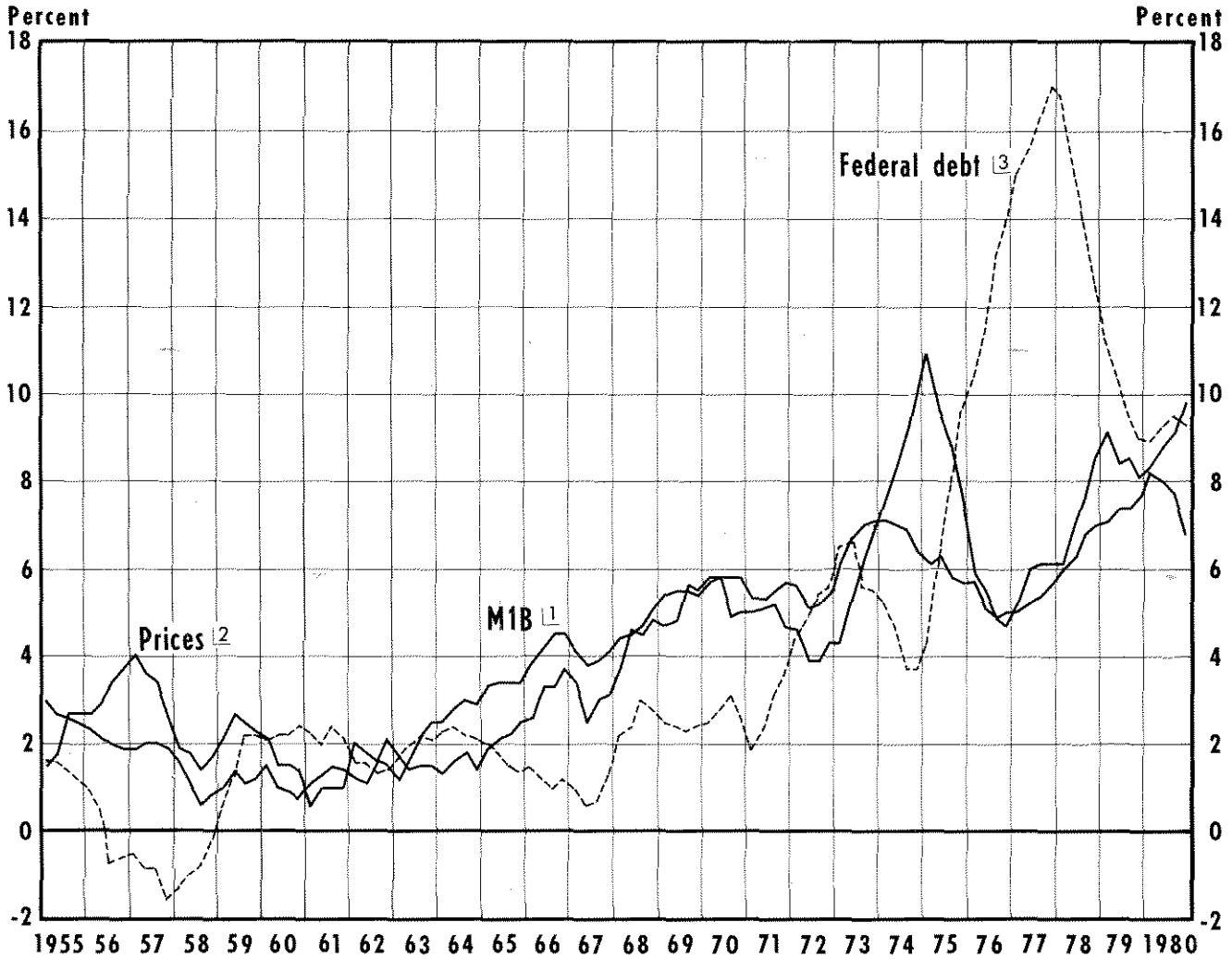
Influence of Federal Government Debt on Monetary Expansion



*Data prior to 1959 are M1.
 Shaded areas represent periods of business recessions.
 Percentages are annual rates of change for periods indicated.
 Latest data plotted: 4th quarter

Chart 2

Growth Rates of MIB, Prices and Federal Debt



1 Data are two-period lag of three-year growth rates.

2 GNP deflator. Data are one-year growth rates.

3 Total debt, not including debt held by U.S. agencies and trusts. Data are three-year growth rates. Latest data plotted: 4th quarter

growth, 6.4 percent, and debt growth, 11.5 percent.¹² This evidence then is consistent with the theory that inflation is caused by excessive money growth. On

the other hand, the evidence is *not* consistent with the view that increases in the federal debt (i.e., deficits) cause inflation.

¹²The reader can see that money growth underpredicts inflation by a sizable amount over the period 1974-76. This is the result of a one-time wealth loss following the significant oil price increases of late 1973 and early 1974. The wealth loss resulted in reductions in the quantity of money demanded and, as a result, inflation was greater than money growth alone would suggest. A similar phenomenon is observed in

1980, but on a smaller scale. For technical discussions of this effect, see Denis S. Karnosky, "The Link Between Money and Prices - 1971-76," this *Review* (June 1976), pp. 17-23; and Robert H. Rasche and John A. Tatom, "Energy Resources and Potential GNP," this *Review* (June 1977), pp. 10-24.

SUMMARY AND CONCLUSION

This article has described how federal deficits could cause inflation within a monetary framework. The potential link between federal deficits and inflation has been traced through the impact of deficits on the money stock and on the desire to hold money. It was argued that the link between deficits and money growth is not a causal one, in the strict sense of the word; that is, deficits need not directly cause increases in the money stock. Only when monetary authorities attempt to prevent interest rates from rising will federal deficits lead to increases in the money stock and, subsequently, inflation. This link was apparently important from 1955 through early 1975. More recently, however, the link appears to have been broken, either

because monetary authorities have shown more concern about money growth and less about the level of interest rates or because recent deficits have not put undue pressure on market interest rates. Over the period 1975 to 1980, the rate of increase in the federal debt has been almost twice that of money growth and inflation.

Two possible channels by which deficits could reduce the desire to hold money balances were also detailed. These channels, operating through rising market interest rates and reduced wealth, are direct conduits by which deficits could directly lead to inflation. Neither of these channels, however, is relevant to recent inflation in the United States.

