

**Table 1 Growth Rates for Equation of Exchange Variables**Peak to peak and trough to trough<sup>a</sup>

Period	Inflation, percent		Money growth, <sup>b</sup> percent		Velocity growth, percent		Real output growth, percent	
	Rate <sup>c</sup>	Differ- ence <sup>d</sup>	Rate <sup>c</sup>	Differ- ence <sup>d</sup>	Rate <sup>c</sup>	Differ- ence <sup>d</sup>	Rate <sup>c</sup>	Differ- ence <sup>d</sup>
<b>Peak to peak</b>								
1953:IIQ-1957:IIIQ	2.5	—	1.5	—	3.1	—	2.2	—
1957:IIIQ-1960:IQ	1.9	-0.6	1.1	-0.4	3.7	0.6	3.0	0.8
1960:IQ-1969:IIIQ	2.6	0.7	4.0	2.9	2.8	-0.9	4.2	1.2
1969:IIIQ-1973:IVQ	5.2	2.6	6.2	2.2	2.6	-0.2	3.5	-0.7
1973:IVQ-1980:IQ	7.6	2.4	6.6	0.4	3.7	1.1	2.7	-0.8
1980:IQ-1981:IQ	10.3	2.7	6.7	0.1	4.2	0.5	0.9	-1.8
<b>Trough to trough</b>								
1954:IIQ-1958:IIQ	2.6	—	1.3	—	3.7	—	2.4	—
1958:IQ-1960:IVQ	1.8	-0.8	1.6	0.3	3.8	0.1	3.5	1.1
1960:IVQ-1970:IQ	2.9	1.1	4.2	2.6	3.0	-0.8	4.3	0.8
1970:IQ-1975:IQ	6.5	3.6	6.1	1.9	2.5	-0.5	2.2	-2.1
1975:IQ-1980:IIQ	7.1	0.6	6.7	0.6	4.2	1.7	3.7	1.5
1980:IIQ-1982:IQ	8.5	1.4	8.1	1.4	0.8	-3.4	0.5	-3.2

a. See Equation of Exchange, equation 2.

b. Money is defined as currency in circulation, demand deposits, and other checkable deposits (M-1A) from 1960:IQ to 1982:IIQ and as currency in circulation plus demand deposits from 1953:IIQ to 1960:IQ.

c. Average annual percentage rate of growth.

d. Percentage point difference between percent rates of growth from one period to the next.

SOURCES: U.S. Department of Commerce, Bureau of Economic Analysis; and Board of Governors of the Federal Reserve System.

more and more private-sector investment opportunities become unprofitable, and lenders become more and more cautious about making loans. Unlike the private sector, the government faces no interest-rate constraint on its spending programs, and Treasury debt carries essentially no default risk. When credit is scarce, the Treasury moves to the head of the credit queue, squeezing some private borrowing from the line, a phenomenon known as **crowding out**.

Most economists acknowledge that crowding out occurs, but disagree about its extent, the time frame over which it occurs, and its importance for long-term real growth. Many believe that in the long run a dollar of Treasury borrowing displaces a dollar of private investment. They argue that budget deficits are appropriate only during economic downturns and that budget surpluses should be generated during economic recoveries so that the budget is balanced over the business cycle. Large deficits that persist over the

business cycle reduce the rate of private capital accumulation; consequently, the economy experiences the substitution of slow-growth public spending for more rapid-growth private spending. Other economists acknowledge that deficits could result in a substitution of public spending for private spending and allow that deficits can influence real spending over the short and medium term, but they contend that deficits do not affect real economic growth in the long term.

### Conclusion

This *Economic Commentary* has described a number of possible channels through which large, persistent federal-budget deficits could influence the long-term growth of the money stock, velocity, and real GNP and, hence, could cause inflation. Of all the possibilities, the deficit-inflation linkages operating through changes in the money-stock growth rate are particularly important because of the unique role money plays in the inflation

process and because governments can control their money stocks.

Over the past 30 years, changes in the long-term rate of inflation appeared most closely related to changes in the long-term money-growth rate (see table 1). When long-term money growth accelerated (or decelerated), inflation nearly always accelerated (or decelerated). Similar close relationships in the appropriate directions generally are not apparent when changes in the rate of inflation are compared with changes in either long-term velocity growth or long-term real-output growth. Changes in the long-term growth of velocity and changes in the long-term growth of real output on occasion explain more of the change in the rate of inflation than changes in money-stock growth. This is particularly true during the most recent periods; however, long-term velocity growth and long-term real output growth have fluctuated within a much narrower range than either long-term money growth or inflation, and they frequently moved in directions that did not contribute to the movement in the inflation rate as shown in equation 2. Consequently, linkages between deficits and velocity growth and between deficits and long-term real-output growth are probably much less important

for inflation than linkages between deficits and money growth.

The monetary link between deficits and inflation is also important, because long-term money growth is more directly under the control of policymakers than either velocity or long-term real growth. Even if persistent Treasury borrowing should raise velocity or reduce long-term real growth, the Federal Reserve System can undertake the necessary offsetting adjustments to maintain price stability. In this sense, inflation is ultimately the product of government policy. As indicated earlier, the System's ability to conduct offsetting and anti-inflation monetary policy is best preserved when the System is using monetary-aggregate targets instead of interest-rate targets. For this reason the Federal Reserve's October 1979 monetary-policy change is an important and necessary anti-inflation policy adjustment in an era when Treasury borrowing to finance large and persistent federal deficits is placing upward pressure on interest rates.

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## Do Deficits Cause Inflation?

by Owen F. Humpage

When the Reagan administration first took office, it forecast federal-budget deficits of \$45 billion for fiscal year (FY) 1982 and \$23 billion for FY 1983, and it projected a balanced budget by FY 1985. Fiscal year 1982, however, ended in September with a record \$110-billion deficit, and most budget analysts now expect a deficit of approximately \$170 billion to \$180 billion in FY 1983. Moreover, the deficit could easily remain above \$100 billion through FY 1985 unless Congress cuts expenditures or increases taxes. The federal government must finance these deficits by selling Treasury securities either to the Federal Reserve System or to the public.

The prospects for large federal budget deficits persisting over the next few fiscal years have raised fears that the hard-fought gains recently won against inflation will be lost as the economic recovery gathers momentum. In the United States there appears to be a long-term association between persistent budget deficits and inflation. Since FY 1960, there has been only one year, FY 1969, when the federal budget was not in deficit. The annual rate of inflation, as measured by the GNP implicit price deflator, accelerated from a 1.0 percent to 2.0 percent range in the early 1960s to approximately 9.0 percent in both FY 1980 and FY 1981. The relationship between deficits and inflation, however, is sufficiently weak to raise doubts about the claim that deficits cause inflation. Between FY 1976 and FY 1979, for example, the deficit narrowed by approximately \$39 billion, while the rate of inflation increased by 3.0 percentage points.

This *Economic Commentary* explores the possible channels through which deficits could cause inflation. Unless we can conclusively identify channels of influence running from deficits to inflation, we might conclude that inflation causes deficits or

that some outside factor affects both deficits and prices simultaneously.

### Equation of Exchange

Inflation is a *persistent* rise in the overall level of prices. It cannot exist without an equally persistent rise in the supply of money or decline in the demand for money that outpaces the growth of goods and services. It is in this sense that inflation often is described as "too many dollars chasing too few goods."

Fisher's equation of exchange provides a useful framework for analyzing inflation. It is tautologically true that:

$$(1) \quad MV = PQ.$$

That is, the money stock ( $M$ ) times the velocity of money ( $V$ ), or the rate at which money changes hands, must equal the price level ( $P$ ) times real output ( $Q$ ).<sup>1</sup> The product of the last two terms,  $PQ$ , equals nominal GNP. After expressing the elements of the equation in percentage rates of change and rearranging the terms, it is approximately true that:

$$(2) \quad P\% = M\% + V\% - Q\%.$$

Expressed in this manner and defined over an appropriately long time frame, the equation is consistent with the earlier definition of inflation: inflation ( $P\%$ ) cannot exist without an equally persistent rise in the money supply ( $M\%$ ) or a decline in the demand for money, evidenced by a rise in velocity ( $V\%$ ) that outpaces the growth in real output ( $Q\%$ ).

1. Throughout this article, the term **money** is defined narrowly as assets that function as a medium of exchange and/or a temporary store of purchasing power. Currency, travelers' checks, demand deposits, negotiable order of withdrawal accounts, and time deposits are examples of assets that possess these attributes.

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If deficits cause inflation, they must operate through one or more of the variables on the right-hand side of equation 2. Deficits, therefore, either must increase the money supply, raise velocity, or reduce real long-term output growth if they are to cause inflation.

### Deficits and the Money Supply

The Federal Reserve System is responsible for conducting U.S. monetary policy, and it exercises this responsibility primarily through its purchases and sales of U.S. government debt securities with private securities dealers. When the System purchases government debt, for example, it pays for the securities with funds that are deposited in the securities dealers' bank accounts. These funds become the cash reserves of deposit institutions and the basis for a much larger increase in the money supply.<sup>2</sup> When the System sells a government-debt security, the money stock contracts.

The Federal Reserve System owns nearly 16 percent of the total, outstanding, publicly held U.S. government debt. The percentage has decreased from a recent high of nearly 23 percent in 1974 but has increased, on balance, since at least 1960.<sup>3</sup> Although the System holds a sizable share of the Treasury's debt, it is under no legislative requirement to do so. The Treasury recently maintained a limited direct borrowing privilege of less than \$5 billion with the System, but it seldom used this facility and never to an economically significant amount. As a practical matter, therefore, there is no *direct* link between the budget deficits and the money-supply process.

The linkage between Treasury borrowing to finance the deficit and monetary policy, however, could be *indirect*, stemming from the Federal Reserve's concern about high interest rates. When the Treasury borrows from the public to finance

the budget deficit, interest rates tend to rise, especially if economic activity is robust and private credit demands are strong. If the Federal Reserve attempts to offset such interest-rate increases by injecting reserves into the banking system, an indirect link is forged between deficit spending and money creation. Under such circumstances, deficits have an inflationary potential. The more closely the System attempts to maintain interest-rate targets, the stronger the inflation potential of the budget deficit.

Throughout most of its post-World War II history, the Federal Reserve System has been acutely sensitive to high interest rates. Immediately after the war, the Federal Reserve keyed monetary policy to maintaining low interest rates on Treasury securities, a procedure left over from war financing. Although the March 1951 Accord with the Treasury relieved the System of this responsibility, the Federal Reserve continued to conduct monetary policy during most of the 1950s and 1960s with an eye toward dampening interest-rate fluctuations. In the late 1960s and early 1970s, this approach was loosened somewhat as the importance of focusing policy on monetary aggregates became more widely appreciated; yet, it was not until October 1979 that the Federal Reserve shifted its day-to-day operating focus away from influencing interest-rate levels to managing the stock of bank reserves as the primary means of controlling money-stock growth. Throughout most of the post-World War II period, therefore, interest-rate targets could have provided an indirect causal link between deficit spending, monetary growth, and inflation.

A correlation between federal-budget deficits and money creation also would exist if both the fiscal and monetary authorities conducted their policies to reduce swings in the business cycle. When business activity declines and unemployment rises, tax receipts, especially those tied to income and profits, automatically decline, and spending for such entitlement programs as unemployment compensation and food stamps automatically increases. The federal-budget deficit automatically rises. In addition to these automatic responses, Congress often introduces addi-

tional tax-reduction and spending programs during recessions to stimulate recovery, and these programs add further to the deficit. Business downturns and rising unemployment also can induce the Federal Reserve to inject additional reserves into the banking system to stimulate a business upturn. Under such circumstances the deficit could appear to be monetized by the Federal Reserve System. Unlike the indirect interest-rate linkage, however, the correlation between money creation and deficit financing produced by policymakers' sensitivity to the business cycle does not imply a causal link between deficits and money-stock growth. The relationship results because both the U.S. monetary and fiscal authorities respond to fluctuations in a third factor, the business cycle.

Although not unanimous in their findings, empirical studies indicate that increases in the money supply partially have accommodated federal-deficit financing during the 1960s and 1970s, but not during the 1950s.<sup>4</sup> A number of factors can explain this apparent shift during the early 1960s in the willingness of the Federal Reserve to accommodate the federal deficit. Between 1947 and 1960, the budget was not persistently in deficit, but shifted between surplus and deficit generally in response to the business cycle and military requirements. The Treasury did not consistently put upward pressure on interest rates during this period, especially during the periods of economic growth. Only after 1961 did the United States embark on a virtually unaltered path of deficit financing. In addition, both monetary and fiscal stabilization policies became more active between 1960 and the mid-1970s and focused more on the overall policy goal of maintaining potential output instead of smoothing business-cycle fluctuations. A

4. See, for example, Michael J. Hamburger and Burton Zwick, "Deficits, Money and Inflation," *Journal of Monetary Economics*, vol. 7, no. 1 (January 1981), pp. 141-50; W. Douglas McMillin and Thomas R. Beard, "The Short-Run Impact of Fiscal Policy on the Money Supply," *Southern Economic Journal*, vol. 47, no. 1 (July 1980), pp. 122-35; and Richard T. Froyen, "A Test of the Endogeneity of Monetary Policy," *Journal of Econometrics*, vol. 2, no. 2 (July 1974), pp. 175-88.

tendency to over-estimate the economy's level of potential output could have introduced an inflationary bias into policy. During the 1960s there also was a general belief that unemployment was a more serious problem than inflation; by accepting a bit more inflation, the nation could attain a lower unemployment rate. This trade-off between inflation and unemployment proved to be illusory beyond the very short run.

### Deficits and Velocity

Even in the absence of a monetary accommodation, large persistent deficits could cause inflation if they raised the growth rate of the velocity of money (see equation 2). An increase in the velocity of money implies that individuals are holding smaller cash balances for a given level of GNP; looking at it from a slightly different perspective, an increasing velocity implies that a given rate of money-stock growth can support a larger rate of GNP growth. Changes in velocity are associated with changes in interest rates, availability of money substitutes, wealth, and innovations in the payments mechanism, such as credit cards and electronic funds transfer. Persistent deficits could raise the velocity growth rate if the public viewed Treasury securities as net wealth *and* if Treasury securities were a close substitute for money.

When the federal government increases expenditures or decreases taxes and issues debt to finance these activities, the effect on individuals' anticipated net wealth depends on whether they perceive a corresponding increase in their future tax liabilities to service and retire the newly issued debt. If, for example, the federal government issues securities to cover a one-time \$100-billion deficit with maturity dates sufficiently short so that the current generation of taxpayers expects to retire the entire debt plus the interest due on the debt through future taxes, the current value of those future taxes would equal \$100 billion.<sup>5</sup> Financing federal expendi-

5. If the government finances a \$100-billion deficit by issuing one-year securities at the market interest rate of 10 percent, the cost of retiring the debt is \$110 billion. However, the present value (PV) of paying \$110 in one year with market interest rates at 10 percent is  $PV = 110/(1 + 0.10)$ , or \$100 billion.

tures through issuing debt would have no different impact on taxpayers' net worth than financing the same federal expenditures through current taxes. If, however, debt were issued with a maturity sufficiently long so that the burden of retiring the debt were shifted, at least in part, to future generations, the current generation might feel wealthier by the amount of the federal expenditures for which it does not pay. The outcome also depends on the altruism of the current generation toward its descendants. The current generation might not wish to saddle future generations with a large debt burden and consequently could leave bequests to retire the debt. Higher interest rates induced by the deficit would provide an added incentive for such altruism. In effect, the current generation would tax itself.<sup>6</sup>

The United States has added to its outstanding debt, through budget deficits, almost continuously since the early 1960s. Opinions about whether this constitutes a perceived increase in current-generation taxpayers' net wealth differ. Many economists do not view the debt as a burden on future generations; theoretically, the debt can be rolled over indefinitely, postponing the need to retire it indefinitely. Moreover, federal debt outstanding measured as a ratio to GNP generally has fallen since the early 1950s.

An increase in wealth increases individuals' demands for financial assets, including money, and for nonfinancial assets. For deficits to raise velocity, assuming Treasury debt is viewed as net wealth, the demand for real assets must increase more than the demand for money. This could occur if the public also perceived Treasury debt as a close substitute for money. Treasury securities generally do not function as a medium of exchange, as do currency and checks; yet, Treasury securities, especially those with short maturities, exhibit many qualities similar to more broadly defined forms of money.

6. Although a deficit tends to shift the burden of government finance to future generations, the current expenditures by government tend to confer some benefits on future generations. Presumably, the current generation would tax itself only to retire the net burden of the debt.

These qualities make Treasury securities effective temporary stores of purchasing power. Like most bank deposits, Treasury debt entails little risk of loss from the default of the issuer, and a well-developed resale market for Treasury securities enables holders to convert Treasury securities into cash with little difficulty or risk of loss. The liquidity of Treasury securities makes them excellent, but not perfect, substitutes for money. When the Treasury issues debt securities, interest rates tend to rise, increasing the opportunity cost of holding idle cash balances relative to holding Treasury securities.

### Deficits and Output

As suggested in equation 2, federal deficits could cause inflation if they restricted the nation's ability to supply goods and services, while leaving money and velocity growth unaltered. This applies to the long-term growth of real output and not to short-term fluctuations in the business cycle; business-cycle declines in real output are associated with demand changes and tend to reduce inflationary pressures. While distinguishing between changes in long-run trends and cyclical fluctuations in output is difficult, the data in table 1 show the growth of real output over similar phases of the business cycle. Since 1970, the long-term growth rate has slowed somewhat.<sup>7</sup> Many factors could have contributed to the slowing ability of the United States to supply goods and services, including the increasing relative importance of the service sector, changing work-force demographics, growing government regulations and taxation, increasing investment for environmental and health requirements, and rapidly rising energy prices.

Deficits could also contribute to the long-term slowdown in U.S. real output growth. As already mentioned, Treasury borrowing to finance deficits tends to raise interest rates, particularly when economic activity is robust. As interest rates rise,

7. Another measure of the nation's ability to supply goods and services is potential GNP, which attempts to gauge the amount of output the economy can produce at full-resource employment. Potential GNP grew 3.8 percent from 1950-59, 3.7 percent from 1960-69, and 3.4 percent from 1970-81.

2. When reserves are lent and relent in a fractional reserve banking system, the initial increase in reserves is capable of supporting a much larger increase in the money supply. See Lester V. Chandler, *The Economics of Money and Banking*, 6th ed., London: Harper & Row, 1973.

3. Data from the Flow of Funds, Board of Governors of the Federal Reserve System.