Monetary vs. Fiscal Policy: New Evidence on an Old Debate

By Peter E. Kretzmer

The economy's apparently sluggish response to lower interest rates during 1991 has led some analysts to speculate that monetary policy may be less effective than in the past. These analysts argue that fiscal stimulus is necessary to combat the recent slow growth of the economy. In response, the President and Congress are debating the shape of a fiscal stimulus package.

Questions about the relative effectiveness of monetary and fiscal policy are not new. The issue was at the heart of the Monetarist-Keynesian debate of the 1960s and early 1970s. The monetarists held that monetary policy was much more important to the economy than fiscal policy, while the Keynesians argued that fiscal policy was dominant.

Evidence from this debate, however, is of limited help to today's policymakers. First, the debate was never fully resolved. Moreover, numerous changes in the U.S. economy have occurred in the last two decades.

This article revisits the monetary-fiscal policy debate. The first section reviews the dispute between the monetarists and the Keynesians. The second section discusses how the effects of monetary and fiscal policy on the economy may have changed in recent years. The final section presents evidence indicating that while monetary policy has become less effective over the years, it is still relatively more effective than fiscal policy.

THE MONETARY-FISCAL POLICY DEBATE

The debate over the relative importance of monetary and fiscal policy was originally waged by two philosophically opposed groups of economists. The monetarists believed the money supply played a central role in determining economic performance. They used evidence from their empirical studies to show that changes in the money supply had a larger effect on the economy than changes in fiscal variables. The Keynesians believed that to stabilize the economy, fiscal policy was essential. They claimed that methodological problems invalidated the conclusions of the monetarist studies.

The first empirical study that attempted to determine which of the two positions was correct was conducted by Milton Friedman and David Meiselman in 1963. They examined simple correlations between consumption and money and

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between consumption and fiscal variables. Friedman-Meiselman found that consumption was correlated to a much larger extent with money than with the fiscal variables. They interpreted this piece of evidence as consistent with the monetarist belief that monetary policy is more important than fiscal policy.

In 1965, Keynesians Albert Ando and Franco Modigliani argued that Friedman and Meiselman's evidence failed to show that monetary policy was more important than fiscal policy. First, Ando-Modigliani attacked Friedman-Meiselman's choice of sample periods on the grounds that the results may be sensitive to the inclusion of the World War II years. Second, Ando-Modigliani criticized Friedman-Meiselman's focus on contemporaneous relationships, reasoning that any complete study of the effectiveness of policy must account for lags in the effect of policy changes.

Ando-Modigliani's most serious criticism, however, was that Friedman-Meiselman failed to allow for feedback from the economy to the measures of monetary and fiscal policy. One example of this problem arose in the way in which Friedman-Meiselman measured their fiscal variable (called autonomous expenditures). Ando-Modigliani pointed out that the monetarists' measure of autonomous expenditures included the fiscal deficit, which moves inversely with economic activity. To see why this is a problem, suppose the government increases autonomous expenditures to increase economic activity. The increase in economic activity will reduce the deficit by generating tax revenue, thereby offsetting part of the initial rise in autonomous spending. As a result, the correlation between economic activity and autonomous spending would appear weak even if the initial increase in spending had a strong effect on output.

A 1968 study by Leonall Andersen and Jerry Jordan responded to some of the Ando-Modigliani critique.[1] Andersen-Jordan regressed U.S. nominal GNP on current and lagged measures of

money and two fiscal variables.[2] They made a key improvement over the Friedman-Meiselman study by including lagged effects of the monetary and fiscal variables. They also used fiscal policy measures that corrected for the problem of feedback from the economy. Andersen-Jordan found that the coefficients on the monetary variable were statistically significant, while the coefficients on both fiscal variables were not. Thus, despite changes in methodology, the Andersen-Jordan results continued to support the Friedman-Meiselman conclusion that monetary variables dominate fiscal variables in explaining the U.S. macroeconomy.

But the Andersen-Jordan study, and similar studies that followed, still had problems. A remaining central flaw, noted in 1974 by Alan Blinder and Robert Solow, was a failure to control for the feedback from the real economy to the conduct of monetary policy. Blinder-Solow argued that such feedback could lead to incorrect conclusions about the relative importance of monetary and fiscal policy.

This feedback problem arises from the way in which the Federal Reserve has conducted monetary policy during much of the post-World War II era. With some exceptions, the Fed has carried out a policy of stabilizing interest rates over the short term. Suppose an increase in investment demand pushes interest rates and output upward. If the Fed is stabilizing interest rates, it will increase the money supply to limit the increase in interest rates. In other words, the increase in output causes the increase in the money supply, not the reverse. Failure to allow for the effect of output on money could have led to positive coefficients on money in the Andersen-Jordan study even if changes in money do not cause changes in output. Thus, not accounting for the potential feedback from output to money may render the monetarist conclusion unwarranted.[3]

By the mid-1970s, the debate between the monetarists and the Keynesians subsided without either side being able to convert the other.

Monetarists continued to believe monetary policy was dominant, while Keynesians continued to believe the flaws in the studies were serious enough to invalidate the monetarists' conclusions.

RECENT CHANGES IN THE EFFECTS OF MONETARY AND FISCAL POLICY

The uncertainty surrounding the results of the early studies makes it difficult for policymakers to draw firm conclusions on the effects of monetary and fiscal policy. But even if the debate had been resolved, would the results be of value today? Probably not, because the economic impact of monetary and fiscal policy is likely to have changed since the mid-1970s.

Monetary policy

Monetary policy in the United States is conducted primarily through Federal Reserve open-market operations. Open-market operations, which are purchases or sales of Treasury securities by the Fed, change the quantity of reserves held by the banking system. Open-market operations also affect the federal funds rate, the interest rate at which banks lend reserves to one another for short periods of time. Changes in the federal funds rate in turn can affect real output. For example, a decrease in the federal funds rate can lead to a decrease in other interest rates, thereby raising both consumption and investment demand.[4]

Recently, however, structural changes in the U.S. economy may have changed the impact of monetary policy on real output. These changes include the removal of interest rate ceilings on bank deposits, the development of more nonbank sources of financing for firms, and the growth of the foreign sector.[5]

Prior to their removal in the 1980s, interest rate ceilings on bank deposits tended to reinforce the effect of higher interest rates on economic activity. When market rates rose above the ceil-ings, disintermediation—the flight of funds from the banking system—took place. With a smaller pool of funds available to banks, bank credit for purchases such as homes and consumer durables became less available, reinforcing the effects of higher interest rates. The removal of interest rate ceilings on bank deposits, therefore, has probably reduced the real effects of monetary policy.

The growth of more nonbank sources of financing for firms has also probably weakened the effect of monetary policy. Investment by firms that depend largely on bank loans is sensitive to their availability. But now that more firms can turn to the commercial paper market, the convertible bond market, or the swap market to help finance their investment, interest rate increases may have less effect on business investment.

The growth in the foreign sector has also impacted the effect of monetary policy. As world capital markets have become more integrated and the U.S. share of the world economy has shrunk, monetary policy has become less effective because it is more difficult for the Federal Reserve to alter U.S. interest rates relative to other countries' interest rates. For example, assume the Federal Reserve sells Treasury securities in an effort to increase U.S. interest rates. The higher interest rates will now immediately attract foreign investors. As the foreign investors purchase the securities, U.S. interest rates are pushed back down. Thus, it has become more difficult for the Federal Reserve to alter U.S. interest rates.

On the other hand, with a larger foreign sector, the exchange rate has become more important for output determination because it affects the levels of both exports and imports. If expansionary monetary policy causes the value of the dollar to fall, exports should increase and imports should decrease, thereby expanding real output. Now that the foreign sector is larger, the output effect will be larger. Thus, the exchange rate channel for monetary policy has become more important, potentially making the economy more sensitive to monetary policy.

Fiscal policy

Fiscal policy refers to expenditures by federal, state, and local governments and to the taxes levied to finance these expenditures. The U.S. economy has recently changed in several ways that may have altered the impact of fiscal policy on real output. First, transfer payments have grown and defense spending has shrunk as shares of the federal budget. Second, federal individual income tax rates dropped sharply in the 1980s. And third, budget deficits have been large in recent years.

Defense and transfer payments. The balance between defense spending and transfer payments as shares of the economy has changed rather dramatically over the past few decades. Defense spending proposed by President Bush's latest budget (FY 1993) continues a long-term decline, falling from over 10 percent of GNP in the early 1950s to about 5 percent today.[6] At the same time, transfer payments—payments from the government to a group of people defined by a characteristic such as age or income—have increased from about 3 percent of the economy in the 1950s to over 10 percent today.

This change in the makeup of the budget may have reduced the potency of fiscal policy. In the 1950s, a 1 percent change in government spending across the board would have included larger changes in defense spending than in transfer payments, because defense spending was a larger share of the budget.[7] Today, however, a 1 percent change in spending would include larger changes in transfer payments. Because defense spending is stimulative while many types of transfer payments are not, the effect of proportional changes in government spending on output may have weakened over the years.

Increases in defense spending are likely to stimulate aggregate demand. To understand why, first consider another form of government spending that affects the economy differently than defense spending. For example, when the govern-

ment buys food products to serve meals to its employees, the purchases presumably substitute for about an equal amount of private meal purchases (by the same employees) that would otherwise have been made. Thus, there is little or no net increase in aggregate demand. However, when the government buys military equipment, the purchase is not a good substitute for private spending on goods and services. Thus, an increase in defense spending is likely to generate a net increase in aggregate demand.[8]

Transfer payments affect aggregate demand only if the spending patterns of the group receiving the transfer payments differ from the spending patterns of taxpayers in general. To illustrate, consider government aid to students. This program takes money from taxpayers and redistributes it to students. As long as the spending patterns of students are similar to the spending patterns of the general population, expanding aid to students should have no effect on aggregate demand.

Tax rates. Tax rates fell substantially in the 1980s, potentially increasing the effectiveness of fiscal policy. When the government buys goods and services, it creates income for the producers of the goods and services. The income is consumed in an amount that depends, among other things, on how much of the income remains after taxes. With lower tax rates, more after-tax income is earned, more consumption takes place, more after-tax income is generated, and so on. The size of this "multiplier" for government expenditure thus depends on tax rates. Lower tax rates in the 1980s may have increased the output effect of government expenditures, making fiscal policy more potent.

Budget deficits. The large budget deficits of recent years may have forced policymakers to rely less on fiscal policy to influence the economy. A great deal of public attention has focused on the size of the deficits and their possibly harmful effects. In this environment, it has become more difficult to propose new expenditure programs or engage in other aggressive fiscal policy, making

fiscal policy a less important factor in the 1980s. Furthermore, fiscal policy could lose even more importance in the 1990s, since the 1991 budget agreement forces Congress to offset expenditure increases or tax reductions so that the budget deficit does not grow.[9]

NEW EVIDENCE ON THE MONETARY-FISCAL POLICY DEBATE

This section presents evidence on the monetary-fiscal policy debate that attempts to account for the methodological problems of previous studies and for the changes in the U.S. economy. The results suggest that while monetary policy has become less effective over the years, it is still more effective than fiscal policy.

Empirical model

One of the remaining problems with the earlier studies is that they did not completely account for the feedback from the economy to the policy variables. To account for the feedback, a vector autoregression (VAR) is used to analyze the data. In a VAR, each variable is regressed on its own lags and the lags of each of the other variables in the data set. In this way, the procedure allows each variable to be affected by its own history and the history of each of the other variables. For example, output is regressed on lags of policy variables in one equation, while the policy variables are regressed on lags of output in other equations.

The variables in the VAR are quarterly measures of real output, inflation, two monetary policy variables, and two fiscal policy variables.[10] Output is measured by the growth rate of industrial production.[11] Inflation is measured by the growth rate of the CPI. The monetary policy variables are the growth rate of the monetary base and the 90-day Treasury bill rate.[12] The fiscal policy variables are the change in total government expenditures (net of interest payments) as a fraction of

GNP and the government budget deficit as a fraction of GNP.[13]

VARs are run for two 30-year subsamples. The results are then compared in order to identify changes over time in the potency of monetary and fiscal policy.[14] The first subsample extends from the second quarter of 1950 through the fourth quarter of 1979. The second subsample extends from the second quarter of 1962 through the fourth quarter of 1991.

Results

Using the results of a VAR, there are several ways to evaluate the effects of monetary and fiscal policy on output. The three used here are causality tests, variance decompositions, and impulse response functions. Causality tests focus on the statistical significance of monetary and fiscal policy variables in affecting real output. Variance decompositions compare the relative contributions of the monetary and fiscal variables in explaining output. Impulse response functions show the estimated responses of output to hypothetical changes in policy.

Causality tests. Causality tests are used to determine whether the effects of the policy variables on output are statistically significant. For example, if the coefficients on the monetary policy variables are significant but the coefficients on the fiscal policy variables are not, the test would suggest that monetary policy is more effective than fiscal policy.

The effects of monetary policy on output, while not that strong, probably exceed the effects of fiscal policy (Table 1). The coefficients on the monetary policy variables are statistically significant, at the 10 percent significance level in the first subperiod and at the 5 percent significance level in the second subperiod. In contrast, the fiscal policy variables do not have a statistically significant effect on output in either subperiod.

Variance decompositions. While the causality tests indicate whether policy variables have a

Chart 1

Effect of Monetary Base Shock on Output

Percent*

1950:Q2 to 1979: Q4

1962: Q2 to 1991: Q4

Quarter after shock
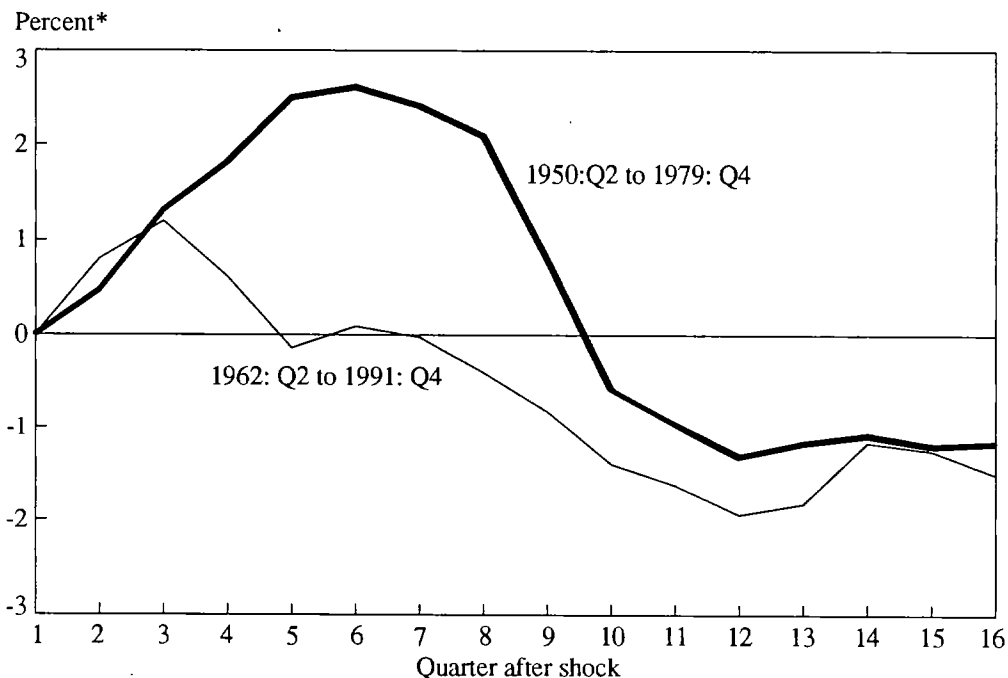
* Cumulative percent change in output.

statistically significant effect on output, they do not show the relative size of these effects. The variance decomposition of output, however, can

Table 1

Causality Tests

Sample period	Monetary	P-value	Fiscal	P-value
1950:Q2–1979:Q4	1.64	.07	1.05	.42
1962:Q2–1991:Q4	1.76	.05	1.46	.13

Note: Column 2 reports F-statistics for the hypothesis that monetary variables do not affect output. Column 4 reports F-statistics for the hypothesis that fiscal variables do not affect output. Columns 3 and 5 report the associated significance levels for the hypotheses tests.

be used to compare the size of the monetary policy effect with the size of the fiscal policy effect, and to see how the size of the effects has changed over time. Specifically, the variance decomposition shows the percentages of the variability of output that are explained by the monetary and fiscal policy variables.[15]

The variance decomposition results appear in Table 2. The first column, the estimated effect of monetary policy, shows the percentage of the variance of output explained by monetary base changes and Treasury bill rate changes. The second column, the estimate of the effect of fiscal policy, shows the percentage of the variance of output explained by government expenditure changes and budget deficit changes.[16]

Table 2 indicates that the effect of monetary policy is greater than the effect of fiscal policy in

Chart 2

Effect of Interest Rate Shock on Output
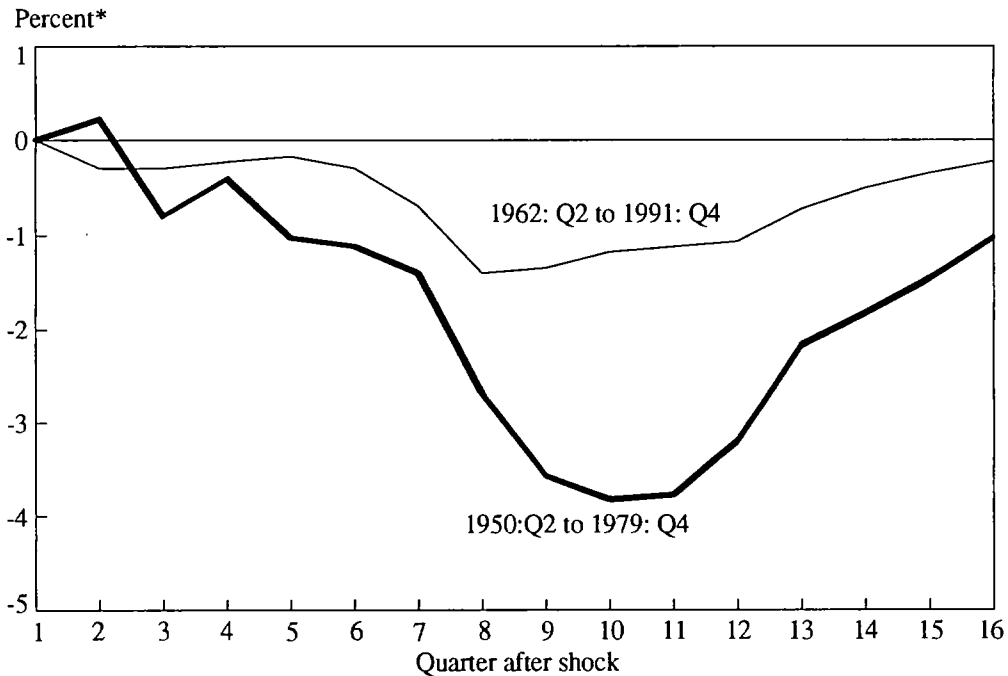
Percent*

* Cumulative percent change in output.

both subperiods. For example, in the first sub-period, the variation in output due to monetary policy is estimated to be about twice that due to fiscal policy. Table 2 also shows that the importance of monetary policy fell somewhat from the first to the second subperiod, while the importance of fiscal policy remained about the same.

Impulse response functions. The impulse response function shows the estimated response of output to a permanent change in monetary or fiscal policy.[17] It is particularly useful for determining the economic significance of the output response to a policy change of a particular size. Charts 1 and 2 show the output responses to changes in the monetary policy variables, while Chart 3 shows the output responses to changes in the fiscal policy variables.
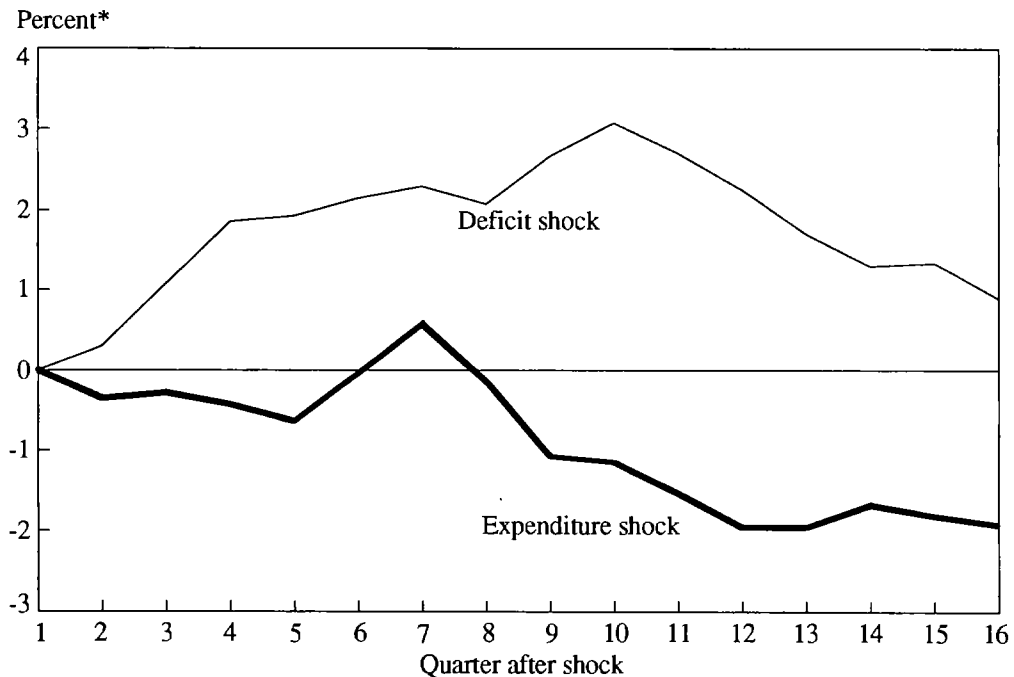
Chart 1 compares the response of output to a

1 percent increase in the monetary base in the two subperiods. The increase in output is larger in the first subperiod than in the second subperiod. For

Table 2

Variance Decompositions of Output

Sample period	Monetary	Fiscal
1950:Q2–1979:Q4	28	15
1962:Q2–1991:Q4	23	17

Note: Column 2 reports the estimate for the percentage of output variance explained by monetary policy variables. Column 3 reports the estimate for the percentage of output variance explained by fiscal policy variables.

Chart 3

Effect of Expenditure and Deficit Shocks on Output

* Cumulative percent change in output.
Note: Sample period is 1962: Q2 to 1991: Q4.

the first subperiod, the peak response of output to a 1 percent base increase is between 2 and 3 percent.[18] For the second subperiod, the peak response of output is just over 1 percent.

Chart 2 compares the response of output to a one-percentage-point increase in the Treasury bill rate in the two subperiods. The decline in output following an increase in the Treasury bill rate is larger for the first subperiod than for the second subperiod. For the first subperiod, output falls almost 4 percent after a one-percentage-point increase in the Treasury bill rate. For the later subperiod, the response is much smaller—output falls between 1 and 2 percent.[19]

Chart 3 shows how output responds when government expenditures and the budget deficit increase by 1 percent of GNP. Only the second subperiod is shown for these fiscal policy changes

because the causality tests clearly showed that fiscal policy was statistically insignificant in the first subperiod. The response of output to the increase in government expenditures is slightly positive after about two years but appears to be negative in the longer run. Output responds more strongly to the increase in the budget deficit, rising by about 3 percent.

CONCLUSIONS

Monetarists and Keynesians debated the relative importance of monetary and fiscal policy throughout the 1960s and 1970s. Yet the evidence from this period is of limited help to today's policymakers, since these studies had methodological flaws and many changes in the U.S. economy have occurred in the last two decades.

This article corrects the flaws of the early studies and finds that monetary policy has become less effective over time, but is still more effective than fiscal policy. The effects of both money and interest rates on output appear to have fallen over the years. As a result, more monetary stimulus may now be necessary to achieve a particular change in output than in the past.

The study also suggests that the fiscal stimulus packages being debated by Congress may be of limited help. While the effect of fiscal policy on output is not statistically significant over the sample period, there is some evidence that increases in the budget deficit may increase output. The fiscal packages under consideration, however, leave the deficit unchanged, as required by the 1991 budget agreement.

ENDNOTES

[1] The Andersen-Jordan study was the first, and perhaps the most important, of the St. Louis studies, so-called because the studies were prepared by the research department of the Federal Reserve Bank of St. Louis.

[2] The monetary variable was M1 or the monetary base, and the fiscal variables were full-employment expenditures and full-employment tax receipts. The sample period extended from the first quarter of 1952 through the second quarter of 1968.

[3] More precisely, the bias in the estimated coefficient on money arises if output shocks are contemporaneously correlated with money through the feedback mechanism or if output shocks cause future changes in money and there is autocorrelation in the output shocks.

[4] Newly created reserves, through increasing the money supply, may make households and corporations feel wealthier. This perceived increase in wealth may also stimulate consumption and investment demand.

[5] Kahn discusses a similar set of factors as reasons for the changing interest sensitivity of the U.S. economy.

[6] The decline in defense spending was only partially offset by the Reagan defense buildup during the first half of the 1980s.

[7] This example assumes that the 1 percent change affects all categories of expenditure proportionately, leaving each category's share of the government budget unaffected. It is not difficult to imagine an expenditure proposal that violates this assumption. The measure of expenditures used in the empirical section of this article does not differentiate among different types of government spending.

[8] The effect defense spending has on the aggregate supply of goods and services depends on the degree to which the spending affects the productivity of the private economy. There is substantial debate over the effect of defense spending on productivity. One argument is that defense spending spurs innovation and scientific progress that add to the productivity

of the nondefense sector. Others argue the defense industry is a drag on productivity, since it diverts scientific talent from nondefense to defense jobs. There is currently no clear consensus on the effects of defense spending on productivity and aggregate supply.

[9] Congress must compensate for any tax reduction by cutting expenditures or raising other taxes; any expenditure increase must be offset by an expenditure cut elsewhere or a tax increase.

[10] Similar data sets have been analyzed by authors such as Sims and Litterman and Weiss, but usually without the fiscal variables.

[11] The empirical work was repeated using the growth rate of real GNP as an alternative output measure.

[12] The monetary base was chosen over M1. since its movements are more likely to indicate Fed monetary policy. Movements in M1 are also influenced by bank behavior as well as the liquidity preferences of the public.

The federal funds rate is considered by many to be the optimal interest rate for the analysis of monetary policy because it has often been the Fed's main policy instrument. The short-term Treasury bill rate is substituted in its place because a longer series is readily available for the Treasury bill rate than for the funds rate. Both interest rates yield similar results.

Using both the interest rate and money variables tends to exaggerate the importance of monetary policy. since interest rate innovations can also reflect other nonmonetary shocks to the economy. Sims. and Litterman and Weiss assume that only money stock innovations reflect the effects of monetary policy, an assumption that almost surely underestimates the true importance of monetary policy. This research treats the combined effect of monetary and interest rate innovations as reflecting an upper bound on the possible influence of monetary policy. By ordering the interest rate last in computing the variance decompositions and impulse response func-

tions, the degree of exaggeration in this measure of the effect of monetary policy is minimized. See Kretzmer (forthcoming) for further details.

[13] The budget deficit is measured as the difference between government expenditures, net of interest payments, and total government receipts, including inflation tax revenue. The deficit is used as the second fiscal variable, rather than receipts, in order to impose on the VAR the cointegration of government expenditures and government receipts. See Bohn and Kretzmer (forthcoming) for more details on this issue.

[14] The subsample length of 30 years is judgmental, based on the tradeoff between statistical power and the ability to infer when changes in the effects of policy actually occurred. There are six variables and ten quarters of lags included in the VAR. Thus, each equation has 61 regressors. At least 120 observations, twice the number of regressors, are needed to obtain a reasonable degree of precision.

[15] The estimated variance decompositions and impulse response functions (the third technique) are unique only if the innovations in the variables are mutually uncorrelated. In the absence of this condition, it is necessary to model the relation among the contemporaneous innovations. Typically, an ordering is determined, where first in the ordering means "most exogenous" and last in the ordering means "most endogenous." In this setup, innovations in X, for example, are maintained to be related only to the innovations in the

variables that precede X in the ordering.

[16] Innovations in the two fiscal policy variables are strongly positively correlated. As a result, it is difficult to separate out the individual influences on output of expenditure innovations and deficit innovations with any degree of confidence. Equivalently, the ordering of the two variables substantially affects the individual results. However, the sum of the influences is quite unaffected by the ordering.

[17] In order to compute the impulse response function, it is necessary to invert the VAR, expressing each variable as a function of lagged innovations in itself and the other variables. Then, the coefficients on the lagged innovations measure the response over time of the dependent variable to a unit shock in that independent variable. Thus, the change is permanent in the sense that it is not actively reversed by policymakers.

[18] Recall that the results reported here use industrial production as the output measure. Industrial production is more responsive to money than is real GNP. This result is consistent with Kretzmer (1989) who finds that output of service industries is less responsive to money than output of durable manufacturing industries. The results using real GNP are qualitatively similar to the results reported for industrial production.

[19] The reduced sensitivity of output to interest rate innovations is consistent with the results presented in Kahn.

REFERENCES

Andersen, Leonall C., and Jerry L. Jordan. 1968. "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," Federal Reserve Bank of St. Louis, *Review*, November, pp. 11-24.

Ando, Albert, and Franco Modigliani. 1965. "The Relative Stability of Monetary Velocity and the Investment Multiplier," *American Economic Review*, September, pp. 693-728.

Blinder, Alan S., and Robert M. Solow. 1974. "Analytical Foundations of Fiscal Policy," in *The Economics of Public Finance*. Washington: Brookings Institution.

Bohn, Henning. 1991. "Budget Balance through Revenue or Spending Adjustments? Some Historical Evidence for the United States," *Journal of Monetary Economics*, June, pp. 333-59.

Friedman, Milton, and David Meiselman. 1963. "The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897-1958," in *Stabilization Policies*. Englewood Cliffs: Prentice Hall.

Kahn, George A. 1989. "The Changing Interest Sensitivity of the U.S. Economy," Federal Reserve Bank of Kansas City, *Economic Review*, November, pp. 13-34.

Kretzmer, Peter E. Forthcoming. "How Important Are Monetary and Fiscal Policy in Explaining Postwar U.S. Data? A Vector Autoregression Approach," Federal Reserve Bank of Kansas City, working paper.

_____. 1989. "The Cross-Industry Effects of Unanticipated Money in an Equilibrium Business Cycle Model," *Journal of Monetary Economics*, March, pp. 275-96.

Litterman, Robert B., and Laurence Weiss. 1985. "Money, Real Interest Rates, and Output: A Reinterpretation of Postwar U.S. Data," *Econometrica*, January, pp. 129-56.

Sims, Christopher A. 1980. "Comparison of Interwar and Postwar Business Cycles: Monetarism Reconsidered," *American Economic Review*, May, pp. 250-57.