June 1983

A Five-Country Analysis of Money, Credit, and Nonfinancial Activity

This past winter the Federal Reserve Board decided the first time to add to its monetary targets one for total domestic nonfinancial debt. Economic research has shown that in the United States this credit aggregate bears as close and as stable a relationship to total economic activity as do well-known measures of the money supply, or the monetary base (currency in circulation plus bank reserves). In other words, if the amount of total nonfinancial debt grows, it indicates that similar growth in the gross national product (GNP)—the nation's output of goods and services —either is already occurring or will follow in short order. Now NBER Research Associate **Benjamin M. Friedman,** in *Working Paper No. 1033,* **Money, Credit, and Nonfinancial Economic Activity: An Empirical Study of Five Countries,** has added to his earlier research on the U.S. economy a similar analysis of the economies of Canada, West Germany, Japan, and the United Kingdom. Friedman finds that the relationship between credit and nonfinancial activity is not unique to the United States. It exhibits a stability in all five nations that is roughly comparable to that between money and economic activity. That suggests, according to Friedman, that central banks in all these countries might well choose a credit aggregate as one of their "principal targets" along with the monetary targets that they already use in determining monetary policy.

Friedman uses a variety of methodologies to test his credit–economic activity thesis. In the first of these tests, he looks at the movement over time of three financial aggregates, relating these on a contemporaneous basis to gross national product. These aggregates are in each case a narrow measure of the money stock (M1, in the United States currency in circulation plus accounts on which checks can be written), a broad money stock measure (M2 or M3, measures that include M1 plus certain savings deposits or similar accounts), and total nonfinancial debt (credit). The data are quarterly, except in Germany where credit data are available only on an annual basis. He finds that the credit ratio, as judged from the raw data, is more stable than either of the money ratios in Canada, Japan, and the United States; after "detrending" the data, the credit ratio has a closer relationship to GNP than either of the money ratios in all of the countries but Canada. Further, the relationship of M1 to GNP is more stable than that of M2 or M3 in all but Japan.

> "...the relationship between credit and nonfinancial activity is not unique to the United States."

The second test is "dynamic," taking account of the lead or lags between these money and credit measures and GNP. In this case, M1 comes out ahead on average (winning in Canada, Germany, and the United States), with credit hard on its tail (winning in

Japan and the United Kingdom), and M2 or M3 placing third in the relationship with GNP (except in Germany, where credit is last).

Two other tests also confirm that the stability of the credit-to-income relationship is comparable to that of the money-to-income relationship. Other tests show that within total nonfinancial debt, if the public debt component grows rapidly, private debt will grow less rapidly or shrink—or vice-versa. So private and public debt tend to offset each other within the total. Finally, further tests show that, as is the case for money, the relationship of credit to nonfinancial activity is not just that of a mirror reflecting what would happen in any case. Credit does affect nonfinancial activity. But Friedman does not spell out how it does so; it remains "a puzzle," he writes, although no more so than the relationship between money and income.   DF

Nonmonetary Factors in the Great Depression

In **Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression,** *NBER Working Paper No. 1054,* Research Associate **Ben S. Bernanke** indicates that disruptions in the allocation of credit, caused by the banking crises of the early 1930s, contributed greatly to the depth and duration of the Great Depression. The role of the banking crises in exacerbating the Depression was first noted 20 years ago by Milton Friedman and Anna Schwartz. However, their analysis focused on the way in which bank failures brought about a contraction in the money supply, which in turn depressed economic activity. Bernanke's work deals with a second impact of the banking crises.

The banking system went through the most difficult and chaotic conditions in its history between 1930 and 1933. Waves of bank failures culminated in the shutdown of the entire system on the "bank holiday" in March 1933. The series of banking crises coincided with similar adverse turns in economic output. Notably, an apparent attempt at recovery from the 1929–30 recession came to a halt at the time of the first wave of bank failures in November 1930, and the economy went into a deeper slump with the banking panic of mid-1931. Both economic output and the banking system reached their nadirs in March 1933.

Much support exists for the monetary view of how the bank failures affected economic activity. However, it does not provide a complete explanation of the link between the financial sector and aggregate output in the 1930s. For one thing, no theory of how money affects the real economy can explain why the Depres-

sion persisted for so long. Second, the reductions in the money supply during the early 1930s seem too small to explain the full drop in output that followed. Bernanke builds on the Friedman–Schwartz work by considering another way in which financial crises (which include debtor bankruptcies as well as the failures of banks and other lenders) may have affected output.

"...disruptions in the allocation of credit, caused by the banking crises of the early 1930s, contributed greatly to the depth and duration of the Great Depression."

His theory holds that financial markets are imperfect, and that costly market-making and information-gathering services are needed to move funds between some classes of lenders and borrowers. As he views the conditions of the early 1930s, disruptions in the banking system raised the real cost of performing those services, which he calls the cost of credit intermediation, or CCI. Credit became expensive and difficult to obtain for certain types of borrowers, especially households, farmers, and small businesses. The credit squeeze reduced aggregate demand and, he believes, helped convert the recession of 1929–30 into a protracted decline. The theory does not offer a complete explanation of the Great Depression, but Bernanke maintains that it helps explain why the downturn lasted so long. Moreover, the theory does not rely, as some others do, on the assumption that people behaved irrationally.

The banking crises clearly were an important cause of the sharp contraction in bank credit during the Depression. Credit outstanding declined very little before October 1930 despite a 25 percent drop in industrial output. But the first wave of bank failures that occurred in November brought on a long period of credit contraction, and the shrinkage followed the rhythm of subsequent banking crises. For example, in October 1931, the worst month for bank failures, the drop in outstanding credit equaled 31 percent of personal income. Moreover, the fall in loans wasn't simply a reflection of the decline in bank deposits. The fear of runs caused surviving banks to make precautionary increases in their reserve-to-deposit ratios and switch into more liquid investments. As a result, the ratio of outstanding loans to demand and time deposits dropped sharply.

Widespread bankruptcies on the part of borrowers also affected bank behavior. As borrowers became progressively less solvent and the value of their collateral declined, banks responded by raising their quality standards for loans. One indication of the flight to quality is that banks virtually ceased making new mortgage loans. Another is the yield differential

between Baa corporate bonds and Treasury bonds. The differential went from 2.5 percentage points in 1929–30 to nearly 8 points in mid-1932. In the sharp recession of 1920–22, the differential never exceeded 3.5 points.

Bernanke interprets the shifting composition of bank assets and the flight to quality as evidence of an increase in the cost of credit intermediation. (The CCI cannot be measured directly because commercial loan rates do not capture the shadow cost of funds to potential borrowers who are turned away. When banks are lending to only the most creditworthy borrowers, loan rates may decline while the cost of credit intermediation actually is rising.)

Under Bernanke's theory, the higher cost of credit intermediation for some borrowers (in this case, households, farmers, and small businesses) can reduce output by lowering aggregate demand. These borrowers face a higher effective cost of credit, and some may not be able to borrow at all. If the higher rate applies only to their borrowing, and not to what they earn on savings, the effect of higher borrowing costs is to reduce their demand for current-period goods and services. This implies lower output and lower interest rates for borrowers who are not affected by the crisis, such as the federal government. Both of these circumstances prevailed from 1930 through 1933.

Bernanke tested his theory with regressions using monthly data from January 1919 through December 1941. His first set of equations showed that unanticipated changes in both the money supply and prices had statistically significant effects on output. However, changes in money and prices captured no more than half the decline in output during the mid-1930 to March 1933 period. His next step was to add the deposits of failing banks and the liabilities of failing businesses as proxies for the nonmonetary impact of financial crises. Both of those variables affected output in the expected way and, taken together, were statistically significant. Bernanke takes this as tentative confirmation that the nonmonetary effects of financial crises augmented the monetary effects in the short-run determination of economic output.

The nonmonetary effects of the banking crises may also have played a role in the length of the Depression. Banks remained extremely conservative after the 1933 bank holiday. Reviewing several contemporary surveys of lending practices, Bernanke concludes that the private financial system did not return to normal for at least two more years and that financial recovery would have been more difficult without extensive federal intervention under the New Deal. "A moderate estimate," he writes, "is that the U.S. financial system operated under handicap for about five years, from the beginning of 1931 to the end of 1935. . . . This is consistent with the claim that the effects of financial crisis can help explain the persistence of the Depression." AE

Petrodollars and Growth in the 1970s

In *NBER Working Paper No. 1056,* **Petrodollars and the Differential Growth Performance of Industrial and Middle-Income Countries in the 1970s,** Research Associate **Michael Bruno** develops an explanation of why "the industrial countries [ICs] performed so miserably after the first oil shock while the middle-income oil importing countries [MICs] seem to have flourished." Bruno concentrates on the economies of 19 OECD countries (including the United States, United Kingdom, France, and Japan) and 19 MICs (for example, Korea, the Philippines, and Egypt) before the first oil shock, 1960–73, and after it, 1973–80.

Between those two periods, the growth rate of gross domestic product (GDP) fell from 4.7 to 2.6 percent in the industrial countries; it fell hardly at all in the MICs, slowing from 6.6 percent to 6.3 percent. GDP growth per employed person, one indicator of labor productivity, slowed sharply in the OECD group, falling from 3.6 percent to 2.0 percent. In the MICs, on the other hand, there may have been a slight improvement: for the 10 countries where employment data were available, the growth rate rose from 2.7 to 3.0 percent.

The variability of growth in output during each of the periods rose for the OECD group, while falling slightly for the MICs. Perhaps most striking, though, was the MICs' share of the increase in total manufacturing output of 25.1 percent from 1970–78. The U.S. share was 25.4 percent, Germany and Japan together accounted for 25.1 percent, and all of the other OECD countries represented only 21.6 percent of that increase.

> "...these differentials can be explained by countries' adjustments to supply price shocks and by a world equilibrium determination of capital flows and interest rates."

The MICs' larger share of output was primarily the result of a slight increase in growth in employment. Employment growth fell to a small negative rate in the OECD countries, while labor productivity fell for both ICs and MICs between the two periods.

Bruno suggests that these differentials can be explained by countries' adjustments to supply price shocks and by a world equilibrium determination of capital flows and interest rates. He argues that the effects of supply shocks in the industrial countries were compounded by wage rigidity and contrac-

tionary macroeconomic responses. MICs may have had more wage flexibility and followed more expansionary policies (particularly, borrowing from others). Since MIC growth was at a price of higher current account deficits and more accelerated inflation, though, these countries couldn't use the same strategy after the second oil shock because, by that point, the real cost of foreign borrowing and of domestic labor had increased.

To support his theory, Bruno carefully examines the 1973–80 period. The first oil shock, 1973–74, was followed by a sharp reduction in real interest rates in the financial markets of most industrial countries. Real interest rates remained low or negative in these countries from 1974–77, mainly because of the sharp fall in investment brought on by a profit squeeze. The oil-importing MICs financed their deficits with private loans, funded in large part with petrodollars and at zero or negative real rates. In fact, one of the marked differences at the time between ICs and MICs was their relative investment performance that the MICs financed largely by external debt. Investment growth fell from 6.4 to 0.4 percent in the OECD sample, but only from 9.7 to 8.1 percent in the MIC group.

Immediately after the first shock, Bruno notes, the difference between the two groups was particularly sharp. The OECD countries recovered only partially in 1975–78, while most of the MICs in the sample grew faster than before.

The second oil shock in 1978–80 was followed by a slump in both ICs and MICs that was more pronounced in the OECD countries. Real interest rates were positive, high, and generally above their pre-1973 levels. Both ICs and MICs had large and persistent budget deficits, and investment responded more modestly than after the first shock.

From the pre- to the post-1973 period, terms of trade on average deteriorated in the OECD group but hardly changed for the MICs. On the other hand, inflation accelerated more rapidly in the MICs, from 7.2 to 19.5 percent contrasted with a rise from 4.7 to 10.8 percent in the ICs. Also, the MICs' deficit in the real current account rose relative to GDP, but declined in the ICs.

Bruno finds evidence that real wages in 1973–75 *were* on average flexible downward in the MICs, much less so in the major OECD countries, and not at all in smaller OECD countries. Between 1975 and 1978, though, an increasing number of MICs encountered rising real labor costs. Bruno further finds that "...there was a pronounced trade-off between aggregate productivity and the current account, both short-run and long-run, which the MICs actively used to their advantage in the period between the two oil shocks. There are also clear indications that this 'free ride' was over by 1979–80 as the real costs of foreign borrowing as well as the real costs of domestic labor were rising substantially."

NBER