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In This Issue . . .

The articles in this *Review* focus on two controversial issues currently under public scrutiny. The first article investigates the widespread claims that monetarism is dead. The second article assesses the validity of the charge that bank loan rates — in particular, the prime rate — are "too high," given the cost of obtaining loanable funds.

In the first article, "Are Monetarists an Endangered Species?" Dallas S. Batten and Courtenay C. Stone investigate the alleged failure of monetarism. They point out that monetarism can be viewed in two ways: as a scientific theory about the impact of monetary pressures on the economy, or as a diverse collection of normative propositions about how fast money should grow or what policy actions should be taken. The authors suggest that, while disagreements over normative monetarism are probably unsolvable, debates over scientific monetarism can be resolved.

Batten and Stone examine four scientific monetarist propositions: 1) There is a close, stable relationship between M1 growth and total spending; 2) Inflation is primarily a monetary phenomenon; 3) Sufficiently sharp short-run changes in M1 growth produce similar movements in real output; and 4) The rate of M1 growth can be controlled. None of these propositions, they find, have been discredited by economic events over the past several years.

Batten and Stone also demonstrate that predictions of the growth of spending, prices and real GNP derived from these monetarist propositions have held up well when compared with predictions of two popular, larger non-monetarist structural models of the economy. They conclude that rumors of the death of monetarism have been greatly exaggerated.

In the second article, "The Prime Rate and the Cost of Funds: Is the Prime Too High?" R. W. Hafer investigates the economic forces underlying the prime lending rate.

Hafer notes first that, since the early 1970s, the prime rate generally has varied with current credit market conditions: "As the competition for loanable funds and the cost of liability management have increased with the advent of numerous financial innovations, banks have become more sensitive to interest rate changes in establishing their lending rates." Consequently, prime rate changes accompany changes in banks' cost of funds.

To test this relationship, Hafer examines the effects of movements in the 90-day CD rate and the federal funds rate — measures of a bank's cost of short-term funds — on the prime rate over the period September 1980 to December 1982. His evidence indicates that a 100 basis-point change in these rates will, after three months, produce a similar change in the prime rate; changes in the prime rate generally follow changes in the cost of funds.

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In This Issue . . .

To see whether the prime rate currently is too high, given the present cost of funds, Hafer forecasts the prime rate from January through April 1983, using the actual 90-day CD rate and the federal funds rate for the period. The author concludes that "relative to their cost of funds, banks have not kept the prime rate unduly high during the past few months."

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Are Monetarists an Endangered Species?

DALLAS S. BATTEN and COURTENAY C. STONE

MONETARISM has come under increasingly sharp attack over the past few years. Recent critics have detailed "The Trouble With Monetarism," argued that the choice is between *Monetarism or Prosperity* and even recoiled in horror from *The Scourge of Monetarism.*[1] Various accounts of the failure of monetarism in Argentina, Canada, Chile and Great Britain have received widespread attention.[2] Moreover, monetarism in the United States has been described as a "God that failed," and there have been numerous reports that monetarism is now virtually dead.[3]

The alleged death of monetarism could not have come at a more inappropriate time. Milton Friedman and Anna Schwartz have just published a massive volume entitled *Monetary Trends in the United States and the United Kingdom: Their Relation to Income, Prices and Interest Rates 1867–1975.*[4] In that text, they present extensive and detailed evidence that supports the basic monetarist propositions regarding the impact of money on the economy.[5] It would be both ironic and puzzling if, at the very time that their findings are published, we were to discover that these fundamental relationships suddenly have broken down.

Yet, this claim is precisely the one that critics of monetarism have made. They charge that recent financial innovations and the expanding use of previous financial innovations have so distorted the measure and meaning of money that monetarism, no matter how well supported by historical studies, is no longer valid.[6] Since this claim has been made before and found, in each instance, to be groundless, it should be met with considerable skepticism.[7]

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[1]Alan Reynolds, "The Trouble with Monetarism," *Policy Review* (Summer 1982), pp. 19–42; Bryan Gould, John Mills and Shaun Stewart, *Monetarism Or Prosperity* (Macmillan Press Ltd., 1981); and Nicholaus Kaldor, *The Scourge of Monetarism* (Oxford University Press, 1982).

[2]See, for example, "Monetarism loses face north of the border," Economic Diary, *Business Week* (December 20, 1982), p. 12; John Kirbyshire, "Monetarism Remains Economic Scapegoat," *New York Journal of Commerce*, November 4, 1982; "In Britain, monetarism took a heavier toll," *Business Week* (April 4, 1983), pp. 66–67; Jeremy Morgan, "Argentina Abandons Monetarism," *New York Journal of Commerce*, June 19, 1982; and Everett G. Martin, "Milton Friedman's Proteges in Chile See Influence Declining Because of Recession," *The Wall Street Journal*, July 27, 1982. Even discussions of monetarism can produce conflicts; see "Friedman's Views Ignite Political Debate in Peru," *Washington Post*, November 22, 1981.

[3]For the most recent citation that monetarism has failed in the United States, see "The Failure of Monetarism," *Business Week* (April 4, 1983), pp. 64–67. For earlier criticisms, see Andrew F. Brimmer, "A Return to Monetarism: the Dangers," *American Banker*, February 3, 1983; Stuart E. Eizenstat, "Volcker's Monetarist Policy: Painful, Costly," *The New York Times*, October 18, 1982; William D. Nordhaus, "Destroying the Economy to Save It," *The New York Times*, December 26, 1982; Peter Field, "The Death of Reaganomics," *Euromoney* (September 1982), pp. 95–107; and Irving Kristol, "The Big Question: Is 'Reaganomics' Working?" *The Wall Street Journal*, October 14, 1982. Apparently the only nations where monetarism currently is practiced unchallenged are the People's Republic of China and the Soviet Union; see Leo Goodstadt, "The Great Chinese Economic Retreat," *Euromoney* (April 1981), pp. 73–77; Milton Friedman, "Marx and Money," *Newsweek* (October 27, 1980), p. 95; and Milton Friedman, "Defining Monetarism," *Newsweek* (July 12, 1982), p. 64.

[4]Milton Friedman and Anna J. Schwartz, *Monetary Trends in the United States and the United Kingdom: Their Relation to Income, Prices and Interest Rates, 1867–1975* (University of Chicago Press, for the National Bureau of Economic Research, 1982).

[5]For detailed reviews of the just published Friedman and Schwartz volume, see David Laidler, "Friedman and Schwartz on Monetary Trends: A Review Article," *Journal of International Money and Finance* (December 1982), pp. 293–305; Thomas Mayer, "Monetary Trends in the United States and the United Kingdom: A Review Article," *Journal of Economic Literature* (December 1982), pp. 1528–39; Charles A. E. Goodhart, "Monetary Trends in the United States and the United Kingdom: A British Review," *Journal of Economic Literature* (December 1982), pp. 1540–51; and Robert E. Hall, "Monetary Trends in the United States and the United Kingdom: A Review from the Perspective of New Developments in Monetary Economics," *Journal of Economic Literature* (December 1982), pp. 1552–56.

[6]For a recent version of this claim, see Edward P. Foldessey, "New Bank Accounts May Force Fed to End Experiment in Monetarism," *The Wall Street Journal*, December 28, 1982.

[7]For an assessment of the "monetarism has failed" claim circa 1972, see Darryl R. Francis, "Has Monetarism Failed? — The Record Examined," this *Review* (March 1972), pp. 32–38.

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This article attempts to assess whether current rumors of the demise of monetarism are greatly exaggerated.

A TALE OF TWO MONETARISMS: SCIENTIFIC PROPOSITIONS VS. NORMATIVE PRESCRIPTIONS

Perhaps the most significant obstacle to understanding many of the current arguments, both for and against monetarism, is that the term typically is bandied about with little or no specific reference to its intended meaning. This is a problem because monetarism can refer to two very different kinds of statements. Monetarism can refer to specific, testable, scientific propositions; it also can be used to indicate a set of policy suggestions or alternatives to achieve desired economic goals.[8] In the scientific sense, we can assess easily whether monetarism has failed. In the normative or policy sense, however, it may be impossible to agree whether monetarist policies have even been attempted, let alone have failed.

Monetarism as a Science

Looked at in a scientific sense, monetarism is the label attached to a common set of theoretical and empirical propositions regarding the significant and stable relationship between the money stock and other important economic variables. There is a methodology, common to all sciences, that is used to assess the logical validity and empirical support for competing theories. Scientific theories never die by themselves; they are abandoned only when a better theory comes along. If monetarism, in the scientific sense of the word, has failed, it must have succumbed to an alternative non-monetarist explanation.

It is clear that, within the scientific framework of the rise and demise of theories, monetarism has not been superseded by newer or superior theories of inflation or real output or spending growth.[9] Instead, critics charge that the behavioral relationships that worked well in the past have shifted and that the previously stable relationships underlying the monetarist view have now become unstable. If this has occurred, then the propositions labeled monetarism would become less useful. In the extreme, they would even be replaced by some previously less useful, non-monetarist theory. This issue is analyzed in the latter part of this article.

Monetarism as an Economic Policy

In addition to its scientific meaning, however, monetarism also can be used in a normative or policy sense. As such, it serves as a label for a set of economic policy prescriptions intended to achieve certain economic goals. Of course, such policy prescriptions presuppose that monetarism, in the scientific sense, is valid and that policymakers can exert some control over money growth.

There are several fundamental problems with attempting to assess the success or failure of *normative* monetarism. First, there may be no common agreement on whether a monetarist policy has been followed; consequently, it will be virtually impossible to demonstrate that it has failed. To illustrate this problem, consider the data shown in table 1. A number of countries have announced a variety of monetary aggregate *targets* over the past three years; six of these are represented in the table. Because these countries have adopted and publicly announced such targets, numerous commentators have labeled their policies as monetarist. Because these targets generally were not achieved and because economic conditions in these countries over the past three years were generally poor, it has been charged that monetarism has failed.

At the same time, other analysts have used the same data to support the opposite conclusion. Because the announced targets were not achieved, they argue, the actual behavior of the monetary authorities was clearly non-monetarist. Further, the resultant adverse economic conditions are used to demonstrate why monetarist policies should have been followed.

A prime example of the problem associated with determining whether a specific policy is monetarist is the widespread disagreement over whether the Federal Reserve has been following a "monetarist" policy since October 1979.[10] When a group of policymakers, economists and financial analysts were asked this question recently by the Joint Economic Committee of the U.S. Congress, their answers ranged from the strongly affirmative to the strongly negative to the inscrutably

[8]This distinction is discussed briefly in Milton Friedman's "Defining Monetarism."

[9]The presumed failure of *all* economic theories has been noted recently by John Greenwald, "Where Have All the Answers Gone?" *Time* (January 17, 1983), pp. 36–37.

[10]On October 6, 1979, the Federal Reserve announced that it had changed its operating procedures to achieve enhanced control over money. This change in policy implementation was relaxed in October 1982.

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Table 1

Monetary Aggregate Targets and Monetary Aggregate Growth for Six Countries: 1979–1982

Country	Targeted aggregate	Period	Annual growth rates of aggregate: Targeted	Annual growth rates of aggregate: Actual
Canada	M1	II/1979 to quarter centered on 9/1980	5 to 9%	6.2%
		quarter centered on 9/1980 to present	4 to 8	4.8[1]
Japan	M2 plus CDs	III/1979–III/1980	10	8.4
		IV/1980–IV/1981	10	10.6
		IV/1981–IV/1982	8	8.0
Switzerland	Monetary base	12/1979–12/1980	4	2.3
		12/1980–12/1981	4	−3.3
		12/1981–12/1982	3	8.2
United Kingdom	£ M3	2/1980– 4/1981	7 to 11	19.7
		2/1981– 4/1982	6 to 10	13.3
		2/1982– 4/1983	8 to 12	9.8[2]
United States	M1	IV/1979–IV/1980	4 to 6.5[3]	7.3
		IV/1980–IV/1981	6 to 8.5[4]	5.0
		IV/1981–IV/1982	2.5 to 5.5	8.5
West Germany	Central Bank Money	IV/1979–IV/1980	5 to 8	4.8
		IV/1980–IV/1981	4 to 7	3.5
		IV/1981–IV/1982	4 to 7	6.1

[1]9/1980 to 2/1983.

[2]2/1982 to 2/1983.

[3]Target range for M1B.

[4]Comparable to 3.5–6.0 percent range for shift-adjusted M1B.

cryptic.[11] The basic problem is simply that reasonable people can differ both on their interpretation of whether a specific policy is monetarist and whether it is being carried out in a monetarist fashion.

A different problem with assessments of policy failures is that policymakers and the general public appear to shift back and forth among a variety of goals; further, they often fail to agree among themselves on the likely outcome of policy actions.[12] Flip-flopping between policy goals can lead to erratic policy actions that are unlikely to fit neatly into any category — monetarist or non-monetarist. Disagreement over the likely outcomes of policy actions will lead typically to different assessments by policymakers and others about the "success" of policy actions. To some, policy will have succeeded; to others, it will have failed.

Debates over whether monetarist monetary policies have been tried, or whether they have failed, or even whether they were the appropriate monetarist policies, are unlikely to be resolved. In the normative sense, a discussion of whether monetarism has failed is both inconclusive and, probably, nonsensical as long as there is such widespread disagreement. These discussions only serve to draw attention from the crucial issue that can be resolved — whether monetarism, in the

[11]*Monetarism and the Federal Reserve's Conduct of Monetary Policy*, Compendium of Views Prepared for the Use of the Subcommittee on Monetary and Fiscal Policy of the Joint Economic Committee, Congress of the United States, 97 Cong. 2 Sess. (U.S. Government Printing Office, December 30, 1982).

[12]For the apparent "shiftiness" of monetary policy goals, see Richard Froyen, "A Test of the Endogeneity of Monetary Policy," *Journal of Econometrics* (July 1974), pp. 175–88; Richard K. Abrams, Richard Froyen and Roger N. Waud, "Monetary Policy Reaction Functions, Consistent Expectations, and the Burns Era," *Journal of Money, Credit and Banking* (February 1980), pp. 30–42; John H. Wood, "A Model of Federal Reserve Behavior," in George Horwich, ed., *Monetary Process and Policy: A Symposium* (Richard D. Irwin, 1967) pp. 135–66; and Thomas M. Havrilesky, Robert H. Snapp and Robert L. Schwertzer, "Test of the Federal Reserve's Reaction to the State of the Economy," *Social Science Quarterly* (March 1975), pp. 743–52. For a statement of the failure of monetary policymakers to agree on what the actual outcome of policy is likely to be, see John M. Berry, "Fed to Resist Call on Hill for Its Economic Goals," *Washington Post*, April 5, 1983.

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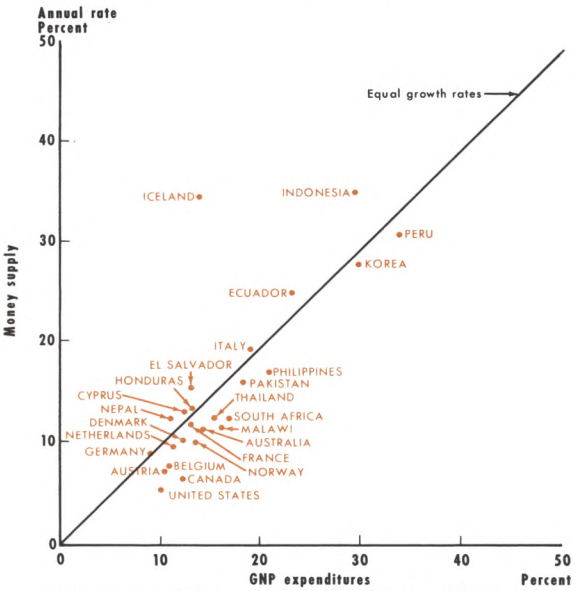
scientific sense, has failed. If scientific monetarism has failed, then discussions over normative monetarist issues are meaningless; there can be no useful monetarist policies if the relationships between money growth and other important economic variables are unstable or nonexistent. On the other hand, if scientific monetarism has not failed, discussions over whether some policy can be labeled as monetarist are mere bagatelles; what matters is not the label attached to the policy, but the actual pattern of money growth that the policy produces. The crucial issue that must be addressed is the success or failure of scientific monetarism.

FOUR WELL-KNOWN SCIENTIFIC MONETARIST PROPOSITIONS: HAVE THEY FAILED?

There are a large number of economic propositions that have come to be associated with monetarism, or at least with individuals who have been labeled monetarists.[13] We do not intend to investigate all such propositions. Instead, we focus on what we consider to be four key monetarist propositions. The first three propositions concern "what money does"; they represent the relationship between money growth and the growth of aggregate spending, prices and real output. The fourth proposition focuses on the controllability of money growth. The first three propositions demonstrate why money matters; the fourth proposition investigates whether monetary *policy* matters.

Chart 1
Growth in the Money Supply and GNP Expenditures in 25 Countries from 1969 to 1980



Source: Paul F. Smith, Comparative Financial Systems (Praeger, 1982), p.5.

Proposition 1: There is a close and stable relationship between the growth of money and the growth of total spending. This relationship can be investigated in a variety of ways. One simple way is to compare the growth of M1, the narrow monetary aggregate consisting of currency and checkable deposits, to the growth of aggregate spending, measured by Gross National Product (GNP) or Gross Domestic Product (GDP). This is done in chart 1 for a large number of countries for the 1969 to 1980 period. It is clear from the chart that, in general, there is a very close relationship between growth in money and growth in total spending; the vast majority of the countries are clustered close to the 45-degree line that denotes equal growth rates for both money and spending over the period.

[13]For statements, suggestions and, in some cases, extensive lists of what monetarism means, see Karl Brunner, "The Role of Money and Monetary Policy," this *Review* (July 1968), pp. 9–24; Darryl R. Francis, "An Approach to Monetary and Fiscal Management," this *Review* (November 1968), pp. 6–10; Allan Meltzer, "Controlling Money," this *Review* (May 1969), pp. 16–24; Karl Brunner, "The Monetarist View of Keynesian Ideas," *Lloyds Bank Review* (October 1971), pp. 35–49; A. Robert Nobay and Harry G. Johnson, "Monetarism: A Historic-Theoretic Perspective," *Journal of Economic Literature* (June 1977), pp. 470–85; Jerome L. Stein, ed., *Monetarism* (North-Holland Publishing Co., 1976); Thomas Mayer, *The Structure of Monetarism* (W. W. Norton & Company, Inc., 1978), especially p. 2; Brian Morgan, *Monetarists and Keynesians: Their Contribution to Monetary Theory* (Halsted Press, 1978), especially pp. 89–91; Howard R. Vane and John L. Thompson, *Monetarism: Theory, Evidence and Policy* (Halsted Press, 1979), especially pp. 3–16; Douglas D. Purvis, "Monetarism: A Review," *Canadian Journal of Economics* (February 1980), pp. 96–121; David Laidler, "Monetarism: An Interpretation and an Assessment," *The Economic Journal* (March 1981), pp. 1–28; and John Burton, "The Varieties of Monetarism and Their Policy Implications," *The Three Banks Review* (June 1982), pp. 14–31. Needless to say, these are only a few of the huge number of articles and books on this issue. Moreover, there are a host of alleged kinds of monetarists and monetarism. John Burton provides the following listing in "The Varieties of Monetarism": Marxist, Friedmanite, rational expectations, global, fiscal, Austrian and Thatcherite. Herbert Stein, in "Monetarism Under Fire," *AEI Economist* (September 1981), pp. 1–8, distinguishes three categories of monetarists: half-way, true-blue and gold-standard. Robert D. Auerbach in *Monetarism and the Federal Reserve's Conduct of Monetary Policy*, pp. 39–45, lists the following kinds of monetarists: exaggerated or naive, cameo, asymmetric, creeping asymmetric, commodity target, distant target, changing target, multiple target, conventional, central banks, one-issue-at-a-time and interest rate. Finally, there are numerous different kinds of pejorative monetarism that are mentioned frequently; among our favorites are: miscreant, flinty-eyed, macho, knee-jerk, simple, simplistic and mechanical. Given the above varieties of both monetarism and monetarists, it is crucial, in any evaluation of monetarism, that the term be carefully defined and consistently used.

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A more analytical method of assessing the relationship between growth in M1 and GNP for the United States involves the use of the St. Louis equation, which was developed specifically to investigate the impact of monetary and fiscal actions on GNP.

The St. Louis equation typically is written as:

$$(1)\ \dot{Y}_t = \text{constant} + \sum_{i=0}^{4} m_i \dot{M}_{t-i} + \sum_{i=0}^{4} e_i \dot{E}_{t-i},$$

where $\dot{Y}$, $\dot{M}$ and $\dot{E}$ are the annualized quarterly growth rates of GNP, M1 and high-employment government expenditures, respectively, m_i and e_i represent the impact of current and lagged values of $\dot{M}$ and $\dot{E}$, respectively, the constant term represents the impact of other influences on GNP growth, and $i = 0, \ldots, 4$ shows that the equation investigates the extent to which GNP growth in quarter t is affected by the current and past four quarters' growth in M and E.

Table 2 shows the results of estimating this equation over the period from II/1960 to IV/1982. There are three key aspects to these results. First, as the $\bar{R}^2$ shows, the estimated equation accounts for a sizable proportion of the actual fluctuations in GNP growth; in this instance, about 30 percent of the variation in Y is explained by the variables on the right-hand side of the equation. Second, the explanatory power of the equation is derived solely from the monetary variables; only the estimated coefficients on $\dot{M}$ are statistically different from zero. Third, the sum of the coefficients on $\dot{M}$ is not significantly different from one; this indicates that, other things unchanged, any given change in the growth of M1 will produce the same change in the growth of GNP within five quarters.

Another way of looking at this relationship can be seen in chart 2, which contains the year-to-year growth rates of nominal GNP and M1 for the United States. Clearly, changes in the growth of GNP from one year to the next are positively associated with changes in the growth of M1.

If monetarism has failed due to recent financial innovations, then the relationships estimated in table 2 and shown in chart 2 should have eroded substantially since late 1979.[14] This purported erosion is not apparent in chart 2: the link between money growth and economic activity since III/1979 seems no different from that which existed during the previous two decades.

Table 2
Estimation of St. Louis Equation: II/1960 to IV/1982

Equation Estimated:

$$\dot{Y}_t = \text{constant} + \sum_{i=0}^{4} m_i \dot{M}_{t-i} + \sum_{i=0}^{4} e_i \dot{E}_{t-i} + u_t$$

Coefficient	Estimate[1]
Constant	1.67 (1.31)
m_0	0.34* (2.98)
m_1	0.43* (5.47)
m_2	0.30* (3.11)
m_3	0.05 (0.63)
m_4	−0.14 (1.21)
Σm_i	0.98* (4.85)
e_0	0.07 (1.62)
e_1	0.03 (0.75)
e_2	−0.01 (0.30)
e_3	0.01 (0.19)
e_4	0.04 (1.05)
Σe_i	0.14 (1.36)

$\bar{R}^* = .31$ SE = 3.83 DW = 1.89

[1]Absolute values of t-statistics in parentheses.
*Statistically significant at the 5 percent level.

Of course, visual evidence is never conclusive; appearances always can be deceiving. What is significant is that there is no *statistical* support that the relationship between money and spending in the St. Louis equation has broken down in recent years. When the parameters of the St. Louis equation were tested for their structural stability, the hypothesis that the structure had "slipped" in the later period was rejected.[15] Thus, there does not appear to have been a

[14]Since it is never possible to identify a single beginning point for a continuous process like financial innovation, the date of the Fed's change in operating procedures (October 1979) is used as the break point in this, and all subsequent, analysis.

[15]The stability of the coefficients in equation 1 is examined by estimating

$$\dot{Y} = a_0 + a_1 D + \sum_{i=0}^{4} m_{1i} \dot{M}_{t-i} + \sum_{i=0}^{4} m_{2i} D \dot{M}_{t-i} + \sum_{i=0}^{4} e_{1i} \dot{E}_{t-i} + \sum_{i=0}^{4} e_{2i} D \dot{E}_{t-i} + e_t,$$

where D, a dummy variable, equals 1 from II/1960 to III/1979 and 0 otherwise. The stability test for the coefficients on M1 growth is conducted by testing the joint hypothesis that all of the estimates of m_{2i} are simultaneously equal to zero. The calculated F-statistic for this test is 2.01; the critical F-value is 2.72 for the 5 percent significance level. Consequently, the hypothesis that the coefficients on M1 growth have changed since III/1979 can be rejected at the 5 percent significance level.

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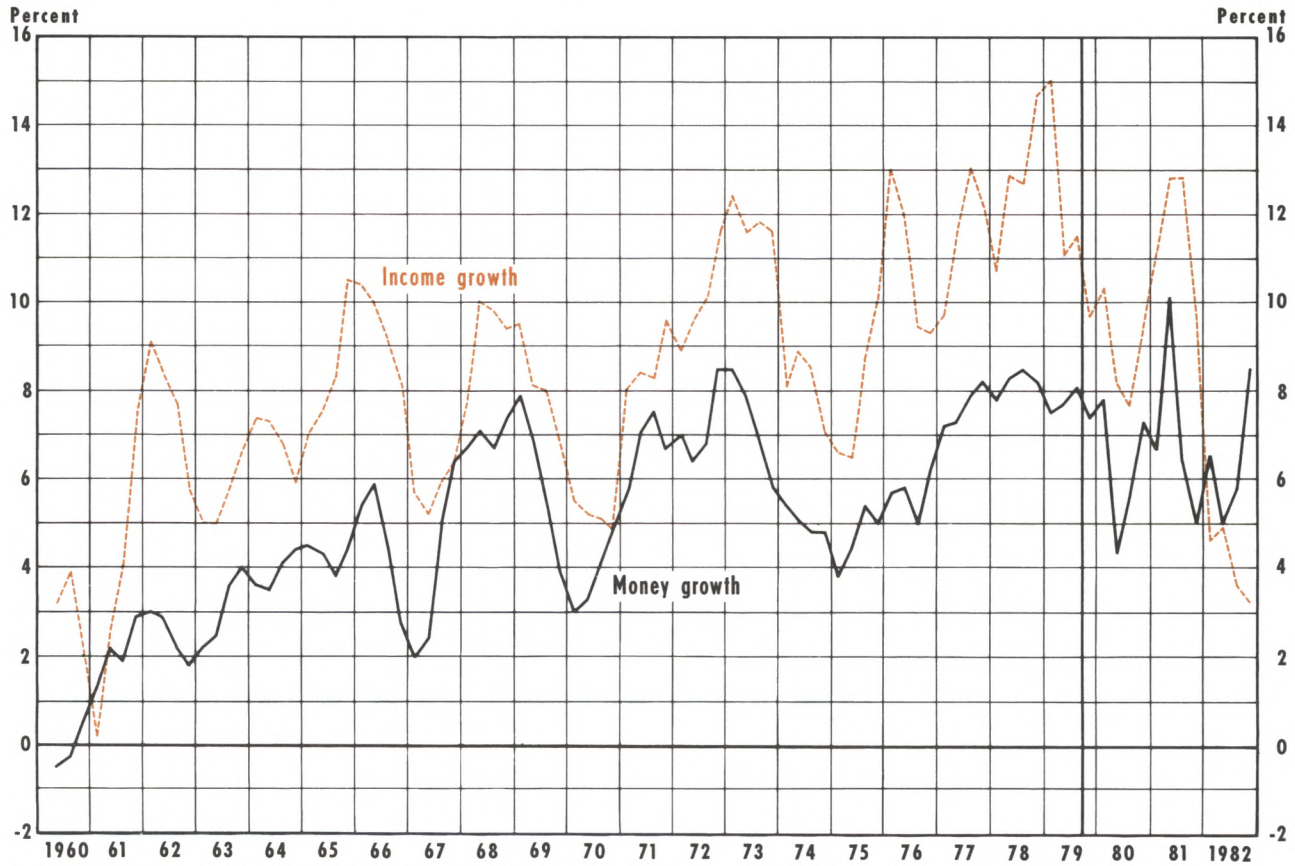
Chart 2

Growth Rates of M1 and Nominal GNP [1]



[1] Each line represents a four-quarter growth rate. The vertical line between III/79 and IV/79 indicates the change in Federal Reserve operating procedures and the beginning of financial innovations.

sudden failure of monetarism in the 1980s, at least as judged by the relationship between money growth and the growth of total spending.[16]

The second and third propositions are concerned with how changes in money growth affect the two fundamental components of nominal GNP growth — *real* GNP growth and price growth (inflation).

Proposition 2: Inflation is primarily a monetary phenomenon. This proposition states that there is a close positive relationship between the trend growth in money and the growth in prices over long periods of time. One example of the universality of this relationship is shown in table 3 for a variety of countries

[16]For further evidence that innovations have had no significant impact on M1, see John A. Tatom, "Recent Financial Innovations: Have They Distorted the Meaning of M1?" this *Review* (April 1982), pp. 23–35 and "Money Market Deposit Accounts, Super-NOWs and Monetary Policy," this *Review* (March 1983), pp. 5–16.

Table 3

Money Growth and Inflation Across Countries: 1973–1980

Country	Average annual rates of M1 growth	Average annual rates of Inflation[1]
Italy	18.3%	17.6%
United Kingdom	13.0	16.4
France	10.9	10.6
Japan	9.4	7.0
Canada	8.9	10.0
Germany	8.7	4.7
Netherlands	8.4	7.8
Belgium	6.6	7.4
United States	6.4	7.7
Switzerland	3.8	3.6

[1]Measured by GNP deflator.

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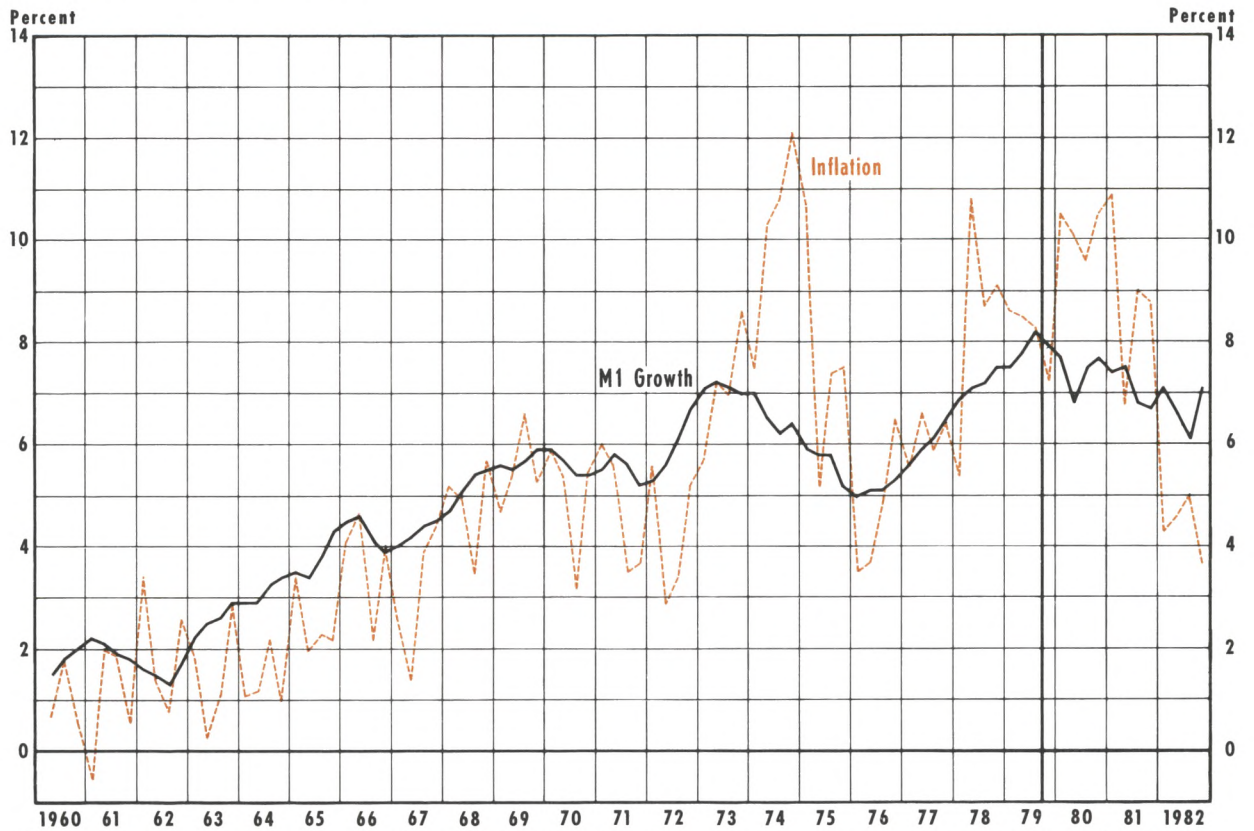
Chart 3

M1 Growth and Inflation [1]



[1] The M1 growth line represents a twelve-quarter moving average of M1 growth. The quarter-to-quarter rate of change of the GNP deflator is displayed in the inflation line. The vertical line between III/79 and IV/79 indicates the change in Federal Reserve operating procedures and the beginning of financial innovations.

over the period from 1973 to 1980. With few exceptions, those countries with the greater M1 growth also had the higher rates of inflation.

Another way to assess the relationship between price changes and money growth is to separate the monetary and non-monetary influences on prices to determine their relative importance at various points in time. Since it is the *trend* growth in money that influences prices, the monetary influence on the rate of inflation in any period is the growth in money over some fairly long past period.[17] Chart 3 reports the long-term rate of M1 growth (measured by its 12-quarter moving average) and the quarter-to-quarter rate of growth of the implicit price deflator for GNP for the United States. In general, the path of inflation follows that of long-run money growth. In fact, after accounting for oil-price shocks, long-run M1 growth explains over 80 percent of the variation in the quarter-to-quarter rate of inflation.[18]

[17] There is exhaustive literature attesting to the existence of a long lag between money growth and inflation rates. For recent evidence, see Keith M. Carlson, "The Lag From Money to Prices," this *Review* (October 1980), pp. 3–10; John A. Tatom, "Energy Prices and Short-Run Economic Performance," this *Review* (January 1981), pp. 3–17; and Dallas S. Batten, "Money Growth Stability and Inflation: An International Comparison," this *Review* (October 1981), pp. 7–12.

[18] See Carlson, "The Lag From Money to Prices." The results of estimating a similar inflation equation over the II/1960 to IV/1982 period are:

$$\dot{P}_t = \underset{(2.19)}{-0.866} + \underset{(13.30)}{1.091} \sum_{i=0}^{12} \dot{M}_{t-i} \underset{(3.43)}{-1.736}\, D1 + \underset{(1.42)}{0.695}\, D2 - \underset{(0.11)}{0.001}\, \dot{p}^e_{t-1} + \underset{(3.96)}{0.065}\, \dot{p}^e_{t-2} \underset{(0.29)}{-0.005}\, \dot{p}^e_{t-3} + \underset{(2.93)}{0.041}\, \dot{p}^e_{t-4}$$

$$\bar{R}^2 = .83 \qquad SE = 1.19 \qquad DW = 1.88$$

where $\dot{P}_t$ is the rate of inflation (measured by the GNP price deflator) in quarter t, D1 and D2 are dummy variables for the control and decontrol phases of the Nixon wage-price control period, $\dot{p}^e$ is the growth rate of the relative price of energy and the absolute values of t-statistics are in parentheses.

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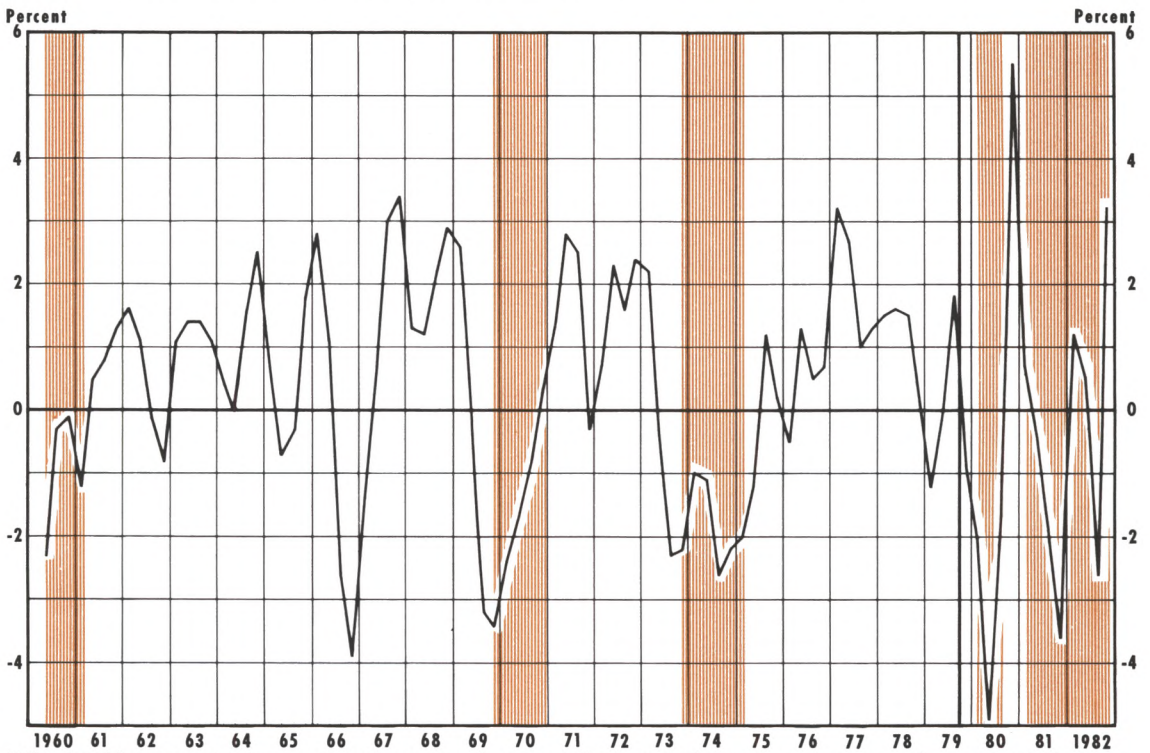
Chart 4
Deviations of Short-Run Money Growth from Trend [1]



[1] The plotted line represents a two-quarter moving average of money growth minus a twelve-quarter moving average of money growth. The vertical line between III/79 and IV/79 indicates the change in Federal Reserve operating procedures and the beginning of financial innovations. Shaded areas represent periods of business recession.

Once again, there appears to be no significant breakdown in this relationship after late 1979: the long-run rate of money growth has declined during the past 3½ years as has the rate of inflation. Moreover, an econometric investigation indicates that there has been no breakdown in the M1-inflation relationship over the past three years.[19]

Proposition 3: Short-run changes in money growth, if sufficiently sharp, produce real output movements. Conceptually, a change in money growth creates a monetary disequilibrium: the quantity of money that individuals desire to hold differs from the quantity that they actually are holding. By altering their rate of spending, they attempt either to increase or to decrease their money holdings to a desired level. Eventually, as discussed previously, this change in the rate of aggregate spending will cause a change in the rate of inflation.

In the short run, however, producers cannot tell immediately whether this change in the rate of aggregate demand (spending) is permanent or merely temporary; thus, they respond initially by changing their rate of production. That is, the change in money growth results in a deviation of real economic activity from its "normal" rate. Only when the change in spending (motivated by the monetary disequilibrium) has been identified as permanent will producers change their prices and return production back to its normal rate. Thus, the impact of a change in the rate of money growth shows up *initially and temporarily* on output and employment.[20]

This proposition is demonstrated in chart 4, which reports the deviation of short-run M1 growth (mea-

[19] A more rigorous investigation of a breakdown in the money growth-inflation relationship entails conducting a test similar to that in footnote 15 for the inflation equation cited in footnote 18. The calculated F-statistic for this test is 1.53, well below the critical value of 2.72 at the 5 percent significance level. The hypothesis that the coefficients on M1 growth in the inflation equation have changed since III/1979 can be rejected.

[20] For a discussion of the microeconomic rationale behind the timing of the effect of changes in money growth on real output (initially) and prices (ultimately), see Carlson, "The Lag From Money to Prices," pp. 6–8.

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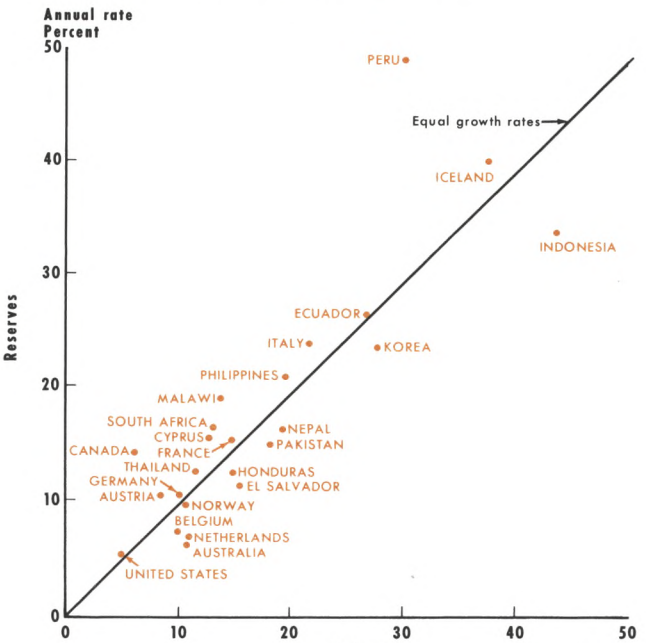
sured by its two-quarter moving average) from its long-run trend (measured by its 12-quarter moving average). The shaded areas represent periods defined as recessions by the National Bureau of Economic Research. Every downturn in economic activity in the last two decades has been associated with a substantial slowing in money growth relative to its trend; every substantive slowdown in short-run M1 growth has been associated with an economic downturn.[21] Although the 1966 episode was not technically labeled a recession, the United States experienced a "growth recession"; real GNP growth fell from about 10 percent to zero following the dramatic decline in money growth in 1966.

There appears to be no breakdown in this relationship since late 1979. In fact, this proposition is supported quite strongly by recent events. For example, money growth declined substantially in early 1980 (almost 5 percentage points below its trend); accompanying this decline in M1 growth, real economic activity declined rapidly and dramatically. By the third quarter of 1980, money growth had rebounded and the economy began pulling out of a short-lived recession. When short-run money growth declined from 5½ percentage points above its trend in IV/1980 to about 4 percentage points below its trend by IV/1981 (an unprecedented drop), however, the economy headed into its second recession in as many years, a recession from which we have only recently begun to recover.

Proposition 4: Monetary authorities can control the rate of money growth. Within the context of monetary policy, the first three monetarist propositions are relatively unimportant unless the growth of money is controllable. The money definition that we have used in this study, M1, consists of currency and checkable deposits, the two things generally offered and accepted in exchange for goods and services. The monetary authority cannot control M1 *directly* because the checkable deposits that make up a large part of M1 are created by depository institutions. The monetary authority, however, through its open market operations

Chart 5
Growth in Reserves and Demand Deposits in 24 Countries from 1969 to 1980



Source: Paul F. Smith, Comparative Financial Systems (Praeger, 1982), p.11.

and lending to depository institutions, can control the stock of reserves held by depository institutions upon which these checkable deposits are based. As a result, the monetary authority can control the growth of money supply *indirectly* by controlling the rate of growth of these reserves.[22]

In the very short run, changing asset preferences of individuals may cause discrepancies between the rate of growth of reserves and that of checkable deposits. Yet, over longer periods of time, these growth rates conform closely across a wide variety of monetary institutions, as exhibited in chart 5 for a large number of countries. This chart illustrates that, over time, reserve growth and demand deposit growth are associated closely. Moreover, because checkable deposits are a large portion of the M1 definition of money, reserve growth is, then, a prerequisite for money growth.

This analysis neglects the role that currency plays in the money supply process. Since currency in the hands of the nonbank public is another potential source of bank reserves, changes in the public's demand for currency also may be the source of monetary expansion

[21] Again, this proposition has been documented extensively. See, for example, Milton Friedman and Anna J. Schwartz, "Money and Business Cycles," *Review of Economics and Statistics* (Supplement: February 1963), pp. 32–78; William Poole, "The Relationship of Monetary Decelerations to Business Cycle Peaks: Another Look at the Evidence," *Journal of Finance* (June 1975), pp. 697–712; Dallas S. Batten and R. W. Hafer, "Short-Run Money Growth Fluctuations and Real Economic Activity: Some Implications for Monetary Targeting," this *Review* (May 1982), pp. 15–20; and Dallas S. Batten and R. W. Hafer, "Is There a Role for Monetary Targeting?" *Review of Business and Economic Research* (forthcoming, 1983). The last two articles cited above demonstrate that similar results are found across countries as well.

[22] See Anatol B. Balbach, "How Controllable is Money Growth?" this *Review* (April 1981), pp. 3–12.

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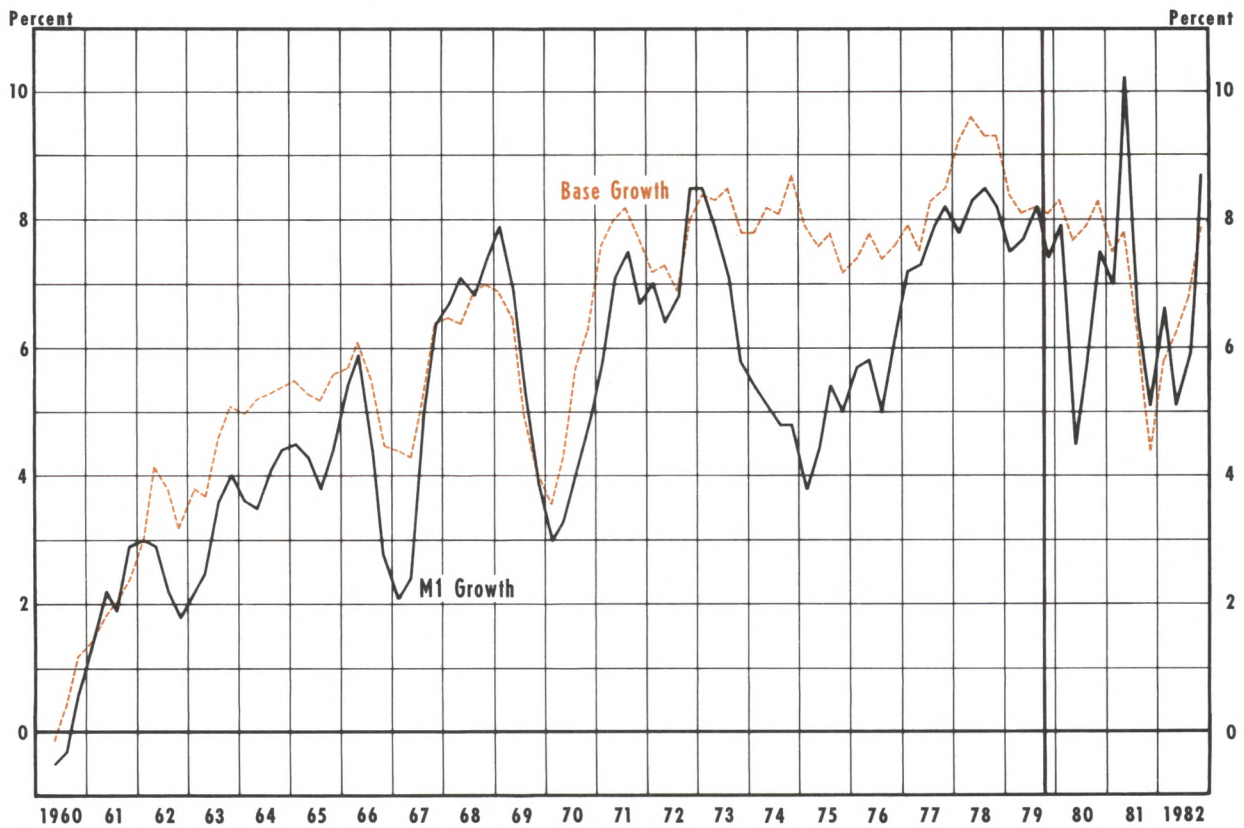
Chart 6
Growth of M1 and the Adjusted Monetary Base [1]



[1] Each line represents a four-quarter moving average. The vertical line between III/79 and IV/79 indicates the change in Federal Reserve operating procedures and the beginning of financial innovations.

and contraction. Thus, both reserve availability and the amount of currency in the hands of the public must be controlled by the monetary authorities if they desire to control money growth.

The monetary base is the sum of bank reserves and currency in circulation. In the United States, it represents a liability of the Federal Reserve. Even though the Federal Reserve does not possess discretionary control over all of the items in its balance sheet, it does have sufficient control to determine the level and growth of the monetary base it desires, even on a weekly basis.[23]

The link between the monetary base and the money supply is the money multiplier. Changes in this multiplier reflect changes in the public's preferences for various financial assets. Since these changes can either intensify or mitigate the impact of Federal Reserve actions, control of the monetary base may still be associated with periods of highly variable money growth if changes in the multiplier are highly unpredictable.[24] This, however, does not appear to be the case over periods of one year or more.

Chart 6 contains four-quarter moving averages of the rates of growth of the adjusted monetary base and M1. Except for the period in the mid-1970s, money growth and base growth have moved together fairly closely. In fact, a 1 percentage-point increase in the rate of base growth leads to approximately a 1 percentage-point increase in money growth.[25]

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[23]See Balbach, "How Controllable is Money Growth?"

[24]For a discussion of this point covering the growth of money in 1982, see R. W. Hafer and Scott E. Hein, "The Wayward Money Supply: A Post-Mortem of 1982," this *Review* (March 1983), pp. 17–25.

[25]This can be seen more clearly from the following estimated relationship between base growth and M1 growth:

$$\dot{M}_t = \underset{(0.51)}{-0.344} + \underset{(9.27)}{0.921}\,\dot{B}_t$$

$\bar{R}^2 = .49$ SE = 2.29 DW = 1.92

where $\dot{B}$ is the growth rate of the adjusted monetary base.

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Table 4

Average Absolute Forecast Errors: IV/1979–IV/1982

Model	Rate of growth of Nominal GNP	Real GNP	GNP Deflator
St. Louis	4.95%	3.96%	1.49%
Wharton	4.62	3.42	1.56
Chase	4.92	3.95	1.38

Further, there appears to be no breakdown in this relationship since late 1979. Except for the period of credit controls (II/1980-III/1980), there has been little difference between the rate of base growth and the rate of money growth during the post-III/1979 period.[26]

A CLASH OF COMPETING MODELS: MONETARIST VS. NON-MONETARIST VIEWS OF THE ECONOMY

As stated earlier, monetarism can be rejected only if there is an alternative explanation of macroeconomic behavior that has greater explanatory or predictive power. The following experiment was conducted to ascertain whether the primarily non-monetarist economic theories inherent in two of the popular large macroeconomic models could explain economic behavior over the past three years as well as a monetarist model. The St. Louis equation (equation 1) and the inflation equation cited in footnote 18 were estimated over the period from II/1960 to III/1979. The rates of growth of nominal GNP (total spending), real GNP (real output) and the GNP price deflator then were forecast for the next 13 quarters (that is, from IV/1979 to IV/1982). These forecasts were compared to those of the Wharton and the Chase Econometrics models. The average absolute forecast errors for each of these three models are reported in table 4; the quarterly forecast errors for each variable are shown in charts 7, 8 and 9.

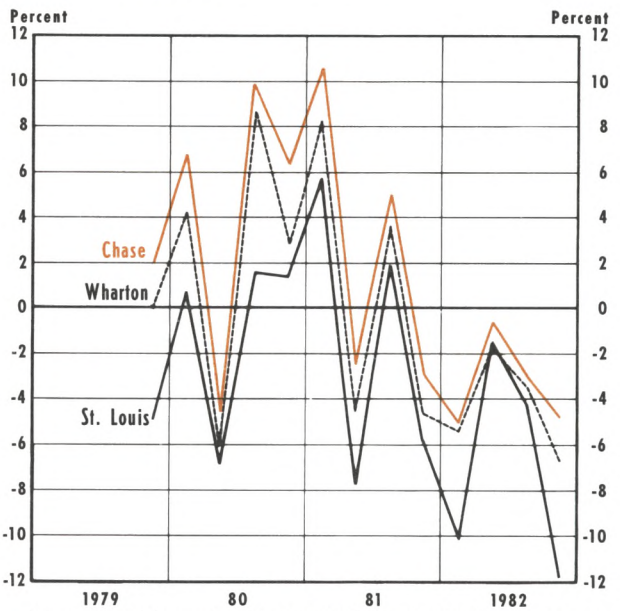
It should be noted, at the outset, that the empirical deck was stacked against the monetarist forecasts; they

[26]Again, the stability issue is tested as in footnote 15 for the equation cited in footnote 25. In this case, the calculated F-statistic is 1.64, below the critical value of 3.09 at the 5 percent significance level. Consequently, the hypothesis that the relationship between base growth and money growth has changed since III/1979 can be rejected.

Chart 7

Nominal Income Forecast Errors of Alternative Models

Actual minus Predicted Values

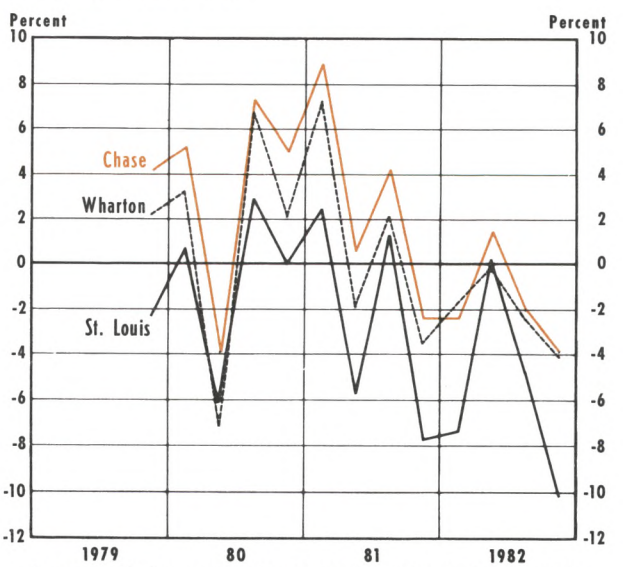


Sources: The Conference Board Statistical Bulletin and Federal Reserve Bank of St. Louis

Chart 8

Real Income Forecast Errors of Alternative Models

Actual minus Predicted Values



Sources: The Conference Board Statistical Bulletin and Federal Reserve Bank of St. Louis

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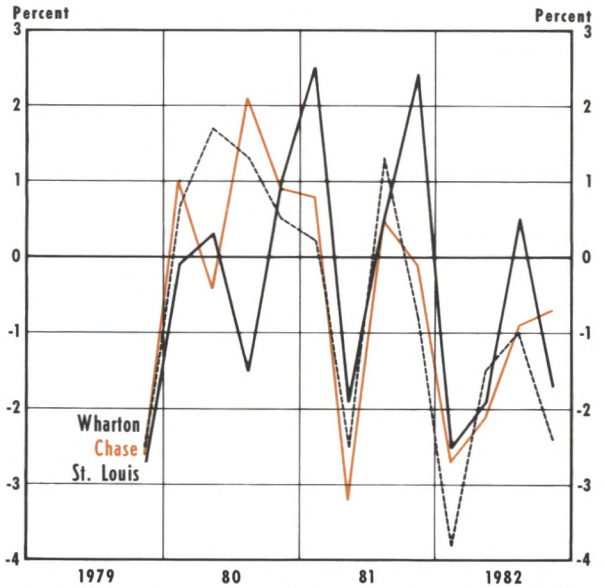
Chart 9
Price Forecast Errors of Alternative Models
Actual minus Predicted Values



Sources: The Conference Board Statistical Bulletin and Federal Reserve Bank of St. Louis

were obtained using coefficients from empirical relationships that were estimated through III/1979 and *never updated*. The forecasts from both Chase and Wharton were one-quarter-ahead forecasts derived from models that were re-estimated constantly over the period from IV/1979 to IV/1982.[27] Despite this estimation bias favoring the non-monetarist models, there is virtually no difference in the comparative short-run forecasts for recent years between the presumably outdated monetarist model and the updated non-monetarist ones. For example, while the average annual absolute forecast errors for nominal GNP using the St. Louis model was 4.95 percent, the Chase result was virtually identical, and Wharton's was nearly as large. From the results in table 4, it is clear that neither of the two alternative models has outperformed this version of a monetarist model over the past three years.[28]

Moreover, the information in charts 7, 8 and 9 reveals that the relative performance of the St. Louis forecasts generally has remained constant throughout the forecast period. That is, the St. Louis forecasts did not collapse, relative to those of Chase and Wharton, as financial innovation continued throughout the forecast period. If monetarism has died, it surely was not killed off by the superior performance of whatever theoretical relationships underlie these major non-monetarist economic models.

SUMMARY AND CONCLUSIONS

Monetarism can be viewed in two ways. It is a scientific theory that stresses the importance of focusing on the level or growth of money in order to understand the behavior of such key macroeconomic variables as prices, real output and spending. As a scientific theory, it also stresses the importance of focusing on the behavior of the monetary authority in order to understand how and why money grows the way it does. Monetarism also can be viewed as a diverse collection of normative propositions about how fast money should grow or what the proper monetary policy should be. While disputes over normative propositions are generally insolvable, the validity of scientific propositions can be examined.

This paper has assessed the claim that monetarism, in the scientific sense, has failed, by testing four key monetarist propositions to see whether they can explain economic events over the past three years. Contrary to recent rumors of the death of monetarism, we found that the four propositions tested were as valid and useful over the past three years as they had been over the prior 20 years. Moreover, when compared with the predictive behavior of two well-known non-monetarist econometric models, we found that a simple monetarist analysis worked equally well in explaining the economic patterns of spending, output and prices over the past three years. Rumors of the death of monetarism have, indeed, been exaggerated.

[27]This estimation bias was introduced to compensate for the fact that *actual* values of the right-hand-side variables were used to derive the St. Louis forecasts, while Chase and Wharton did not know these values when they made their forecasts. This type of comparison obviously is not the ideal one; it is, however, the best that can be accomplished without access to the estimated parameters of the Chase and Wharton models. For similar comparisons of these models' long-run properties, see Keith M. Carlson and Scott E. Hein, "Four Econometric Models and Monetary Policy: The Longer-Run View," this *Review* (January 1983), pp. 13–24.

[28]Similar results are obtained when root mean square errors (RMSE) are compared for the three models. This method of summarizing forecast errors gives more weight to large errors than does the average (mean) absolute error.

	RMSE for forecasts of the growth rate of		
Model	Nominal GNP	Real GNP	GNP Deflator
St. Louis	5.99%	5.03%	1.74%
Wharton	5.18	4.06	1.83
Chase	5.68	4.54	1.69

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The Prime Rate and the Cost of Funds: Is the Prime Too High?

R. W. HAFER

BANK lending rates recently have received considerable attention in the popular press.[1] There appears to be widespread opinion that the rates charged by banks exceed their cost of funds by an abnormal amount. The purpose of this article is to assess whether banks' lending rates during the past few months have been "too high" relative to other market rates. Because the prime rate generally is viewed as a benchmark lending rate for banks, the analysis focuses on the recent behavior of this rate relative to other market interest rates.

THE PRIME RATE AND THE COST OF FUNDS

The prime rate quoted in the press and discussed by the public commonly is considered to be the interest rate charged to a bank's most credit-worthy corporate customers for short-term loans. The prime rate is not, however, the rate charged to each and every corporate borrower; each loan and prospective borrower have their own characteristics that may necessitate different lending rates.[2] For example, the loan rate charged to a specific customer reflects that customer's credit worthiness, previous relationship with the bank, the maturity of the loan, the nonfee services provided by the bank in maintaining the loan, the use of fixed or flexible maturities and rates, and other factors.

Before the 1970s, the prime rate was relatively slow to adjust to market conditions. For instance, between 1929 and 1969, the prime rate changed only 40 times, an average of once per year and less often than market interest rates. In contrast, since 1970 the rate has changed an average of about 13 times per year.

This shift in the prime rate's more frequent adjustment to credit market conditions occurred in 1972 when the First National City Bank of New York, known today as Citibank, announced that its prime rate would be pegged to the 90-day commercial paper rate. This change was important because it directly linked the prime rate to *current* credit market conditions. Furthermore, as the competition for loanable funds and the cost of liability management have increased with the advent of numerous financial innovations, banks have become more sensitive to interest rate changes when establishing their lending rates.[3]

The increased sensitivity of the prime rate to market rates has accompanied certain changes in the credit market. The rapidly expanding use of the commercial paper market as an alternative to bank funding is one example. Another is the increased competition coming from money market funds which has increased the need for flexibility in the income stream from the bank's loan portfolio. More recently, the volatility of market rates has contributed to more frequent changes in the prime rate. Because of this sensitivity, there should be a close empirical relationship between the bank's cost of funds and the prime rate. If such a relationship exists, it can be used to assess the current level of the prime rate with respect to other interest rates that reflect the prevailing cost of funds facing banks.

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[1]See, among others, Hobart Rowan, "Reagan Says Lower Rates Up to Banks," *Washington Post*, February 24, 1983; Teresa Carson, "Reagan Latest to Criticize Bank Rates," *American Banker*, February 24, 1983; "More Pressure on Loan Rates," *New York Times*, February 27, 1983; and Leah R. Young, "Charges Against Banks on Rates 'Unfounded'," *New York Journal of Commerce*, March 18, 1983. For an interesting comparison of today's arguments, see Leonard Silk, "The Mystery of High Rates," *New York Times*, March 17, 1982.

[2]The following discussion draws on Gerald C. Fischer, "The Myth and the Reality of the Prime Rate," *Journal of Commercial Bank Lending* (July 1982), pp. 16–26.

[3]Ibid. See also, Michael A. Goldberg, "The Pricing of the Prime Rate," *Journal of Banking and Finance* (July 1982), pp. 277–96.

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To investigate this issue, two interest rates are used. One important source of loanable funds is the 90-day certificate of deposit (CD) market; as such, the 90-day CD rate is a useful measure of a bank's cost of funds. Although recent financial innovations may have lessened the once primary position held by the CD market, it remains a key source of funds.[4] The federal funds rate — the rate charged for overnight funds — also is a useful measure of the bank's cost of funds. It not only measures the bank's cost of short-term funds, but also is watched by credit market participants as a guide to Federal Reserve actions. In other words, it is viewed as an indicator of whether current credit demands are being matched by the reserves supplied to the banking system.

The Evidence

Chart 1 plots the prime rate, the 90-day CD rate and the federal funds rate for the period September 1980 to December 1982.[5] As illustrated, the prime rate tends to follow movements in the other interest rates, albeit with a slight lag. This tendency reflects the previously mentioned sensitivity of the prime rate to other market rates — that is, the effect of current and past costs of the bank's managed liabilities.

The data in chart 1 can be translated into a regression relationship to provide a more rigorous assessment of the prime rate level relative to other market rates. To do this, the following equation was estimated:

$$(1)\quad PR_t = \alpha_0 + \sum_{i=0}^{N} \beta_i\, i_{t-i} + \epsilon_t,$$

where PR_t represents the prime rate, i_{t-i} stands for contemporaneous and lagged values of the CD rate or the federal funds rate, and ϵ_t is a random error term. The lags are included to reflect the pattern observed in chart 1.[6]

Table 1 reports the results from estimating equation 1 over the period September 1980 to December 1982.[7] As hypothesized, movements in the prime rate are explained reliably by both the CD rate and the federal funds rate as proxies for the bank's cost of loanable funds.[8] Each regression outcome suggests that the prime rate reflects not only the marginal cost of acquiring additional funds (represented by the contemporaneous term), but also the cost of managing existing liabilities.[9]

Another interesting aspect of the results in table 1 is the different long-run effects. For example, a 100 basis-point change in the CD rate results in a 106

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[4]For example, as of year-end 1981, negotiable CDs at large weekly reporting banks with assets of $750 million or more totaled $137,490 million. Consumer and industrial loans (C&I) were $195,499 million. Thus, the ratio of CDs to C&I loans was 0.7. In December 1982, however, the ratio fell to 0.6 as negotiable CDs fell to $132,340 million, and C&I loans increased to $216,860 million.

[5]This period is examined because it represents the data available since the advent of numerous deregulation measures. One such change is the reserve requirement for different banks on large CDs. To ensure compatibility, only the period since late 1980 is used. In addition, Goldberg has examined the period from 1975 to 1980 and found similar results.

The prime rate used is the average of daily rates reported by five of the nation's ten largest banks (by size of deposits, as of December 31, 1980). The monthly average includes all calendar days; rates for weekends and holidays are same as the preceding business day.

The CD rate is the secondary market rate, monthly average of daily rates, excluding weekends and holidays. The daily rate is an average of the rates offered by five or more dealers. The source is table 1.35, in any *Federal Reserve Bulletin*.

The federal funds rate used is a monthly average of daily rates; the rate for weekends and holidays is the preceding business day's rate. The daily rate is determined by averaging the rates from approximately six brokers in the federal funds market reporting to the New York Federal Reserve Bank's trading desk. The individual rates are "weighted" by the volume of transactions and, therefore, amount to the "effective" rate.

[6]A similar equation is estimated in Goldberg, "The Pricing of the Prime." In that study, however, only the CD rate is used.

[7]The lag length was selected to minimize the standard error of the equation. In each case, adding another lag did not improve the fit significantly.

The Durbin-Watson statistic for the equation using the CD rate falls in the indeterminate range. Applying a first-order autocorrelation correction procedure yielded an estimated value of rho that was not statistically different from zero at the 5 percent level. Consequently, the OLS results presented in table 1 are used in the analysis.

[8]An alternative equation was estimated using the 4-month commercial paper rate to explain movements in the prime rate. This rate was used because it represents an alternative source of funds for firms and, therefore, a competitive rate vis-a-vis the prime rate. The outcome of the estimation is

$$PR_t = \underset{(1.09)}{0.63} + \underset{(11.55)}{0.628}\, CPR_t + \underset{(5.77)}{0.401}\, CPR_{t-1} + \underset{(2.75)}{0.184}\, CPR_{t-2}$$

$$\bar{R}^2 = 0.982 \qquad SE = 0.374 \qquad DW = 1.83 \qquad \hat{\rho} = 0.33$$

where $\hat{\rho}$ is the first-order serial correlation coefficient. The results are quite similar to those presented in table 1.

[9]Goldberg, "The Pricing of the Prime," points out that this indicates that banks engage in average-cost pricing. In other words, "banks price their prime rate on the basis of some average of their currently — and previously — issued, but still outstanding, costs of managed liabilities" (p. 292).

As noted by Goldberg, the estimated constant term ($\hat{\alpha}_0$) represents the bank's profit margin. Note that the constant term is significantly different from zero for both of the equations reported in table 1, but is not in the equation using the commercial paper rate (fn. 7).

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Chart 1

The Prime Rate, 90-Day CD Rate and Federal Funds Rate

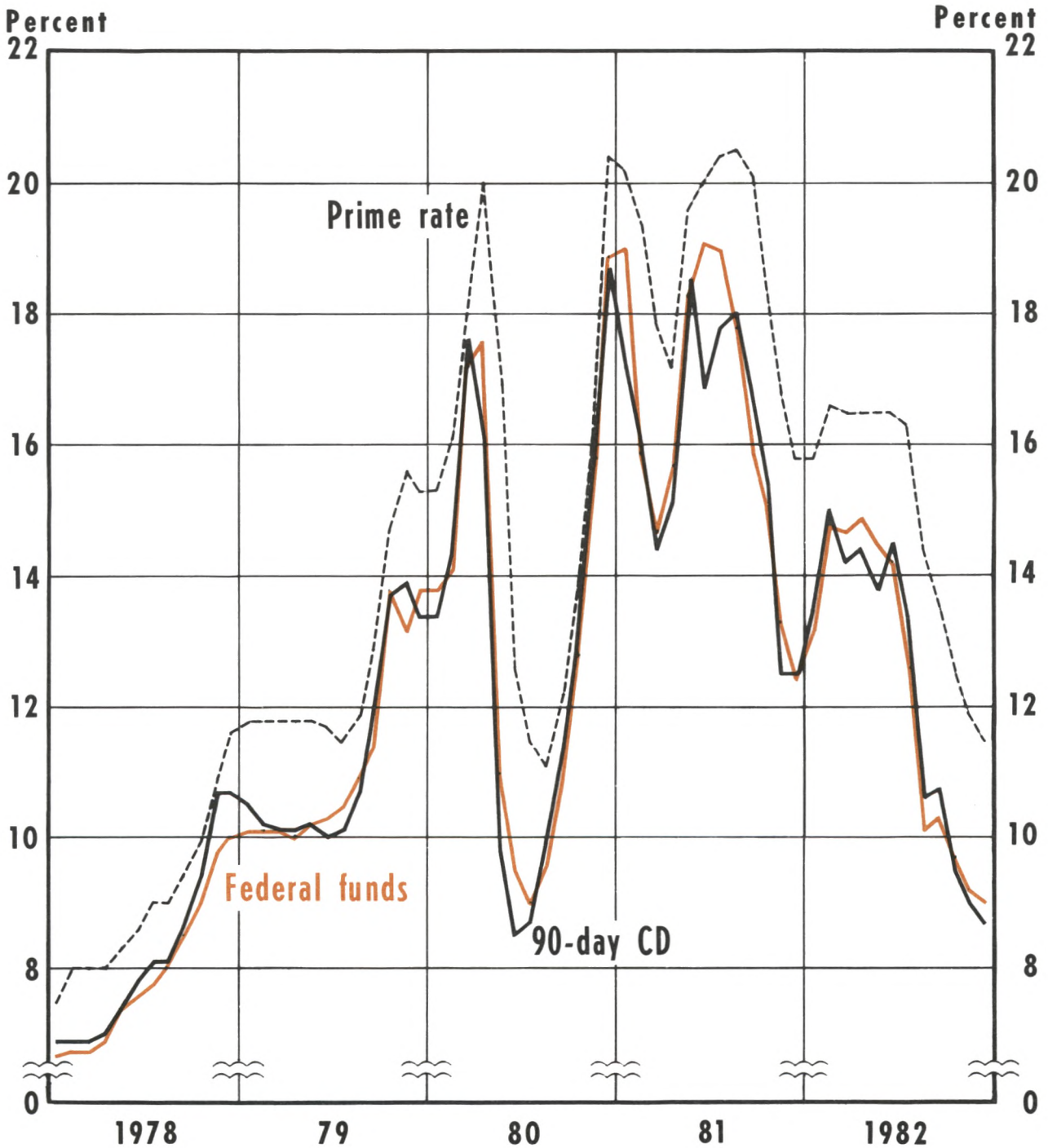

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Table 1

Regression Estimates of the Prime Rate: September 1980 to December 1982

Rate[1]	Estimated coefficients[2] α_0	β_0	β_1	β_2	$\Sigma\beta_i$	Summary statistics[3] $\bar{R}^2$/SE	DW
CD	1.58	0.564	0.338	0.164	1.064	0.983	1.45
	(3.94)	(11.63)	(4.62)	(3.37)	(38.32)	0.360	
FF	2.80	0.542	0.181	0.243	0.966	0.970	1.73
	(5.43)	(6.80)	(1.39)	(3.04)	(27.35)	0.487	

[1]CD is the 90-day CD rate and FF is the federal funds rate.

[2]t-statistics appear in parentheses.

[3]$\bar{R}^2$ is the adjusted coefficient of determination; SE is the regression standard error; and DW is the Durbin-Watson statistic.

basis-point change in the prime after three months.[10] A similar change in the federal funds rate produces a 97 basis-point change in the prime, a change that is not significantly different from 100 basis points. Note, however, that these changes occur over a three-month horizon; about 55 percent of the effect on the prime rate occurs simultaneously with changes in the CD and federal funds rates.

This evidence suggests that the prime rate closely reflects the costs faced by banks in acquiring new and in managing existing loanable funds. Moreover, the full effect of a change in the cost of funds on the prime rate is *not* immediate, but takes place over several months. Consequently, reductions in the CD and the federal funds rates are unlikely to produce immediate declines of equal magnitude in the prime rate; they will do so only with a lag of about three months.[11]

Table 2

Actual and Forecasted Values of the Prime Rate: January 1983 to April 1983

Period	Actual	Forecasted values using CD	FF
January 1983	11.16%	10.67%	11.36%
February	10.93	10.63	11.15
March	10.50	10.72	11.20
April	10.50	10.77	11.77

Forecasting the Prime Rate

The equations in table 1 were estimated through December 1982 to permit out-of-sample forecasts of the prime rate to be obtained for the first four months of 1983. If recent levels of the prime rate are significantly greater than those forecasted using the regres-

[10]Goldberg reports that, for the period January 1975 to October 1980, the summed effect of changes in the CD rate on the prime rate is 1.076. For the period January 1977 to October 1980, the sum is 1.094. Thus, our result is consistent with those from earlier periods.

The summed effect of the CD rate, however, is statistically different from unity (t = 2.31). This result is expected given the cost, over-and-above interest, that the bank faces when it issues a new CD. One major cost is the reserves that the bank must hold for each CD issued. Currently, the required reserve ratio is 3 percent. If one calculates the "effective" cost of issuing a CD — one that incorporates both the interest expense and the opportunity cost incurred by holding non-interest-bearing reserves against the CD — a CD rate of 10 percent then becomes 10.31 percent. Thus, for a 100 basis-point change in the CD rate, the change in the effective cost to the bank actually is 103 basis points. Indeed, the summed effect reported in table 1 does not differ from an effective rate of 1.03. The hypothesis that $\Sigma\beta_i = 1.03$ cannot be rejected at any reasonable level of significance (t = 1.22).

[11]The effect of average-cost pricing during periods of rising and falling interest rates has been noted by Goldberg, "The Pricing of the Prime." For example, he states that "During a period of declining interest rates . . . their past-issued, but still outstanding, liabilities are more expensive than their currently-issued managed liabilities. This leads to a situation where their average (over time) cost-based formula calls for a prime rate substantially in excess of the bank's prime customer's cost of commercial paper financing" (p. 288).

It also should be noted that evidence exists suggesting that banks switch from average-cost pricing to marginal-cost pricing during periods of declining market rates. In other words, banks may price discriminate in favor of their best customers by offering "below prime" loans. Because the sample used here is too restrictive to test this hypothesis (the available data is quarterly), the reader is referred to Goldberg (pp. 289–92) for a discussion of and empirical results favoring the "below prime" lending scenario.

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sions reported in table 1, then recent criticisms may be justified. If not, then the recent behavior of the prime rate simply reflects the underlying relationship between a bank's cost of funds and its lending rate captured in equation 1.

The prime rate forecasts based on the equations in table 1 and the actual prime rate for January through April 1983 are shown in table 2. During January, the actual prime rate exceeded the rate forecasted with the CD rate by about 50 basis points. In contrast, the prime rate was 20 basis points *less* than the one forecasted using the federal funds rate. In each instance, however, the forecast errors were not unusually large for the estimated equation; they were within two standard errors of the regression standard errors.

The lagged effect of the recent changes in the cost of funds (see chart 1) on the prime become more apparent in February, March and April. During February, for example, the average forecast error falls to 26 basis points. By March and April, however, the predicted prime rate exceeds the actual rate by an average of 46 basis points and 77 basis points, respectively. Given recent movements in the cost of funds, the results in table 2 indicate that the prime rate has not been too high relative to other market rates during the past few months.

CONCLUSION

Have banks kept the prime rate "too high?" The evidence presented in this article suggests that, relative to their cost of funds, banks have not kept the prime rate unduly high during the past few months. The prime rate adjusts, with a lag, to changes in the cost of acquiring and managing loanable funds. These costs are represented here by the 90-day CD rate and the federal funds rate. The well-established empirical relationship between the prime rate and these measures explains why the prime rate has not decreased as fast as these other rates during early 1983.

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