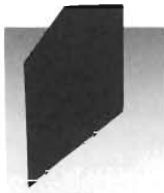


Testing the “spread”

The difference between interest rates on long Treasuries and the fed funds rate looks like a useful economic indicator; if so, 1989’s “soft” landing may be harder than many hoped for

Robert D. Laurent



The 1980s have been difficult years for monetary policy. Through the 1970s, policymakers had increasingly relied on changes in monetary growth rates as a policy guide. However, the relationship between money growth and the real economy appeared to deteriorate and become less reliable in the early 1980s. In response to this problem, two basic approaches are possible. One may try to repair the monetary aggregates or one may look for a new indicator. The notion here is that the monetary authority would find useful a leading indicator of the real economy which is also to some extent under its influence.

The second course was followed, and a new indicator suggested, in an article published in this review at the beginning of 1988.¹ That study showed that the “interest-rate spread”—the difference between the yields on a long-term government bond and overnight federal funds (on a bond-equivalent basis)—increased before real GNP accelerated and decreased before real GNP decelerated. The spread performed better in forecasting future changes in real GNP over the period 1964–1986 than many different monetary aggregate growth rates and a few other interest rate-based indicators. Perhaps most important, the spread forecast best even over a truncated period ending in 1979, before the time when the monetary aggregates are widely thought to have deteriorated.

Although the results of the earlier study seemed to indicate that the spread would be a

promising monetary policy indicator, the evidence in that study is hardly conclusive. The fundamental problem is that the same data used to formulate a hypothesis cannot simultaneously be used to test that hypothesis.

Economists have developed elaborate techniques that attempt to establish whether a relationship observed over some past data is significant; yet the history of economic research is full of examples of relationships that have tested as significant over past data only to fall apart as soon as they were applied to new data. The earlier study attempted to reduce the probability of accepting a spurious relationship by estimating only with data available at the time a forecast would have been made, but nonetheless it remains a study based only on data that had already been observed. The only true test of a relationship is its ability to explain new data. The surest way to test a relationship on new data is to use the relationship to forecast the future.² This paper examines the forecasting performance of the interest rate spread on the data that have appeared since the data used in the earlier study.

The first section of this article examines some general characteristics of indicators and some specific properties of the interest-rate spread developed in the earlier study. The second section takes a detailed look at the forecasting performance of the spread over recent years. The third section looks at the current level of the spread and its implications

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for future economic activity. The last section discusses some of the benefits of the spread for monetary policy.

The spread as an indicator

Indicators generally are not used to forecast specific values of the variables in which one is interested. Rather, indicators are used to obtain a general idea of the direction of movement in such variables. For example, the index of leading indicators typically is not used to forecast the specific growth rate of future real GNP. Instead, rules of thumb based on movements in the index are used to give a general idea of movements in real GNP, e.g., three consecutive down months for the index presage a recession. Some indexes designed to predict future movements in the stock market consist of the number of individual indicators moving up minus the number of individual indicators moving down. This kind of index is considered to have given a significant signal when a preponderance of the indicators move in one direction. Thus, indicators are a shorthand way of trying to forecast movements in the variable of interest.

Economic theory suggests that no single economic variable serving as an indicator is likely to predict the real GNP of a complex economy accurately. For example, although the rate of change in real M2 is used by some analysts as a measure of monetary policy and is also a component in the index of leading indicators, it is well known that factors affecting the demand for money alter the impact of money changes on real GNP. Any hope of accurately forecasting growth in real GNP requires incorporating the effects of factors such as the opportunity cost of holding money balances. The practice of using a single variable as an indicator is a reflection of both the desire to keep an indicator simple and the difficulty of improving an indicator while incorporating other factors.

In order to compare the performance of various indicators it is helpful to find some way to quantify their predictions. The earlier study, in an admittedly gross simplification, estimated a linear relationship relating changes in real GNP to a constant and as many as eight lagged quarterly values of the indicator. The specific coefficients in the relationship were estimated by ordinary least squares regressions

using only the data that would have been available when the forecast of a given quarter's real GNP was made. The different forms of each relationship were tested by how they would have forecast real GNP growth over the period 1964–1986. This period was chosen because it was the longest period over which data for all the monetary aggregates and interest rates that were used in the earlier tests were available.

When tested in the manner described above, the best model (as measured by the root-mean-squared error of forecast) for each indicator was found to include only one or two lagged values of the indicator. The two equations at the top of Table 1 show the best forms of the equation for the interest-rate spread and the best of the money growth rates (real M2). The first equation indicates that the growth in this quarter's real GNP is affected only by the spread between the long-term bond rate and the federal funds rate two quarters earlier. The second equation indicates that the growth in real GNP next quarter is affected by the rates of growth in real M2 in this quarter and last quarter.⁴ The bottom two equations in Table 1 give the specific coefficients one obtains by estimating these relationships over the period from the second quarter of 1961 through the first quarter of 1989. These would be the equations used to estimate the growth in real GNP for the second quarter of 1989.

The linear relationships between the indicators and real GNP growth is a simplification in yet another respect. The monetary authority has wide latitude to set the rate of change in real M2 or the spread between a long-term bond rate and the fed funds rate over sustained periods of time. Does this mean the monetary authority can change the real growth rate of the economy over sustained periods of time? Economic theory suggests that the answer to this question is no. If the monetary authority tried to implement a policy that produced a faster-than-sustainable level of growth in real income it might succeed for a time, but eventually the policy would produce accelerating levels of inflation. This would eventually lead to a disruption in the functioning of money in the economy and a reduction in real income.

Thus, the linear relationship between a policy indicator and real economic growth is useful only as long as it does not collapse

TABLE 1

**General and specific forms of the linear regression
relationship between real GNP growth
and monetary policy indicators**

General form

Interest-rate spread

$$\text{PCRGNP} = \text{const.} + c_2 * r20\text{mffr}_2$$

Percent change in real M2

$$\text{PCRGNP} = \text{const.} + c_1 * \text{pcrM2}_1 + c_2 * \text{pcrM2}_2$$

Specific form

(estimated with data from 1961II-1989I)

Interest-rate spread

$$\text{PCRGNP} = 3.027 + 1.154 * r20\text{mffr}_2$$

Percent change in real M2

$$\text{PCRGNP} = 1.825 + .326 * \text{pcrM2}_1 + .130 * \text{pcrM2}_2$$

Glossary of variables

PCRGNP = Quarterly change in real GNP at an annual rate.

r20mffr = Interest rate spread in percent, the linked 20-year-30-year constant-maturity treasury bond rate minus the federal funds rate (on a bond-equivalent basis).

pcrM2 = one plus the percentage change in M2 in the quarter at an annual rate, divided by one plus the percentage change in the CPI over the quarter at an annual rate minus one.

subscripts = the number of lagged quarters.

because policy has been pushed to an extreme. An analogy may help clarify this situation. One might describe the relationship between the pressure exerted on an accelerator and the velocity of an automobile as a linear relationship where a given increase in pressure increases velocity by the same amount, regardless of its initial level. Clearly though, there is some point at which further pressure on the accelerator no longer produces the same increase in velocity; and just as clearly there is some point at which further easing in the pressure no longer produces the same decrease in velocity. The linear relationship holds as long as one is in the middle range but is not likely to hold at extreme values. The same also is

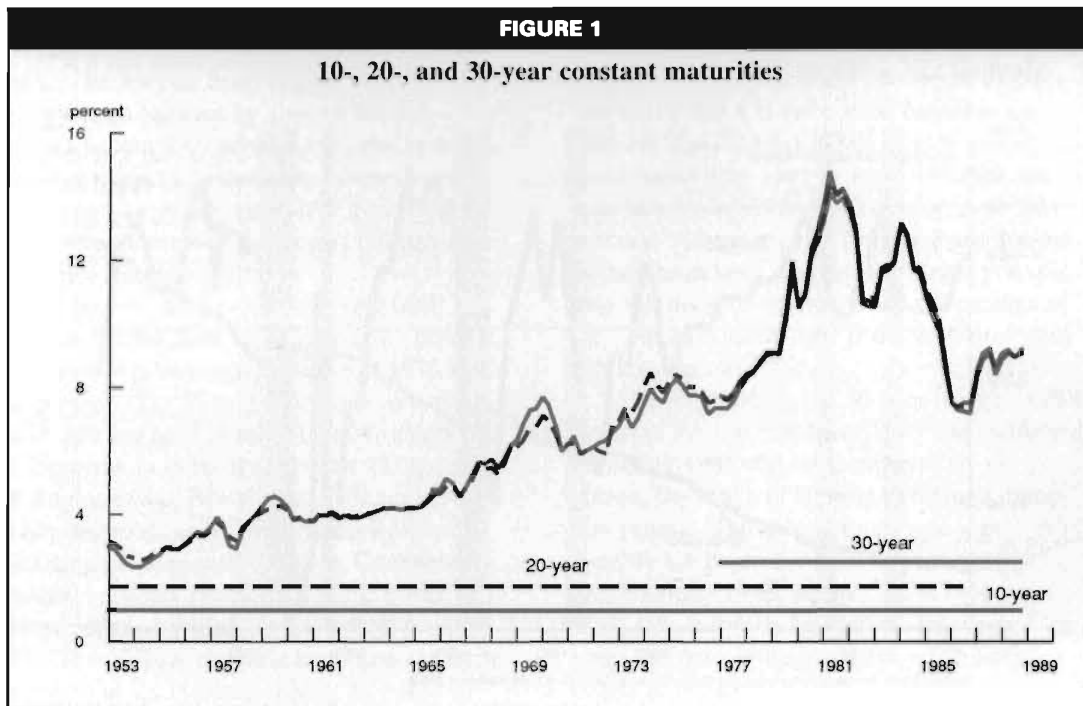
true of indicators of the effects of monetary policy on real GNP.

The justification for the specific form of the spread was presented in more detail in the earlier study, but a brief description is provided here. The Federal Reserve implements policy by affecting a short-term interest rate (specifically, the overnight federal funds rate). It is universally acknowledged that policy is made tighter by raising and easier by lowering this rate. However, history shows that the same level of the fed funds rate can be expansionary in one economic environment and contractionary in another environment.

A clue is provided by the relationship between very short-term rates heavily influenced by monetary policy and long-term rates that are most insulated from monetary policy. The lower is the short-term rate relative to the long-term rate, i.e., the steeper the yield curve, the more expansionary is policy and the more rapid is expected future real economic growth.⁴ The federal funds rate is the obvious choice for the short-term rate. The 20-year constant-maturity Treas-

ury rate was chosen as the long-term rate because it was the longest constant-maturity Treasury rate available for an extended period. The earlier tests covered the period 1964-1986 because that was the longest period over which all the alternative indicators were available, with 1986 being the last year the 20-year constant-maturity Treasury rate was published.

In order to test the performance of the interest rate spread beyond 1986, it is necessary to find a long-term rate to replace the 20-year constant maturity Treasury rate. The three longest constant-maturity Treasury bond rates available for any portion of the last 35 years are the 10-, 20-, and 30-year rates. As Figure 1 shows, there are no substantial differ-



ences in the patterns of these three rates, so predictions using these three rates as the long-term rate are not likely to differ greatly. A series for the long rate was constructed by taking the longest constant-maturity Treasury rate available at any time. This series, with the 20-year rate through the first quarter of 1977, and the 30-year rate since, is used to carry the analysis of the spread past 1986.

Figure 2 plots real income and the spread between the linked 20-year–30-year bond rate and the federal funds rate over the period 1955–1989. The figure shows that for major moves, the spread generally behaves as expected, narrowing before economic activity slows and widening before economic activity accelerates. The figure also indicates that the range of the spread over this period (on a quarterly average basis) has been from +3.05 percentage points (+305 basis points) to –5.61 percentage points (–561 basis points). Yet the distribution is skewed over that range so that, despite the fact that 65 percent of the range is in negative territory, only 26 percent of the observations are negative. The mean quarterly average reading is +37 basis points, yet more than three-fifths of the observations lie above the mean. The half of the observations between the 25th and 75th percentile lie roughly between 0 and +170 basis points. The picture

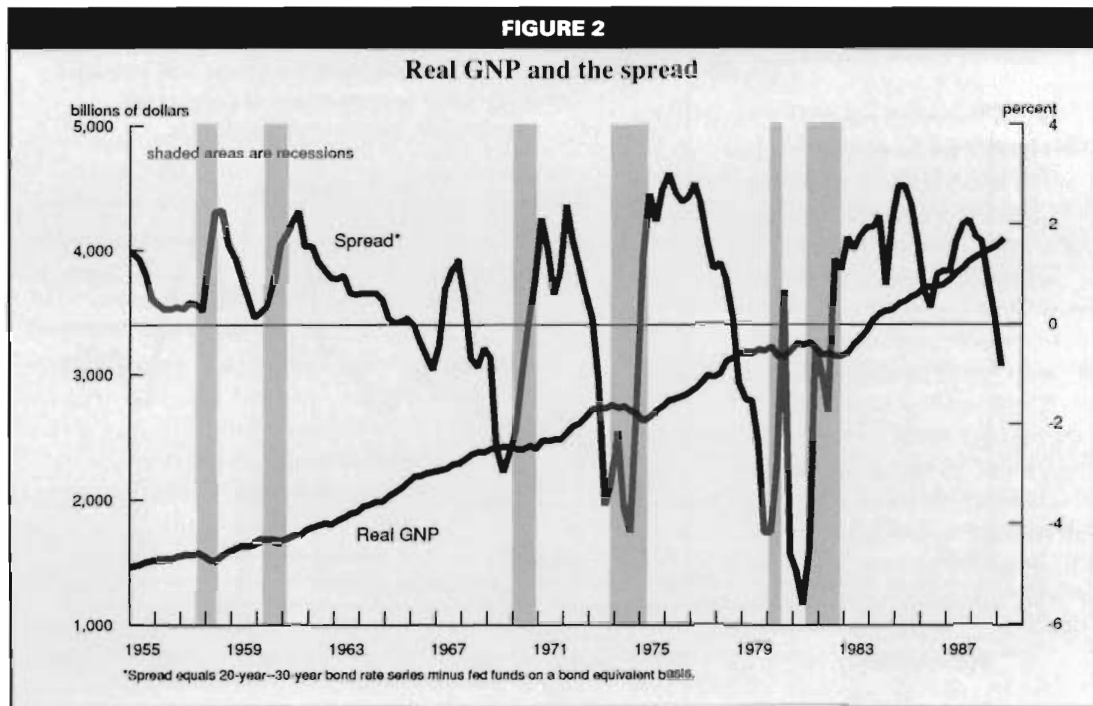
is one in which the spread is typically positive but occasionally goes very negative.

Figure 2 gives a broad perspective of the relationship. However, it must be remembered that the GNP of a complex economy is affected by many factors outside the control of the monetary authority. The relationship between the spread and real GNP is likely to be disturbed by these factors. Thus, the spread will not predict real income precisely. It may, nonetheless, be useful.

By plotting the growth in real GNP and separate monthly data for the two components of the spread, Figure 3 allows a more detailed short-term analysis of the behavior of the spread and its relationship to growth in real GNP over the expansion of the last six years. The bars in the figure plot the annual rate of growth in real GNP for each quarter, and the bottom line plots the spread.

Recent behavior of the spread

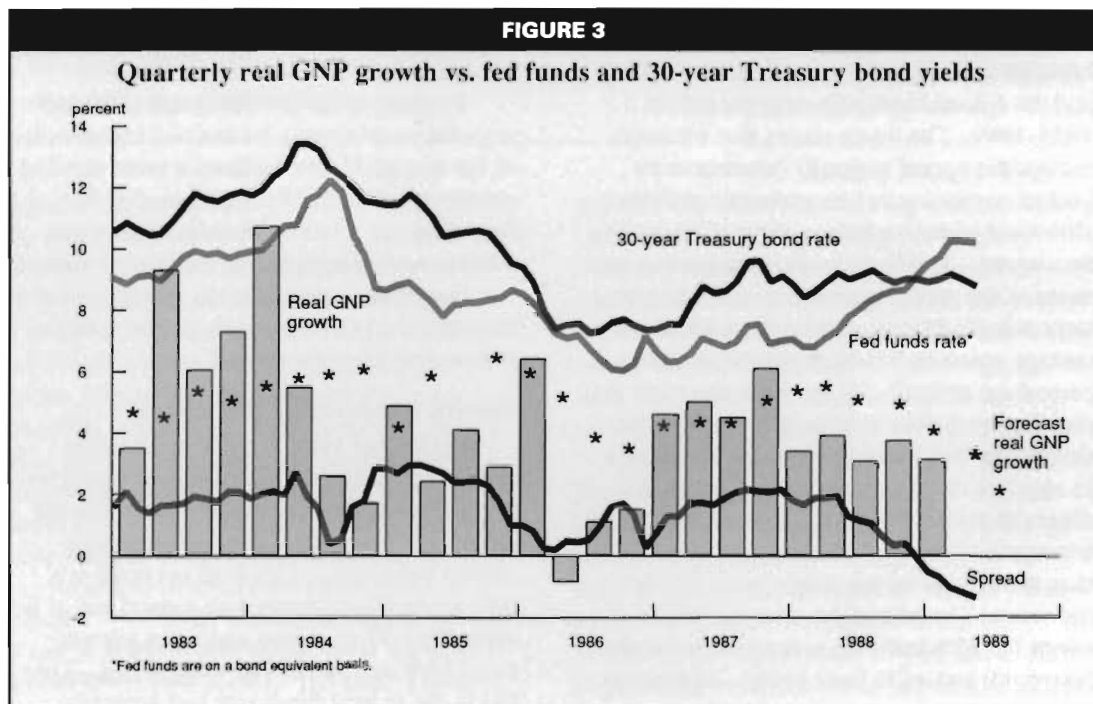
In October 1982, the Federal Reserve shifted emphasis from an operating procedure based on nonborrowed reserves back toward its pre-1979 procedure focused on money market conditions. This shift occurred at a time when the economy was coming out of the deep 1981–82 recession and when interest rates, both short and long, were falling. The fall in the federal funds rate had generally



been steeper than the fall in long-term bond rates through 1982. The spread, which had been negative, turned positive in July 1982 and remained positive the rest of the year. In January, 1983, the fed funds rate of 9.0 percent was historically high, but it was not high relative to the 30-year bond rate of 10.6 percent.⁵ In the

fourth quarter of 1982, real GNP grew for only the second time in five quarters, but at only a slim 0.6 percent rate. In the first quarter of 1983 real GNP rebounded to grow at a 3.5 percent annual rate.

The federal funds rate rose about 100 basis points between the beginning of 1983



and February 1984, with the major part of the increase occurring between May and August of 1983. The 30-year bond rate followed the same pattern but rose by about 130 basis points to about 11.9 percent in February 1984. As often happens in the period immediately following a recession, real GNP grew rapidly (at an annual rate of 7.5 percent) through the last three quarters of 1983.

In the first quarter of 1984, real GNP expanded at the most rapid pace (10.7 percent annual rate) of any quarter between 1978 and the present. The federal funds rate rose at a much quicker pace in early 1984, from about 10.0 percent in February to about 12.2 percent by August 1984. Not all of this increase was policy-induced; under the Federal Reserve's operating procedure of the time, Continental Illinois' solvency problems had the effect of independently pushing up the federal funds rate. The 30-year rate rose even faster early in the year but, as Figure 3 shows, it peaked in June (actually on a weekly basis in late May at 13.8 percent), and then began a steep decline. The average spread for May 1984 was +269 basis points. Through the months of June, July, and August of 1984 the federal funds rate rose while the 30-year bond rate was falling. As a consequence, the spread closed rapidly from +269 basis points in May to +39 basis points in August. This sharp narrowing of the spread appears to have been associated with a slowing of real GNP in the second half of 1984. Real GNP growth was 2.6 percent in the third quarter and dropped to 1.7 percent in the fourth quarter.

From the third week in August until the last week in December, the federal funds rate fell from 12.3 percent to 8.2 percent, one of the steepest declines in the funds rate in a non-recessionary period in history. Although the 30-year bond rate also fell through the end of 1984, the steeper drop in the funds rate increased the spread from +39 basis points in August to +284 basis points in December 1984. This widening in the spread apparently reversed the impact of the earlier narrowing and the economy grew more rapidly beginning in the first quarter of 1985 when real GNP grew at a 4.9 percent annual rate.

Both the federal funds rate and the 30-year bond rate declined at about the same pace through the first nine months of 1985, main-

taining a relatively wide spread, in a range between +230 and +290 basis points. Then, in October, the 30-year bond rate began to drop in a move that was to become one of the sharpest bond market rallies in U.S. history. From September 1985 to April 1986 the 30-year bond rate fell from 10.6 percent to 7.4 percent. All the reasons for this sharp decline in long-term rates are not clear, but a precipitous fall in crude oil prices and the passage of the Gramm-Rudman law must have been contributing factors.

The steep fall in the 30-year bond rate that began in the last quarter of 1985 and continued into early 1986 had, as interpreted by the spread, the effect of sharply tightening monetary policy. The federal funds rate was roughly 8.1 percent in both September 1985 and February 1986, but the fall in long-term bond rates between these two dates caused the spread to narrow sharply from +242 basis points in September 1985 to +80 basis points in February 1986. With the plunge in oil prices reducing the threat of inflation, monetary policy was free to lower the federal funds rate. Under the Fed's operating procedure at the time it was difficult for the funds rate to be lowered without cutting the discount rate.⁶ Between February and August of 1986 there were four 50-basis-point cuts in the discount rate. These rate cuts succeeded in lowering the funds rate from 8.1 percent in February 1986 to 6.1 percent in August. After the first two discount rate cuts, the funds rate was 100 basis points lower while the 30-year bond rate had fallen even more, so that by the middle of April the spread had narrowed, as measured weekly, to about +10 basis points. This sharp narrowing of the spread between September 1985 and April 1986 appears to have also been associated with a slowdown in economic activity. The second quarter of 1986 saw real GNP decline slightly (-0.6 percent annual rate) and the last two quarters of the year saw positive, but weak, growth (1.0 and 1.4 percent annual rates respectively).

The two discount rate cuts in July and August 1986 were associated with a drop in the Fed funds rate from 7.1 percent in June to 6.1 percent in September. These discount rate cuts were accompanied by a rise, rather than a fall, in the 30-year bond rate. Between mid-April and October 1986 the spread widened

from +10 basis points to +170 basis points. The spread was at this same level in March 1987, though a particularly extreme case of the typical yearend rise in the funds rate produced a sharp, but clearly temporary, narrowing in the spread.⁷

Following the widening of the spread between April and October 1986, the pace of economic growth rebounded beginning in the first quarter of 1987 (4.6 percent real GNP growth) and continued through the first three quarters of 1987 (averaging 4.7 percent real GNP growth for three quarters). In April, the Fed began to gradually raise the fed funds rate in a move that extended through the second and third quarters of 1987. From its level of 6.3 percent in March 1987, the federal funds rate rose to 7.5 percent by September 1987. However, a much sharper rise in the 30-year bond rate (from 7.6 percent to 9.6 percent) meant that the spread actually widened by 80 basis points over this period to a level of about +213 basis points in September 1987.

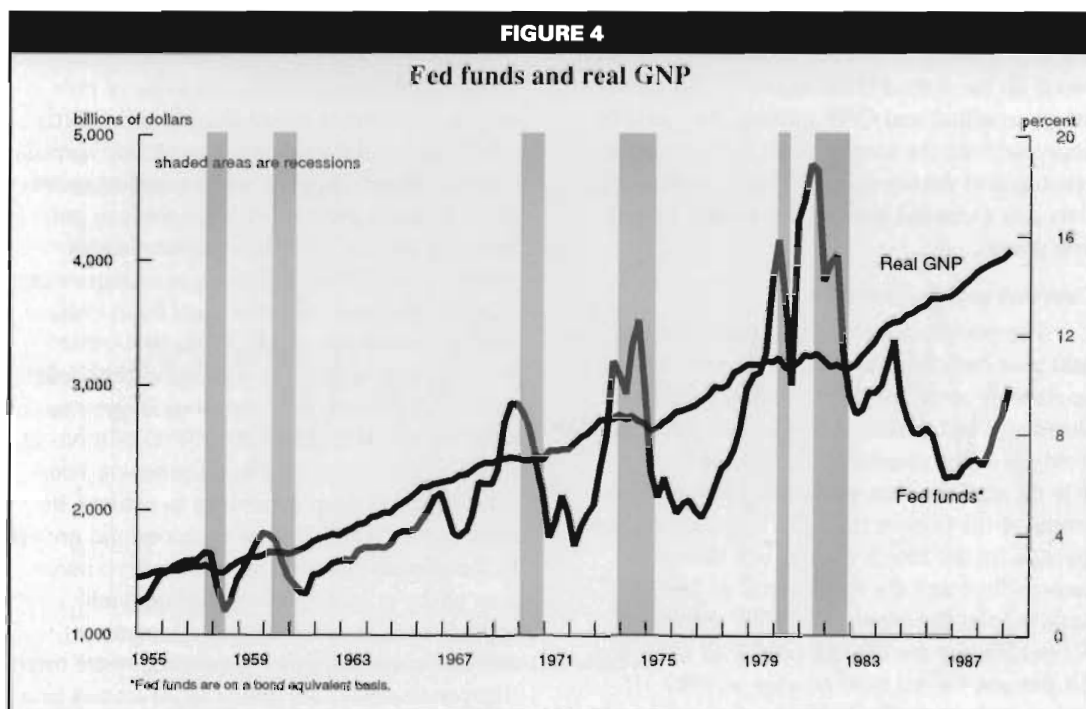
This pattern of increases in the funds rate, the 30-year bond rate, and the spread continued right up to the memorable day of October 19, 1987, when the stock market suffered its sharpest one-day drop in history. On the day preceding the crash, the funds rate was 7.80 percent and the 30-year bond rate 10.25 percent, giving a very wide spread of +245 basis points. The price of the long bond continued to fall (reaching a yield of 10.40 percent) until mid-morning of Black Monday when the stock market had fallen 200 points. At this point, the psychology of the bond market reversed completely. As the stock market continued to plunge toward its final loss of 508 points on the Dow Jones Industrials, the long-term government market moved to perhaps its biggest 24-hour gain in history. By the end of the day the 30-year bond rate had fallen to 9.49 percent. Within three weeks the 30-year bond rate had fallen to a level of 8.85 percent.

According to almost any school of economic thought, the proper monetary policy response to the stock market crash, engendering as it did vast amounts of fear amid widely resurrected recollections of the stock market crash of 1929, was a lowering of the funds rate. And, indeed, the fed funds rate did drop from 7.8 percent on the eve of the crash to 6.9 percent within three weeks. Despite the fall

in the 30-year bond rate, the response of the Fed was sufficiently vigorous to prevent a decline in the average spread in the fourth quarter of 1987 from its third-quarter level.

The situation at the end of 1987 presented an interesting test of alternative forecasts of the economy. Following its largest one-day decline in history on October 19, 1987, the stock market stood far below its August high. Monetary growth had been weak through the last ten months of 1987. The performance of both money and stock prices helped dampen the index of leading indicators, which declined for five straight months from September 1987 to January 1988. In November, the consensus of the Blue Chip survey of forecasters experienced its largest one-month drop in expected future real growth. Yet, the spread clearly indicated there would be no contraction. At a +205-basis-point average in the fourth quarter of 1987, the spread was wider than at any other time from the third quarter of 1985 to at least the first quarter of 1989. In addition, there was another sign indicating that the economy was not entering a recession. As can be seen in Figure 4, which plots the federal funds rate and real economic activity for the period 1955–1989, every recession over this period was preceded by a rising federal funds rate. By December 1987 the federal funds rate had been lowered about a hundred basis points from its peak in October. Because the earlier study was published at the end of 1987, it provided an important public test of the spread as an indicator of future real GNP growth.

The economy appears to have expanded at a robust pace through all four quarters of 1988.⁸ After adjusting for the effects of the drought, the average quarterly growth, at an annual rate, was 3.5 percent in 1988 and the weakest quarter was 3.0 percent.⁹ By March 1988 it seemed clear that no recession was going to result from the stock market crash. From a level of 6.8 percent in March 1988, the funds rate was raised steadily until March 1989 when it stood 340 basis points higher at 10.2 percent. Figure 3 shows that, although the federal funds rate started to rise in March, the spread did not begin to contract until June and averaged +167 basis points as late as the second quarter of 1988. The spread has narrowed in each quarter since, averaging +91 basis points in the third quarter and +20 basis



points in the fourth quarter of 1988. The spread turned negative in December and averaged -77 basis points in the first quarter of 1989. This pattern in the behavior of the spread indicated that a slowdown in the rate of real economic growth was likely to appear in the first or second quarter of 1989 and that the rate of growth would decelerate through at least the third quarter of 1989. Just how sharp that deceleration is likely to be is discussed in the next section.

This detailed examination of movements in the spread and real GNP growth over the last six years of economic expansion indicates that the relationship between them behaves, at least qualitatively, as hypothesized. Accelerations in real GNP growth follow widenings in the spread and decelerations in growth follow narrowings in the spread. The lag between changes in the spread and subsequent changes in real activity appears to be roughly two quarters. Although indicators are not typically used to make precise forecasts, a quantitative measure of how well the spread has performed recently may be obtained by extending the procedure used to test alternative indicators in the previous paper. Using the linked 20-year and 30-year bond rates to replace the 20-year bond rate used in the earlier study, a forecast of each quarter's real GNP growth was ob-

tained by estimating the coefficients in the simple linear relationship presented in Table 1, using only the data that would have been available when real GNP growth had to be forecast. This relationship forecasts this quarter's real GNP growth using only the average spread from two quarters earlier.

The actual forecast for each quarter obtained from the spread in this way is shown on Figure 3 by an asterisk. Again, the forecast pattern conforms very roughly to the actual pattern observed, although the specific forecasts through the slowdowns in 1984 and 1986 appear to indicate, for those episodes, a lag somewhat shorter than two quarters. The root-mean-squared error of the forecasts over the period since the end of 1986 is 1.30 percentage points. This is substantially less than the root-mean-squared error reported in the earlier study (3.61 percentage points) for the period 1964 through 1986. One factor reducing the more recent forecast errors is the absence of very sharp fluctuations in real GNP growth in the recent period. But it should be noted that even a forecast of no slowing in growth following the stock market crash was not a trivial accomplishment. Figure 5, for example, clearly shows the weakness in real M2 growth in the last 10 months of 1987 that led some to expect a fall in real GNP growth in the wake

of the stock market crash. It should also be noted that while recent forecasts of real growth based on the spread relationship mirror movements in actual real GNP growth, they tend to underestimate the amplitude of both the accelerations and decelerations. This is typical with forecasts extended beyond the sample estimation period.

Current policy posture

The performance of the spread over the past year indicates that economic activity will be slowing over 1989. How sharp will the slowdown be? One estimate can be obtained from the linear relationship estimated with data through the first quarter of 1989 and presented at the bottom of Table 1. Applying the spreads for the fourth quarter of 1988 (+20 basis points) and the first quarter of 1989 (-77 basis points) forecasts a real GNP growth of 3.2 percent for the second quarter of 1989 and 2.1 percent for the third quarter of 1989. If correct, this represents a relatively modest slowing in economic growth.¹⁰

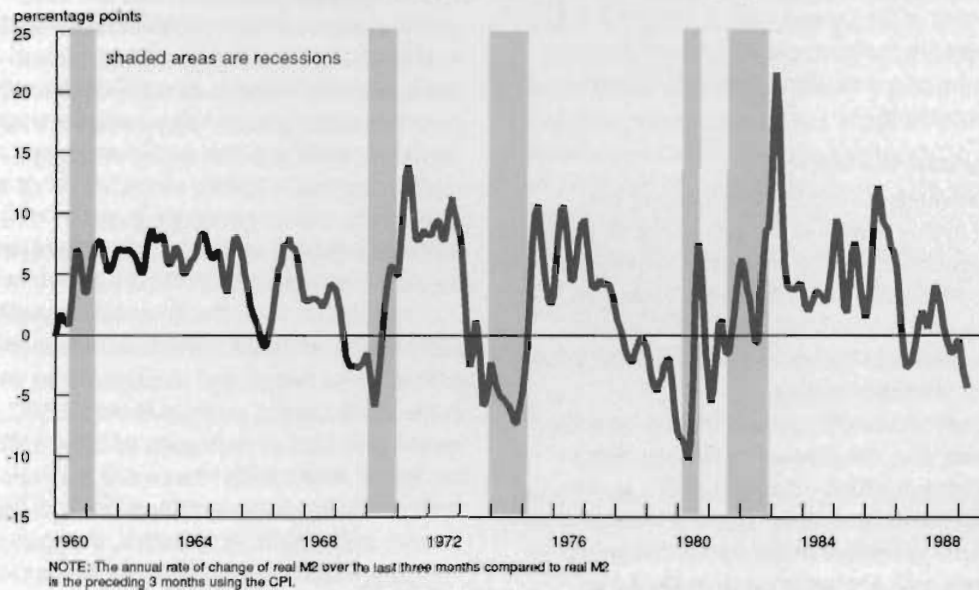
Another analytical approach leads to generally compatible conclusions. Financial market analysts have focused a great deal of attention on the yield curve since short-term rates generally rose above long-term rates towards the end of 1988, i.e., since the yield curve has "inverted." Analysts have examined the extent and duration of past inversions. While the evidence varies slightly depending on the specific short-term and long-term rates used, the general conclusions can be seen in Figure 2, which shows five previous inversions of the spread between the linked 20-year and 30-year constant-maturity Treasury bond rate and the federal funds rate. The last four of these five inversions led to the last four recessions. Past inversions have typically been very long and deep. The average duration of the five inversions is slightly more than 21 months and the maximum inversion (using monthly data) averaged -486 basis points. One way to interpret these results is that the current inversion that began in December 1988 and averaged -137 basis points in May 1989 would have to go much deeper and last much longer before causing a recession.¹¹ So by extension, the inversion seen so far is likely to lead to a mild slowdown.

However, a very plausible argument can be made that policy is much tighter than the

conclusion given above. The fundamental problem with the analysis above is that it views inversions as a separate class of economic phenomena rather than as particularly severe cases of narrowing interest rate spreads. Nothing magic happens when a spread moves from +1 basis point to -1 basis point to put behavior into an entirely separate class of phenomena. When one looks at all narrowings of the spread one sees that there have even been recessions (e.g., 1957-58, 1960) that were not preceded by inversions of the yield curve. The reason why previous inversions were so deep was that economic conditions at those times were such that a tightening Fed policy needed deep inversions to achieve its objectives. Whether slowing economic growth in the present situation requires a deep inversion or the milder narrowing of the yield spreads seen in other episodes depends on whether current economic conditions are more like conditions of the previous inversions or of the milder narrowings.

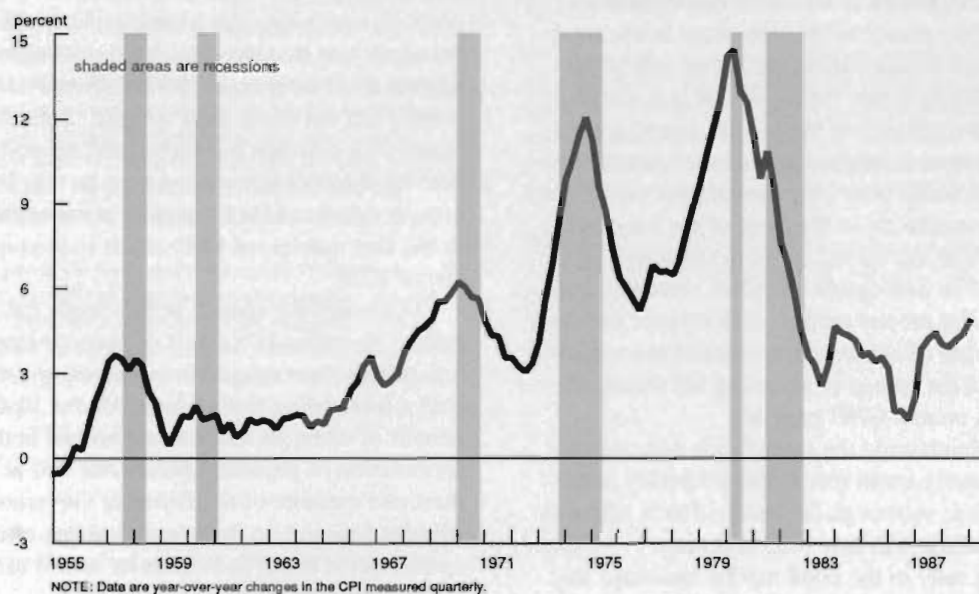
It is difficult to briefly differentiate economic environments at separate points in time but Figure 6 shows that the inflation rate is one factor that clearly differs. The last four recessions occurred when the inflation rate was relatively high. Not only was the inflation rate relatively high but the inflation rate at the beginning of each successive recession tended to be higher than in the previous one. It is easy to imagine that each successive episode required a steeper inversion in the yield curve to establish credibility against inflation. If this interpretation is correct, then the present situation with its roughly 5 percent inflation rate, which is well below inflation rates in the early 1980s, is not likely to require a deep inversion to slow the economy.

This interpretation is supported by another observation. Research tends to concentrate on inversions and recessions because they are easily identified. Yet there have been slowdowns in the economy that involved neither recessions nor inversions. Indeed, as described in the second section of this paper, the two most recent slowdowns (1984 and 1986) occurred without either inversions or recessions. These slowdowns occurred after the high-inflation, deep-inversion episodes of the early 1980s, and thus might give valuable clues for the present situation. During the 1984 epi-

FIGURE 5**Percentage increase in real M2 and recessionary periods**

sode, which is most like the present in that the federal funds rate was being raised in an active attempt to slow the economy, the narrowest monthly reading on the spread was +39 basis points in August 1984. The slowest growth in the economy occurred in the fourth quarter when real GNP growth was 1.7 percent. In

1986, a fall in long-term rates narrowed the spread to a low of +18 basis points in March and was followed by a decline of 0.8 percent in real income in the second quarter and growth rates of 1.0 percent and 1.4 percent in the third and fourth quarters of 1986, respectively. When compared with the evidence

FIGURE 6**Change in the CPI and recessionary periods**

from these slowdowns, the recent pattern of spread behavior (in particular the -137 basis point spread of May 1989) suggests that the slowdown in the second half of 1989 will be substantially more severe than would be suggested by only looking at evidence of past deep inversions.¹²

Policy and the spread

Although the model of the spread presented in this review at the beginning of 1988 does not predict future economic activity precisely, evidence from the last six years—including data beyond that used in the earlier study—indicates the spread could still be valuable for monetary policy.

First, because the spread incorporates the fed funds rate, the primary operating instrument through which monetary policy is currently implemented, it would be almost as easy to control as the funds rate itself. Since the bond rate will generally move in the same direction as the federal funds rate, but by a smaller amount, the monetary authority can affect the spread through movements in the federal funds rate, while observing movements in the long bond rate. Interest rates are observed instantaneously and continuously without later being subject to seasonal or other revisions.

Second, the spread helps to solve the fundamental problem confronting any policy implemented through setting an interest rate. It is universally agreed that, other things being equal, increases in the funds rate tighten monetary policy while reductions in the funds rate ease policy. However, other conditions are seldom if ever equal, so that it is difficult for policymakers to know what monetary policy posture is implied by a given level of the federal funds rate.¹³ By providing a proxy for other conditions in the form of the long-term bond rate, the spread helps to solve that problem. The description of recent monetary policy in the second section of this paper provides a number of concrete examples of the usefulness of the spread in assessing the thrust of policy on real GNP growth.

Maintaining the same funds rate does not necessarily mean that monetary policy is unchanged. Although the federal funds rate was held constant in late 1985 and early 1986, the strong rally in the bond market indicated that

policy was actually tightening, with the consequent slowdown in growth in 1986.

Moving the funds rate does not mean policy is even moving in the direction desired. From March to October 1987, the federal funds rate was raised in an apparent attempt to slow economic growth. However, because the long-term bond rate was rising even more rapidly, monetary policy, as measured by the spread, was actually becoming easier. This fact was reflected in the continued strength in the economy through 1987 and early 1988.

A sharp move in the funds rate may be necessary to maintain the current thrust of policy. In as unique and cataclysmic an event as the stock market crash of October 1987, the spread provided an indication of how much the funds rate would have to move to maintain the policy. Though long-term bond rates dropped sharply in the wake of the crash, the spread indicated that the lowering of the funds rate was sufficient to keep policy from tightening and maintain the same (in this case, expansionary) policy posture.

Third, the roughly two-quarter lag between changes in the spread and the response in real economic growth helps a policymaker set more realistic expectations for policy. The federal funds rate was raised beginning in March 1988 and continued to rise until February 1989. As late as the end of 1988, many observers expressed surprise that, nine months after a tightening in policy began, there were still no significant signs of a deceleration in economic activity. But examination of the data indicates that the spread did not begin to narrow at all until June, and significant narrowing did not occur until August. The two-quarter lag between the spread and economic activity suggests that a slowdown in real GNP growth rate would not typically occur until late in the first quarter, or early in the second quarter, of 1989.

Although the spread, at this point, has not gained the status of a target of monetary policy, private forecasters are increasingly using it as a forecasting tool. Moreover, the likely benefit of using an interest-rate spread in the formulation of monetary policy has led at least one member of the Board of Governors, Manuel Johnson, to include an interest-rate spread in the list of indicators he would use to guide monetary policy.¹⁴

Conclusion

A deterioration in the relationship between growth in the monetary aggregates and future real economic growth has reduced the usefulness of money growth in the formation of monetary policy. In an article published in this review at the beginning of last year, the spread between a long-term government bond rate and the fed funds rate was suggested as a useful indicator of monetary policy. Although the spread does not precisely forecast future real economic growth, the examination of recent experience indicates that it can be a helpful guide for monetary policy. In one

recent instance, the spread clearly predicted that there would be no economic slowdown in the wake of the stock market crash in late 1987. It has more recently indicated that a slowdown in economic growth was likely to begin in the first half of 1989. Viewed in isolation, recent spread data suggests that the slowdown is likely to extend through the rest of 1989 and be quite significant. This scenario is more pessimistic than the current consensus forecast. The economy's performance in the next few quarters will provide an interesting test of the spread.

FOOTNOTES

¹See Laurent (1988).

²The same logic implies that a relationship should, if possible, be tested by forecasting future data after it is formulated, but before it is published. The spread had been formulated in the second quarter of 1986 and its forecasts monitored at the Federal Reserve Bank of Chicago between then and the publication of the article at the beginning of 1988.

³The forms of these two equations are taken from Table 3, p. 12 of the earlier article.

⁴Another possibility is to look at the difference between a *real* long-term rate and a *real* short-term rate. See Furlong (1989).

⁵Recall that the fed funds rate is calculated on a bond-equivalent basis.

⁶The Fed was operating with a borrowed reserve target and borrowings were at the minimum frictional level so that the spread between the fed funds rate and the discount rate could not be lowered by reducing the level of borrowings. Under this operating procedure and these conditions a reduction in the fed funds rate required a reduction in the discount rate. For a more complete discussion of this operating procedure see Kasriel & Merris (1982).

⁷The spike in the funds rate at the end of 1986 was an extreme example of a regular year-end pattern of upward blips in the funds rate that are widely recognized as being without policy significance. In the week ended December 31, 1986, the fed funds rate averaged 9.20 percent. When

monthly averages were calculated, that week raised the December monthly average substantially, and even raised the January 1987 monthly average somewhat.

⁸Real income data from 1988 are still subject to possible substantial revision. A study by Estrella and Hardouvelis (1989) indicates that a spread does much better forecasting final real GNP data than the first issued data.

⁹The real GNP data adjusted for the drought are used, because the spread operates by affecting demand and could not be expected to forecast a supply shock like a drought.

¹⁰It should be noted that the average spread over April and May was -128 basis points which, if it were the second quarter average, would imply a 1.5 percent growth rate in fourth quarter real GNP.

¹¹For one of the most comprehensive studies of this type see Lieberman (1989).

¹²There are still other indications that the slowdown may be quite significant. The linear regression relationship for the spread has generally overpredicted real GNP growth recently, including the last 5 quarters. Also, Figure 5 shows that the growth rate in real M2 has recently been weak, with the May 1989 figure the lowest since early 1982.

¹³For an excellent description of the problems of conducting monetary policy through interest rates, see Mote (1988).

¹⁴See Johnson (1988).

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