

# Credit Cycles and the Pricing of the Prime Rate

The prime rate—so named because it was the rate banks offered business borrowers with the best credit—long has been regarded as a key indicator of borrowing costs. But in recent years the significance of the prime rate has diminished. To begin with, large volumes of below-prime loans have been made. For instance, surveys show that during the second half of 1982, a period of falling interest rates, over three quarters of the new short-term business loans were made at rates below prime. Also, there have been times when the prime appeared to be unusually high relative to other interest rates. For example, during August 1982, the prime fell much more slowly than most money market rates and the spread between the prime and three-month certificate of deposit (CD) rates widened to almost 4 percentage points.

In this article, we present evidence that the prime has been set differently since the mid-1970s. During the early 1970s the prime rate lagged a month or two behind both upward and downward changes of other money market rates. During the late 1970s and early 1980s, however, the prime rate movements lagged more when rates were declining. Some people view this situation as reflecting a noncompetitive prime. But there are few cogent economic explanations of how the U.S. banking market with thousands of institutions could be generally noncompetitive.

We suggest that the reason for the prime's asymmetrical adjustment is that the "competitiveness" of the prime rate now varies with the state of loan demand. When loan demand is weak, individual banks have less interest-sensitive loan demand and tend to keep the prime high relative to market rates. During

such times, banks use pricing schemes other than the prime to attract or to retain those customers who are most sensitive to interest rates. In the future, if the trend to nonprime pricing options continues, the prime may move even less with market rates.

## The prime rate in recent years

Until the late 1970s, the prime rate was considered the measure of the cost of bank credit. Many commercial and industrial loans were tied to the prime, and it was often viewed by the public as an indicator of the overall level and movement of interest rates. Since then, many people have argued that the prime is no longer an indicative rate. What has happened?

During the late 1970s and 1980s, the prime rate deviated more from other money market rates than in the early 1970s (Chart 1). Reflecting this new development, the correlation of the prime with most other interest rates fell after the late 1970s (Table 1).<sup>1</sup> One explanation for this declining correspondence is the increased volatility in interest rates. Since the prime rate changes less frequently than market rates, the prime would diverge more from other rates when the financial markets are more volatile. However, casual observation indicates that the spread between the prime and the commercial paper rates was much higher in the late 1970s than in

<sup>1</sup> Brian C. Gendreau, "When Is the Prime Rate Second Choice?", *Business Review* (Federal Reserve Bank of Philadelphia, May/June 1983), argued that the prime rate has been adjusting faster in recent years than in the early 1970s. However, our results suggest that the faster speed of adjustment was accompanied by an overall decline in the correlation between the prime and other money market rates.

the earlier period. If the increased fluctuation in interest rates was the only reason for the decreased correlation between the prime and other money market rates, the spread would be equally likely to decrease as to increase, and the observed widening of the prime-commercial paper rate spread should not occur. Thus, volatility in interest rates cannot explain entirely the increased deviations between the prime and other money market rates.

**The asymmetric adjustment of the prime rate**

One peculiarity associated with this declining correspondence between the prime and other money market rates is the asymmetric adjustment of the prime rate over an interest rate cycle. Since the mid-1970s, the prime has tended to lag market rates more when they were falling than when they were rising.

A typical adjustment path for the prime rate over a hypothetical interest rate cycle can be derived from statistical analysis of the period 1976-82 (Table 2). During the upswing of an interest rate cycle, the prime rate is adjusted upward rather quickly (Chart 2). For example, if the three-month CD rate increases by 1 percent, the prime is raised by 62 basis points in the first month so that the spread narrows temporarily by 38 basis points (Chart 3). By the second month, the

prime rate is realigned completely. When the CD rate declines, however, the prime rate lags behind substantially. Even after three months, the spread is still 16 basis points higher than its normal level.<sup>2</sup>

One explanation of the widening spread between the prime and other money market rates when rates are declining relates to the "maturity" of the prime relative to the maturity of other money market instruments. The prime rate can be changed by banks anytime and has no obvious maturity. In fact, the prime can be regarded as a "daily" rate while the CD rate used in Charts 2 and 3 is clearly a rate on a ninety-day instrument. If daily market rates are expected to decline over the next ninety days, then a ninety-day rate, which embodies expectations of these lower daily rates, will tend to be below the current daily rate. Or, turning this around, the prime rate which is a "daily" rate should tend to be high relative to the CD rate when rates are falling. Extending this argument to periods when rates are rising rather than falling, we would expect the prime rate to be low relative to the CD rate. In other words, the spread should narrow when rates are rising.

<sup>2</sup> Statistical tests show that the asymmetry in the adjustment path is statistically significant at the 1 percent level.

Table 1  
**Coefficients of Correlation with the Prime Rate**

Rate	July 23, 1975- October 3, 1979	October 10, 1979- July 28, 1982	July 23, 1975- July 28, 1982
<b>Weekly data on:</b>			
Federal funds rate .....	0.98	0.89	0.98
30-day Treasury bill rate .....	0.98	0.84	0.96
30-day commercial paper rate* .....	0.98	0.88	0.94
90-day certificate of deposit rate .....	0.98	0.86	0.98
90-day Treasury bill rate .....	0.99	0.83	0.97
20-year Treasury bond rate .....	0.92	0.55	0.92
<b>Monthly data on:</b>			
Federal funds rate .....	0.92	0.91	0.97
30-day Treasury bill rate .....	0.72	0.87	0.92
30-day commercial paper rate .....	0.94	0.90	0.97
90-day certificate of deposit rate .....	0.94	0.88	0.97
90-day Treasury bill rate .....	0.93	0.85	0.97
20-year Treasury bond rate .....	0.74	0.57	0.92

\* Weekly data for the commercial paper rate begin on April 12, 1978.

Table 2  
**Dependent Variable: Prime-RCD/(1-RR)**

Variable	Equation (1) January 1971- December 1975	Equation (2) January 1976- December 1982	Equation (3) January 1976- December 1982
Constant ...	0.32	0.88*	1.13*
X .....	-0.52*	-0.40*	-0.38*
X (-1) ....	-0.27*	-0.07	—
X (-2) ....	-0.26*	0.05	—
Y .....	-0.79*	-0.60*	-0.65*
Y (-1) ....	-0.24*	-0.19*	-0.23*
Y (-2) ....	-0.11	-0.16*	-0.16*
RR .....	-0.14*	-0.10*	-0.13*
RISK .....	0.58†	0.53*	0.42*
$\bar{R}^2$ .....	0.83	0.94	0.93
DW .....	1.13	2.12	2.14
$\rho$ .....	0.85	0.61	0.57

\* Statistically significant at 1 percent level.

† Statistically significant at 10 percent level.

RCD = Three-month secondary market certificate of deposit rates.

X =  $\Delta RCD$  when  $\Delta RCD > 0$ ; 0 otherwise.

Y =  $\Delta RCD$  when  $\Delta RCD < 0$ ; 0 otherwise.

RR = Required reserve ratio on certificates of deposit (including marginal reserve requirement).

RISK = Difference between rates on BAA and AAA corporate bonds.

To test whether the peculiar adjustment path of the prime rate observed in Charts 2 and 3 is due to the particular maturity of the prime, we also estimated the movement of the prime rate relative to a daily rate, the Federal funds rate. The estimation results show the persistence of the asymmetry. The prime is adjusted relatively fast when the funds rate is rising. When the funds rate is falling, however, the prime tends to lag behind.<sup>3</sup> Therefore, the difference in rate maturities cannot explain entirely the unusual behavior of the prime rate.

Thus far, we have shown that during recent years the prime rate has been adjusting asymmetrically over an interest rate cycle. Did the prime rate exhibit the same behavior in earlier years?

Applying the same kind of statistical analysis, we found that the prime rate moved much more sym-

metrically across the credit cycle during the early 1970s than in the late 1970s and 1980s. During the earlier period, the prime rate seemed to fall just as fast as it rose.<sup>4</sup>

### Causes of the prime's unusual behavior

In past years, many authors have investigated the prime rate and its determination.<sup>5</sup> Two competing hypotheses have emerged on the setting of the prime rate. They are the competitive and noncompetitive approaches.

The competitive approach asserts that the costs of searching and switching banks are not high enough to give banks much leeway for noncompetitive pricing. Rather, fluctuations in the spread between bank lending rates and their cost of funds merely reflect changes in the characteristics of the loans or the services provided by the bank. In contrast, the noncompetitive approach views search and information costs as important factors in the pricing of bank loans. By this argument, banks can price their loans noncompetitively to some extent.

There are several problems, however, in treating the prime as a rate which can diverge greatly from other market rates for extended periods because of noncompetitive behavior. First, it does not seem plausible that there can be an equilibrium in which borrowers pay noncompetitive prices in a nation where there are 15,000 commercial banks. While the markets in which these banks compete are segmented to some degree, it is hard to believe that the barriers to entry in other banks' local markets are sufficiently high to inhibit competitive behavior, at least in urban areas. And, for many borrowers, there are adequate incentives to compare rates among banks and to respond to persistent interest rate differentials. The second prob-

<sup>4</sup> The asymmetry is not statistically significant at the 5 percent level.

<sup>5</sup> For example: Paul Boltz and Tim Campbell, "Innovations in Bank Loan Contracting: Recent Evidence" (Board of Governors of the Federal Reserve System, Staff Economics Study No. 104), 1979; William Dunkelberg and Jonathan Scott, "Credit Conditions for Small Business", mimeographed (National Federation of Independent Business), 1982; Gerald C. Fisher, *The Prime: Myth and Reality* (1982); Gendreau (1983); Michael Goldberg, "The Pricing of the Prime Rate", *Journal of Banking and Finance* (June 1981), pages 277-96; Christopher James, "An Analysis of Bank Loan Rate Indexation", *Journal of Finance* (June 1982), pages 809-25; Jeffrey D. Hanna, Bruce Brittain, and Tran Q. Hung, "Libor vs. Prime: The Internationalization of the U.S. Loan Market", *American Banker* (June 5, 1981); John P. Judd, "Competition Between the Commercial Paper Market and Commercial Banks", *Economic Review* (Federal Reserve Bank of San Francisco, Winter 1979); John W. Lanza, "Criticism of the Prime Rate", *The Journal of Commercial Bank Lending* (February 1973); Randall C. Merris, "The Prime Rate", *Business Conditions* (Federal Reserve Bank of Chicago, April 1975); Howard J. Poduska, "The Prime Rate and Other Pricing Considerations in Past, Present, and Future", *The Journal of Commercial Bank Lending* (October 1978).

<sup>3</sup> This asymmetric adjustment is also statistically significant at the 1 percent level. Statistical results are available upon request.

lem in positing a noncompetitive prime is the lack of strong empirical evidence. Most of those who argue for an oligopolistic banking industry provide suggestive rather than conclusive evidence.<sup>6</sup>

**Cyclical monopolistic competition and the prime**

While it seems unlikely that the banking system consistently behaves noncompetitively, there may be forces which generate noncompetitive opportunities occasionally. We hypothesize that the elasticity of demand for loans from any particular bank varies with economic conditions and can account for periods of a relatively noncompetitive prime. There are times when most businesses know market conditions and are in contact with several banks. At other times, this will not be true. With a significant portion of outstanding loans still linked to the prime, by maintaining a higher prime a bank can make greater profits on the loans that remain with it. It must weigh these extra profits on the loans it maintains against the loss of customers.<sup>7</sup>

When is the elasticity of loan demand low and when is it high? Among small businesses, the most interest-sensitive participants in the credit markets would tend to be borrowers who are applying for new loans or are seeking to establish a credit relationship with a new lender. They already have gathered the materials to prove their creditworthiness and as a matter of course (or precaution) are in touch with several lenders. In this case, other things being equal, the bank which offers the best deal wins their trade. Comparison shopping across banks requires time and resources, however. If a small firm is not already in the market for new loans, it may be reluctant to make the effort to search out the cheapest loan rate.

Large firms, in contrast, generally have relationships with several banks in addition to having access to the commercial paper market. In fact, a 1981 survey reported that more than 75 percent of large companies (Fortune's top 500) deal extensively with five or more banks.<sup>8</sup> Since large companies typically have staffs to keep constant track of credit market conditions, the cost of the search for them may be no more than a phone call in either phase of the business cycle.

Should one lender's rate move grossly out of line, the several banking relationships maintained by large firms would allow them to begin shading their borrowings fairly rapidly toward other banks or the commercial paper market.

Another reason why a small firm may face difficulty in developing a new banking relationship during downturns is that banks have a problem in identifying the source of its borrowing needs: Is the firm seeking a new credit relation to expand and/or to avoid the perceived high spread charged by its previous lender, as it claims, or has it been cut off by its old banker because the firm may not survive? The firm's old banker may be willing to provide credit because, in the course of their relationship, he has acquired information on the fundamental health of the firm. To the extent that such information is difficult to provide to a new prospective lender who is unacquainted with the firm, the firm will be tied to its old credit relationship. Banks may be able to take advantage of these hurdles to entering the loan market which certain borrowers face during downswings. During upswings, however, these hurdles would be much less significant and banks would be forced to charge competitive rates.

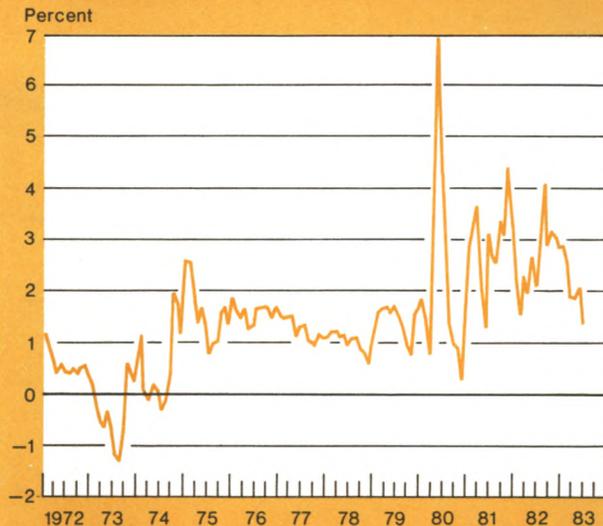
Large firms do not face such problems to the same degree. With several established banking relationships and constant monitoring of their creditworthiness by

<sup>6</sup> For example, Goldberg (1981) argued the current month's prime rate is affected by previous months' CD rates. He suggested that this is a sign of average cost pricing rather than marginal cost pricing, which indicates oligopolistic behavior. However, his results may reflect merely the difference in maturities between the three-month CD and the prime rates. Thus, Goldberg's results did not provide conclusive evidence about the competitiveness of the banking industry.

<sup>7</sup> Judd (1979) also argued that tying floating rate loans to the prime might have reduced the incentives for banks to compete by lowering spreads.

<sup>8</sup> Greenwich Research Associates, "Large Corporate Banking 1981", mimeographed, 1981.

Chart 1  
**Spread between Prime and Commercial Paper Rates\***



\*Thirty-day dealer-placed commercial paper rate.

rating agencies and market analysts, both current and potential lenders can draw distinctions between cyclical and secular weakness in the firm's balance sheets. Overall, then, information and search costs would differ for large borrowers and small borrowers over a credit cycle.

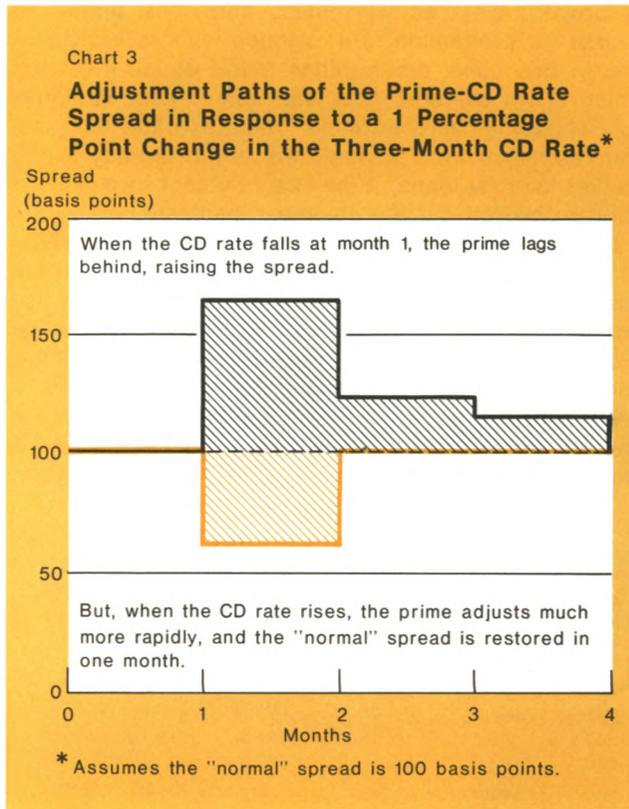
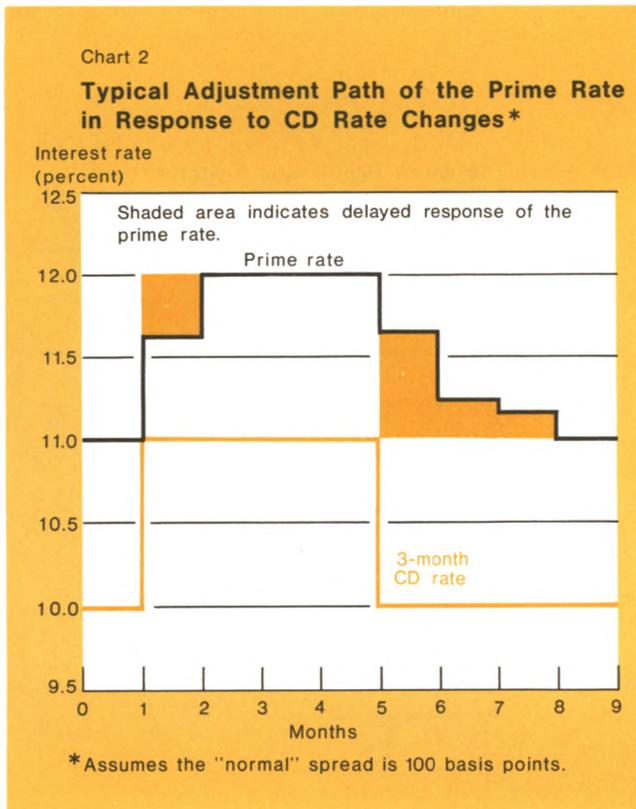
Because of the relative immobility of small borrowers during downturns, individual banks may face different elasticities of loan demand at different points in the credit cycle. The elasticity of loan demand from each individual bank is likely to be highest when total demand for new loans is strongest. This generally happens later in an expansion, a time when interest rates are generally rising, too. At such times the lost revenue from discouraged new borrowers and disgruntled old borrowers outweighs any additional revenue from keeping a wide spread. Therefore, a bank would find it in its best interests to charge a competitive spread. At times when loan demand is weak, however, larger total profits can be earned by keeping a high prime and perhaps foregoing the few interest-sensitive customers. In addition, banks can limit the loss of customers by lending at below-prime rates to particularly interest rate-conscious borrowers when the prime rate is high relative to market rates. Interest-sensitive bor-

rowers can thus be charged market rates at any point in the business cycle.

We, therefore, characterize the pricing of the prime as being subject to cyclical noncompetitiveness. We suspect that it is competitive during periods of stable or increasing market rates but may be somewhat non-competitive when rates are falling.

This argument is supported by statistical evidence. Recall that we found that the prime rate comes down more slowly relative to market rates than it rises, indicating that banks charge higher spreads on prime-based loans during downturns. However, our theory also suggests that borrowers in the market for new loans would be better able to obtain loan rates closely tied to market rates, in contrast to those merely maintaining outstanding loans tied to the prime. Indeed, we find that the interest rates charged on new commercial and industrial loans do not show the same asymmetry with respect to market rates.<sup>9</sup> Although the rates on new loans tend to lag behind the CD rate and move down a bit slower than they move up, the difference in the speed of adjustment is very small and not statis-

<sup>9</sup> Statistical results are available upon request.



tically significant. Of course, these data come from a sample of borrowers who may not be typical of the average loan seeker.<sup>10</sup> Nonetheless, the results suggest that those firms actively in the loan market may be able to obtain market-related rates at any point in the credit cycle, despite the increase in the prime-CD spread during downturns.

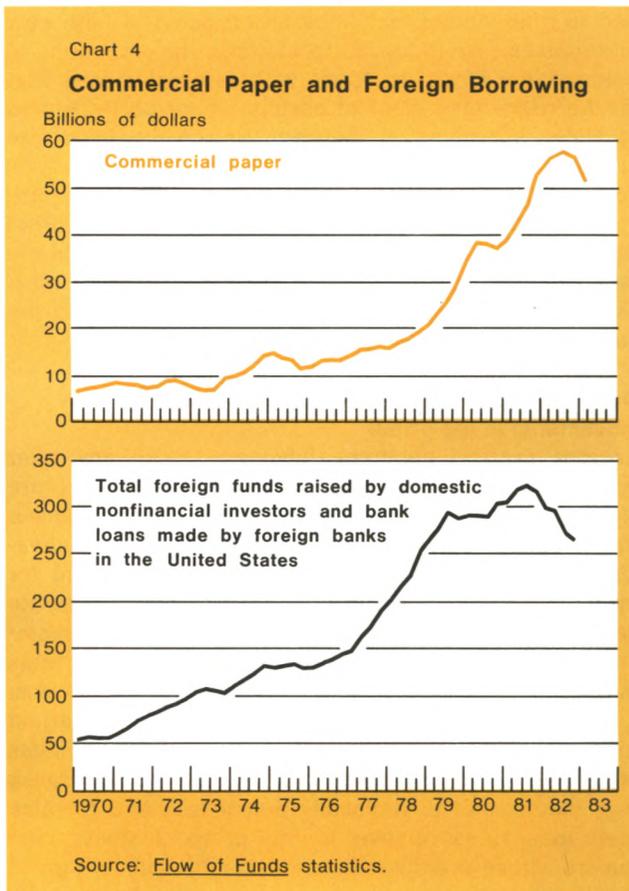
Evidence on below-prime loans is also consistent with the view that such pricing schemes enable banks to retain interest-sensitive customers during periods of a high prime-CD rate spread. If below-prime loans are completely unrelated to the pricing of the prime, then they should be neither more nor less prevalent when the prime-CD spread changes. Statistical analysis, however, indicates that below-prime lending is much more common when rates are falling and the spread is wide, suggesting that some customers move from prime-based to below-prime loans when the prime is out of line with market rates.<sup>11</sup>

**Why did the behavior of the prime rate change?**

While these arguments may explain why the prime adjusts asymmetrically during the credit cycle, they do not explain why the pricing of the prime changed in the last decade. Earlier, we showed that during the early 1970s there was little or no asymmetry in the prime rate *vis-à-vis* market rates across the business cycle. By the late 1970s, however, there was a pronounced asymmetry. Can these results be related to the bank lending practices described above?

Perhaps the most striking change in the banking system in the mid-1970s was the development of alternatives to domestic bank lending. The commercial paper market grew rapidly, while U.S. domestic residents also began to have better access to foreign sources of funds (Chart 4). By most accounts, the development of these markets have made the U.S. banking system on the whole more competitive now than in the past. These pro-competitive developments may have had a somewhat paradoxical effect on the prime rate, however.

In the early 1970s, most floating rate loans were also prime-based loans. Both the interest-sensitive and relatively immobile borrowers were tied to the prime, for the most part without other pricing options. If an individual bank kept its prime too high, then the interest-sensitive customers would leave for an-



other bank or for the commercial paper market, which was beginning a period of rapid expansion. Consequently, banks had to set their prime rate in line with other market rates. Since the loan rates for both rate-sensitive and rate-insensitive borrowers were generally based on the prime, price discrimination between the two classes of borrowers over a credit cycle was more difficult.<sup>12</sup>

In the mid-1970s, new pricing options became more common, as many borrowers began to have easier access to the commercial paper and Euro-lending markets and were no longer restricted to the prime. Commercial banks desiring to retain such customers

<sup>10</sup> The data are from the Survey on Terms of Bank Lending conducted quarterly by the Federal Reserve System. The surveys include business loans extended during the first full week of the middle of the month of each quarter. The sample consists of both large and small commercial banks.

<sup>11</sup> Statistical results are available upon request.

<sup>12</sup> Banks and their customers could negotiate different spreads on their loans at different points in the credit cycle. However, such customer by customer negotiation is an inefficient method for price discrimination between broad classes of borrowers. Similarly, the two-tier prime under the Committee on Interest and Dividends (CID) was monitored closely by the CID, and banks were not able to use this as a vehicle to take advantage of the difference in interest sensitivity between the two classes of borrowers.

had to offer pricing schemes as attractive as the new alternatives. By this interpretation, the function of below-prime loans (or loans with pricing options that the borrower may elect at certain times) partly served to allow discrimination between borrowers. Less mobile borrowers remain tied to the prime when rates come down and spreads increase, while the more mobile borrowers shift to rates closely tied to market rates. Thus, the change in the behavior of the prime rate can be attributed to the declining average interest sensitivity of the prime-based borrowers since the early 1970s.<sup>13</sup>

#### **Other possible explanations for asymmetric movements in the prime**

Besides cyclical noncompetitiveness, there are other possible reasons for the prime to move down more slowly than up. One of them is a change in the relative risk premium attached to nonfinancial business *vis-à-vis* banks over a business cycle. In a recession, for instance, interest rates tend to fall and corporate financial positions tend to deteriorate. Thus, the seemingly high prime during periods of falling interest rates may reflect the higher default risk of business loans.

In addition, the asymmetric movement of the prime rate may be caused by a shift in the creditworthiness of prime-based borrowers during downturns. Banks may choose not to reclassify businesses and to raise their loan rates relative to the prime. Instead, customers whose creditworthiness remains high are given below-prime loans, while the prime is kept high relative to market rates. Those businesses that remain tied to the prime are then companies that require a higher risk premium.

Also, the movement of the prime-CD rate spread may be affected by government policies. Under the Committee on Interest and Dividends (CID), banks offered a lower prime to small businesses from April 1973 to May 1974. And, in 1980, the credit restraint program placed limits on loan growth which may have contributed to the unusually high prime rate during that period.

To take account of these factors, we included several additional variables in our statistical analysis. The spread between the rates on BAA- and AAA-rated corporate bonds was used to measure the higher default risk of business lending. Additional impact from the

shift in the creditworthiness of prime-based borrowers was incorporated in our analysis by adding the business failure rate. Moreover, separate dummy variables for the periods of the CID and the credit restraint program were included in our equations. None of these variables, however, with the exception of the BAA-AAA bond rate spread and the business failure rate, had any significant effect on our estimates. Most importantly, inclusion of these variables did not reduce the asymmetry in the movement of the prime.<sup>14</sup>

Besides testing our hypothesis of cyclical noncompetitiveness against alternative explanations, we also conducted out-of-sample simulations to measure the forecasting accuracy of our equation over the past year. The simulation results indicate that our statistical estimates track quite well the behavior of the prime-CD rate spread from July 1982 to June 1983, accounting for 1.3 percentage points of the 1.4 percentage points narrowing in the spread.<sup>15</sup> In the most recent month, when the prime has been unchanged while market rates were rising, our equation predicted about half the actual narrowing in the spread.

#### **Summary**

There has been a major change in the behavior of the prime rate. Since the mid-1970s, the prime rate has moved asymmetrically over an interest rate cycle.

One explanation for this change is the development of new forms of borrowing by large corporations. Since the mid-1970s, many interest-sensitive borrowers were given pricing options other than the prime. Those borrowers who remain tied to the prime may be less responsive to their loan rates, unless they are in the market for new loans. This may give banks occasional opportunities to increase the spread.

Despite the temporary noncompetitive behavior of bank lending, in the long run we would expect bank loan rates increasingly to resemble other money market rates. For one thing, borrowers may demand more pricing alternatives, which will safeguard them against overpaying at times of falling interest rates. Paradoxically, however, the fewer borrowers remaining tied to the prime would be the least mobile, and the slowness in the prime following other rates down may become even more pronounced than it is now.

<sup>14</sup> Statistical results are available upon request.

<sup>15</sup> The mean error and root mean square error for the out-of-sample period of July 1982 to June 1983 was  $-0.01$  and  $0.33$  percent, respectively, compared with the in-sample root mean square error of  $0.23$  percent for the period January 1976 to June 1982.

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