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The responses of the prime rate to change in policies of the Federal Reserve

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ABSTRACT

This paper examines how commercial banks reacted to the changes in monetary tools in mid-1994, when The Federal Reserve Bank altered its policy by implicitly targeting the Federal Funds Rate (FFR). Prior to 1994, the FFR had a lagged effect on the prime rate that charged commercial banks their best customers. However, after the move by the FED in 1994, commercial banks responded immediately by changing their prime lending rate to the Federal Funds Rate plus a three-percent spread. The result is important because it demonstrates how a more transparent monetary policy targeting can have, in fact, the desired effect.

1. Introduction

The prime interest rate is an important benchmark on which banks price their loans across a wide range of categories. While studies by Golberg (1982), Goldberg (1984) and Forbes and Mayne (1989) find that the prime rate is not responsive to changes in various cost-measures of bank funds in both downward and upward directions, a recent paper, by Zhu, Chen and Li (2009) finds that since the early 1990s, the prime rate has become more responsive to changes in money market conditions.

More importantly, Zhu et al. show that responsiveness of the prime rate is not only independent of the changes in market interest rates, but is also reacting to the element of uncertainty associated with market interest rates. In their study, Zhu et al. (2009) investigate the responsiveness of the prime rate to variations in one-month Certificate of Deposit (CD) rates, which they use as a proxy to changes in money market conditions.

However, Zhu et al. (2009) ignore the possible influences of the Federal Funds Rate (FFR) on the responses of commercial banks. The FFR is an important money market indicator, perhaps the most important monetary policy tool used by the Federal Reserve Bank of the United States (FED). Since the second quarter of 1994, the Federal Reserve monetary policy has explicitly and publically targeted the FFR. Henceforth, this study offers an alternative to the study by Zhu et al. (2009) and analyzes how changes in FFR cause changes in the prime rate.

This paper shows that after 1994, when the FED had altered its monetary policy by openly setting the FFR, and as a response to such a move, commercial banks changed their behavior by setting the prime rate equal to the Federal Funds Rate plus a margin of 3%. Prior to 1994, banks had been less sensitive to policy changes by the FED.

The paper is organized as follows: Section 2 presents a brief literature review. Section 3 presents the data, the modeling methods, and the statistical results. This section presents the results of both the Vector Auto-Regression (VAR) Estimation and the Vector Error Correction (VEC) models. Section 4 concludes.

2. Literature review

Previous empirical studies, specifically those by Golberg (1984) and Forbes and Mayne (1989), find that changes in prime rates are positively correlated with the changes in market interest rates and provide explanations for prime rate stickiness. According to Golberg (1984), the prime rate is the average of banks' cost of current and outstanding liabilities, and thus changes to the banks' cost of funds imply changes

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Table 1a
Unit root tests for Period 1, 1981:05–1993:12.

Null hypothesis: variable has a unit root	t-Statistic	Probability*
Federal funds	−2.65849	0.0838
Prime rate	−2.16491	0.2201
1st difference of Federal Funds Rate	−4.26554	0.0007
1st difference of prime rate	−4.18761	0.001

The null hypothesis is that the variable has a unit root. The t-statistic is the Augmented Dickey–Fuller test statistic where the critical values are −3.47367 for 1%, −2.88046 for 5% and −2.57694 for 10% confidence level. Tests show that the null hypothesis cannot be rejected for the Federal Funds Rate and for the prime rate but is rejected for the 1st differences of these variables.

in the prime rate. Goldberg also suggests that the prime rate adjustments lag behind the changes in banks' cost of loanable funds. The lag is attributed to the unwillingness of banks to change the prime rate upon minor changes in money market conditions. However, Goldberg claims that the prime rate is sticky due to banks' fears that their prices would fail to match in case the interest rate increases.

Forbes and Mayne (1989), in an attempt to explain prime rate stickiness, provide a discussion of a friction model for the prime rate. They identify a threshold that must be met for the prime rate to change with market interest rates. Unlike Golberg (1984), Forbes and Mayne (1989) focus on current interest rates rather than lagged ones.

Zhu et al. (2009) study the prime rate responsiveness in a recent paper. The prime rate, used by banks in lending decisions, has been widely considered to be responsive to the changes in the marginal costs of bank funds, see Goldberg, op cit. and Forbes and Mayne, op cit., but Zhu et al. (2009) provide evidence to the contrary. They claim that the prime rate is independent of the movement of interest rates. The argument that prime rate is related to uncertainty of market interest rates is inconsistent with the preexisting literature on the topic. Zhu et al. (2009) find that prime rate has become more responsive to changes in market interest rates. They also conclude that these changes are correlated with the uncertainty of interest rates rather than the actual changes in the interest rates.

Using time series data for a period of four-decades (1965–2006), along with the econometric models used by Hafer (1983), Golberg (1984), and Levine and Loeb (1989), Zhu, Chen and Li (2009). explore the discrepancies in the literature. Instead of partitioning their study into two groups: UPs or DOWNs, based on one-month Certificate of Deposit (CD) rates from previous months, as it has been done in the past, Zhu et al. (2009) split their sample into three sub-sample periods corresponding to the direction of long-term trends in the prime rate spread, which is the difference between the prime rate and the one-month CD rate.

The first period, which runs from May 1965 to April 1981, sees an upward trend in market interest rates. The second and third periods, from May 1981 to December 1990, and January 1991 to January 2006, respectively, show a downward trend in these rates. It should be noted that these authors ignore the important role of the Federal Funds Rate in determining interest rates in the United States. Additionally, as we report in Section 3.2 below, Zhu et al. (2009) claim that the interest rate series they used were stationary, while our tests indicate the opposite.

Table 1b
Unit root tests for Period 2, 1994:2–2006:12.

Null hypothesis: variable has a unit root	t-Statistic	Probability*
Federal funds	−1.74497	0.4067
Prime rate	−2.08733	0.2501
1st difference of Federal Funds Rate	−4.06586	0.0015
1st difference of prime rate	−4.06586	0.2501

The null hypothesis is that the variable has a unit root. The t-statistic is the Augmented Dickey–Fuller test statistic where the critical values are −3.47367 for 1%, −2.88046 for 5% and −2.57694 for 10% confidence level. Tests show that the null hypothesis cannot be rejected for the Federal Funds Rate and for the prime rate but is rejected for the 1st differences of these variables.

Table 2
Pairwise Granger causality tests.

Sample: 1981:05–1993:12			
Null hypothesis:	Observation	F-statistic	Probability
DFFRATE does not Granger cause DPRIME	152	11.8692	9.00E−16
DPRIME does not Granger cause DFFRATE		2.42164	0.0073
Sample: 1994:2–2006:12			
Null hypothesis:	Observation	F-statistic	Probability.
DPRIME does not Granger cause DFFRATE	155	0.58274	0.853
DFFRATE does not Granger cause DPRIME		3.44381	0.0002

DFFRATE: 1st differences of the Federal Funds Rate.
DPRIME: 1st differences of the prime rate.

3. Data and results

This study examines recent changes in the behavior of the prime rate in the United States. Since February 1994, the Federal Reserve has announced explicitly that its target for monetary policy would be the Federal Fund interest rate. Consequently, commercial banks changed the way they determined the prime rate. After 1994, banks adapted a simple formula that sets the prime rate to be equal to the Federal Funds Rate plus 3%.

This paper analyzes changes in the behavior of the prime rate by utilizing two statistical methods, namely the Vector Autoregressive Approach (VAR) and the Vector Error Correction Model (VEC).

3.1. Data

The monthly data for this study consist of time series of the two types of rates, the Federal Funds Rate and the prime rate. The data for the Federal Funds Rate and the prime rate are obtained from the Federal Reserve Economic Data (FRED) database maintained by the Federal Reserve Bank of St. Louis. The entire period of the study is from January 1981 until December 2006.

Table 3
Variance decomposition.

	Period 1: 1981:05–1993:12			Period 2: 1994:2–2006:12		
Period	S.E.	DFFRATE	DPRIME	S.E.	DFFRATE	DPRIME
Variance decomposition of DFFRATE:						
1.00	0.40	100.00	0.00	0.14	100.00	0.00
		0.00	0.00		−1.90	−1.90
6.00	0.46	94.97	5.03	0.17	98.45	1.55
		−3.44	−3.44		−3.82	−3.82
12.00	0.47	93.73	6.27	0.19	97.10	2.90
		−3.92	−3.92		−4.43	−4.43
18.00	0.47	93.37	6.63	0.19	96.79	3.21
		−4.29	−4.29		−4.46	−4.46
24.00	0.48	93.31	6.69	0.20	96.78	3.22
		−4.40	−4.40		−4.47	−4.47
Variance decomposition of DPRIME:						
1.00	0.23	39.04	60.96	0.12	84.99	15.01
		−5.11	−5.11		−3.24	−3.24
6.00	0.36	70.52	29.48	0.17	86.24	13.76
		−5.11	−5.11		−4.47	−4.47
12.00	0.37	69.56	30.44	0.19	87.39	12.61
		−5.62	−5.62		−5.00	−5.00
18.00	0.37	70.06	29.94	0.19	87.30	12.70
		−6.10	−6.10		−5.07	−5.07
24.00	0.37	70.01	29.99	0.20	87.50	12.50
		−6.16	−6.16		−5.09	−5.09