

An Examination of Stock Price Reactions to Discount Rate Changes Under Alternative Monetary Policy Regimes

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Abstract

This study examines the reaction of stock prices to discount rate change announcements in the period from 1962 through 1990. The market reaction is differentiated according to Federal Reserve monetary policy and motive behind the discount rate change. The results of the study support previous findings that indicate that discount rate increases are considered bad news, while rate decreases are good news. Contrary to previous results, however, a consistent market reaction across alternative monetary policy regimes and rate change motives is observed. The findings suggest that discount rate changes are more informative than implied by previous studies.

Introduction

Financial markets long have considered Federal Reserve monetary policy to have an influence on security prices. Hence, Fed announcements attract considerable attention from market participants. The Fed discount rate often is interpreted as a signal of the future course of monetary policy. A market reaction should accompany discount rate change announcements if the rate changes are interpreted by market participants as providing information relevant to future economic conditions.

Numerous studies have examined the reaction of financial markets to Fed discount rate changes, and the findings have been inconsistent. Most studies have identified an announcement effect associated with discount rate changes.¹ The

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¹Although evidence suggests that discount rate changes produce announcement effects, this finding is contrary to the claims of several researchers. Lombra and Torto (1977), Froyen (1975), and Santomero (1983) argue that rate changes are endogenous and, hence, are unlikely to produce reactions in an efficient market. The authors claim that rate changes represent lagged adjustments to changes in market conditions and, therefore, provide no news to the market.

impact that Fed monetary policy and motive have on the market's reaction and the degree to which the market anticipates rate changes, however, are debatable issues.

The purpose of this study is to reexamine the stock market reaction to changes in the discount rate. The study differentiates the sample of rate changes by the Fed's motive for the change and its monetary policy at the time of the change. In addition, this research examines pre- and postannouncement stock returns to determine the degree of market anticipation and the promptness of the market's reaction to the change.

The results of the analysis suggest that discount rate changes provide more information to the market than previous studies indicate. The current findings document announcement effects across different Fed monetary policy regimes and motives. Evidence also is found that supports the claim that investors at least partially anticipate changes in the discount rate.

Literature Review

The first rigorous analysis of the impact of discount rate changes on security markets was performed by Waud (1970). Waud finds that the stock market reacts positively to rate decreases and negatively to rate increases. Baker and Meyer (1980) report a similar reaction in the Treasury bill market.

These findings are consistent with the view that discount rate decreases serve as good news for the stock market because they signal a less restrictive future Fed monetary policy. The less restrictive policy results in an increase in the money supply which tends to promote economic activity. Conversely, rate increases generally are considered bad news, as they signal a more restrictive monetary policy which tends to constrain economic activity.

Recent studies conclude that the market reaction to discount rate changes differs depending upon both the Fed's current monetary policy and its motive for the rate change. Gilbert (1985) identifies three distinct periods of alternative Fed monetary policy since 1970. The major change in policy occurred October 8, 1979 when the Fed changed its operating procedure from targeting interest rates to targeting monetary aggregates. A significant change in policy also occurred in October 1982 when the Fed shifted from targeting nonborrowed reserves to targeting borrowed reserves.²

²For a description of the operating procedures adopted by the Fed on October 8, 1979, see Cacy (1980) and Axilrod and Lindsey (1981). Wallich (1984) and Gilbert (1985) present discussions of the October 1982 change in procedures. In addition, Froyen (1975) notes that the Fed changed the administration of the discount window in 1968 with the publication of its *Reappraisal of the Federal Reserve Discount Mechanism*. The board failed to adopt the major changes recommended in the proposal, however.

Several studies examine the period before and after October 8, 1979 (pre- and post-1979) to determine the effect of monetary policy on the market's reaction to discount rate changes. Roley and Troll (1984) contend no meaningful announcement effects are possible in the pre-1979 period because any effects on market rates would be offset by changes in the level of nonborrowed reserves. Conversely, in the post-1979 period, discount rate changes are expected to affect interest rates directly via changes in the expected short-run money path. The authors provide evidence that market yields respond to discount rate changes in the post-1979 period, but not in the pre-1979 period. Studies by Pearce and Roley (1985) and Smirlock and Yawitz (1985) support these findings.

In contrast to these results, Cook and Hahn (1988) find evidence of a significant announcement effect in T-bill yields in both the pre- and post-1979 periods. Cook and Hahn attribute the difference in findings to misspecification of the announcement period in earlier studies.

Hafer (1986) examines stock market reactions to discount rate changes in three alternative periods: prior to October 1979 (pre- 1979), October 1979-October 1982 (1979-1982), and after October 1982 (post-1982). He finds stock returns had a direct, but insignificant, relationship with discount rate changes in both the pre-1979 and post-1982 period. He identifies the expected, significant inverse relationship, however, in the 1979-1982 period. Hafer concludes that prior to October 1979 and after October 1982, changes in the Fed's policy objectives were conveyed directly by movements in the federal funds rate; therefore, discount rate changes did not contain information in these periods.

Hardouvelis (1987) studies the periods before and after October 1982 (pre- and post-1982) to determine the reaction of financial markets to movements in eight macroeconomic variables, including the discount rate. He finds, consistent with Hafer, that discount rate changes produced significant announcement effects in the stock market only in the pre-1982 period. Furthermore, Hardouvelis also reports a positive, but insignificant, relationship between rate changes and stock returns in the post-1982 period.

Several recent studies also test whether announcement effects differ depending upon the Fed's motive for the change. Smirlock and Yawitz (1985) distinguish technical and nontechnical discount rate changes. They find that when the Fed adjusts rates to reflect changes in the market rate (technical adjustment), there is no significant announcement effect. When discount rates are adjusted to reflect changes in monetary policy (nontechnical change), however, significant announcement effects are evident.³ Cook and Hahn (1988) also report evidence

³Smirlock and Yawitz (1985) note that the apparent anomalous finding that discount rate changes are endogenously determined yet produce announcement effects is due to previous model misspecification. After controlling for the effects of Fed motive and monetary policy regime, they find support for semi-strong form market efficiency. (See Fama (1970) for a discussion of market efficiency.)

that the T-bill market reacts significantly to announcements with nontechnical aspects, while there is no significant reaction to technical announcements.

This paper evaluates whether discount rate changes in the period from 1962 through 1990 produced an announcement effect in the stock market. The analysis extends previous research in several important respects. First, a larger sample of observations is analyzed. Over the 1962-1990 time period there are 75 discount rate changes, whereas previous studies utilize approximately 30 changes.⁴

Second, this research employs the most comprehensive partitioning of the sample that has been performed to date. The sample of rate changes is separated into three monetary policy regimes and two different Fed motives.

Third, the announcement period is defined in a manner consistent with Cook and Hahn's analysis of the T-bill market. Smirlock and Yawitz (1985) define their announcement period as "the day the discount rate change is reported in the *Wall Street Journal*" (p. 1144). For those announcements made before the stock market has closed, the appropriate day to measure the announcement effect is the day before the discount rate change is reported in the *Wall Street Journal*. Hafer examines the announcement effect on the day the discount rate change becomes effective. The effective date also occasionally varies from the appropriate announcement period.

Fourth, this research performs a more thorough examination of the returns around discount rate changes. While previous studies focus on the announcement effect of a rate change, the current work analyzes the market's response to the announcement, as well as stock returns before and after the announcement.

Fifth, returns are examined for a general stock index and a finance index. Financial stocks are considered to be interest rate sensitive; hence, a finance index may provide a better means of determining the information content of a discount rate change. Finally, the analysis deviates from previous work by considering rate increases and decreases separately.

Sample and Methodology

The discount rate change studied is the initial change announced by any of the district banks of the Federal Reserve System.⁵ During the 29 year period

⁴Smirlock and Yawitz examine an eight year period (1975-1982) with 36 rate changes. Pearce and Roley's analysis covers six years (1977-1982) with 27 changes, and Hafer studies the 1977-1984 period with 32 changes. In addition, each study partitions the sample into different monetary policy regimes. The resulting small sample sizes diminish the chances of finding statistical significance even if economic significance exists.

⁵As indicated by Waud (1970), frequently the New York Fed Bank will either lead or lag changes made at the other district reserve banks by a short period of time. Baker and Meyer (1980) find that the first rate change is associated more closely with changes in T-bill yields, whether it is announced by the New York Fed or by one of the other district banks.

from 1962 to 1990 there were 75 discount rate changes: 36 decreases and 39 increases. Returns are analyzed for the equally weighted CRSP index and an equally weighted index of financial firms. Both indices are calculated from returns including dividends.

The finance index includes all firms with an SIC code between 6000 and 6400 that report return data during a rate change period.⁶ The index is rebalanced for each of the 75 rate change periods to include financial firms that report return data on the CRSP tape during a 12 day event window.

The 29 year period was split into three segments representing time periods of differing Federal Reserve monetary policy. The first period includes discount rate changes occurring in the period from January 1962 to October 6, 1979. Period 2 consists of changes from October 8, 1979 to October 5, 1982, and Period 3 includes changes from October 6, 1982 through 1990.⁷

The sample is segmented further by separating the discount rate changes based on the Fed's motive for the change. This paper employs the classification technique proposed by Smirlock and Yawitz (1985), and followed by Cook and Hahn (1988), to separate the announcements into technical and nontechnical changes. A technical change occurs when the Fed reports that the sole purpose of the change is to bring the discount rate into closer alignment with market rates. In a nontechnical announcement, the Fed reports that the rate change was made due to concern over conditions in the money or credit markets or problems with some macroeconomic variable, such as inflation.⁸

Results

Table 1 presents the effective date of an announcement, the motive for a rate change, the size and direction of the change, and whether the New York Fed was in the group of district banks requesting the change. The size of rate changes during this period ranged from .25 percent to 1 percent. The timing of rate changes was irregular. There were no changes in the rate in 1962, 1966, 1972, and 1983, while more than five changes occurred in 1971, 1973, 1978, 1980 and 1982.

⁶Firms with SIC codes between 6000 and 6400 include commercial banks, savings institutions, finance companies, leasing companies, security brokers and dealers, financial service firms, and insurance companies.

⁷The exact timing of the first change in Fed operating procedures is well defined; however, the second is not. This research follows Hardouvelis (1987) in setting October 6, 1982 as the date the second change in Fed operating procedures occurred.

⁸In most cases, the *Wall Street Journal* announcement is employed in classifying the discount rate changes. In those isolated cases where it does not provide the Fed's motive for the change, the *New York Times* announcement is used.

Returns Around Discount Rate Changes

Table 2 reports return data for the entire sample of discount rate changes. Mean adjusted returns are presented for rate decreases (Panel A) and rate increases (Panel B) for both the market index and the finance index. The mean adjusted returns are calculated according to equation (1).

$$(1) \text{MAR}_i = (1/N) \times \sum_{t=1}^N (R_{it} - \text{MR}) \quad (i = -5 \dots +6, t = 1 \dots N)$$

where:

- MAR_i = Mean adjusted return for event day i ;
- R_{it} = Return for event day i in rate change period t ;
- MR = Mean daily return over all days from the first discount rate change studied to the last, excluding days in the 12 day event window;
- N = Number of discount rate decreases (increases): 36 (39).

The cumulative mean adjusted returns (CMARs) are equal to:

$$(2) \text{CMAR}_i = \sum_{n=-5}^i \text{MAR}_n.$$

The significance of the mean adjusted returns and cumulative mean adjusted returns is determined by dividing each value by its standard error.

The mean return (MR) employed in the adjustment procedure is derived as an average from the entire study period (1963-1990) to avoid biasing the results. If discount rate changes either lead or lag movements in the stock market, adjusting by an average derived from before or after the event will bias the adjusted returns. Furthermore, the average excludes the event window returns to eliminate any effect from the rate changes.

The announcement period is the first day the stock market can trade on the rate change news. While discount rate changes generally are announced while the stock market is closed, eight of the 75 rate changes were made during stock market trading hours (seven of the eight were rate increases). For these eight observations, a two day event window, day 0 and day 1, is appropriate because the news may be incorporated in a stock's price on either (or both) of the adjoining days.⁹

⁹Discount rate changes represent major news events; therefore, determining when the market receives the information is not difficult. Many event studies use a two day (and, in some

The announcement period returns are consistent with previous findings. The market reacts positively to rate decreases and negatively to rate increases, thus supporting the view that stock market investors interpret rate increases as bad news and rate decreases as good news.¹⁰ The size of the announcement period reaction is similar across rate increases and decreases. Furthermore, as expected, the findings suggest that financial firms react more strongly to discount rate changes than does the average firm.

The preannouncement period includes the five trading days preceding the announcement period (days -5 through -1). The preannouncement period exhibits a noticeable movement in stock prices consistent with the announcement period reaction. These findings are consistent with three alternative explanations. First, discount rate changes often can be predicted by those who monitor money market conditions and Federal Reserve policy. Second, the discount rate change may lag economic changes that already have occurred. Third, information leaks may exist from the policy-making process itself. This preannouncement movement is consistent with Waud's results, but counter to Baker and Meyer's findings.¹¹ Finally, the preannouncement market movement is similar in size across rate increases and decreases. In addition, the finance index displays a more pronounced movement than the market average prior to the announced change.

The postannouncement period includes the trading days following the announcement. There are a couple of significant excess returns in the post-announcement period, suggesting a delayed market reaction. The day 1 significant negative excess return accompanying a rate increase can be explained

cases, a three day) announcement period due to the difficulty in establishing when the market became aware of the information. In this analysis, a two day announcement period is employed only for announcements made during trading hours. The reason for this treatment is that on the day of the announcement some infrequently traded stocks may trade before the announcement but not after the announcement. For those stocks, the return on the day after the announcement would reflect the news, while the other stocks would reflect the news on the day of the announcement. A one day announcement period is appropriate for announcements made when the stock market is closed because any trade recorded on the following day would incorporate the news.

¹⁰See Waud (1970) and Smirlock and Yawitz (1985) for a more thorough discussion of the potential information conveyed by discount rate changes. It should be noted that discount rate increases may not always be interpreted as bad news. For example, the rate was increased from 8.5 percent to 9.5 percent on November 1, 1978. The announcement was followed by a 3.73 percent increase in the stock market. Accounts in the *Wall Street Journal* on the following day attribute the rally to the announcement, suggesting that the action was good news because it signalled the Fed meant business in defending the dollar and beating inflation. In addition, a rate change smaller than expected may produce a market reaction counter to the usual inverse relationship. Accounts in the *New York Times* following the rate increase on March 15, 1968 and the rate decrease on August 27, 1982 indicate that investors were expecting bigger rate changes than what occurred. The unexpectedly small rate increase (decrease) produced a positive (negative) reaction because the market anticipated a larger change.

¹¹Pearce and Roley (1985) suggest that Waud (1970) may have identified a preannouncement market movement because he employed New York Fed announcements, and in several cases these lagged announcements by other district Fed banks. This research employs the first announcement, so the current results are not confounded by such problems.

as part of the announcement effect. The seven rate increases that were announced during trading hours may display announcement period reactions for two days, day 0 and day 1. (See footnote 9.) The significant negative return on day 4 does not appear to be part of a pattern and may be due to chance. Overall, it appears that the stock market reacts quickly to discount rate change announcements.

The cumulative mean adjusted returns (CMARs) are reported in Table 2 and graphed in Figures 1 and 2. For both rate increases and decreases, the CMARs become significant a few days before the rate change and stay significant throughout the period. Figures 1 and 2 clearly demonstrate the stock market's preannouncement movement and the large reaction at the time of the announcement. Furthermore, there appears to be some evidence of a small drift in the CMARs following the rate change announcement. A relatively narrow event window is examined due to the Fed's tendency since 1968 to adjust the discount rate in groups separated by little time. Examining a wider event window would create problems in separating the effects from overlapping events. Several rate change announcements fall within two weeks of one another; therefore, a 12 day event window seems appropriate to avoid confounding the results.¹²

In Tables 3 through 6 the impact of Fed motive and policy on stock returns is examined. The tables separate the mean adjusted returns into preannouncement, announcement, and postannouncement categories. The preannouncement period is represented by the five trading days preceding the announcement. In the eight cases where the discount rate change was announced during trading hours, the announcement period includes day 0 and day 1 and the postannouncement period includes days 2 through 6. For the other 67 rate changes, the announcement period is day 0 and the postannouncement period is day 1 through 6.

The returns reported in Tables 3 and 4 are derived as the arithmetic average of the mean adjusted daily returns calculated according to equation (1). The t-statistics are calculated as the mean adjusted daily return over the event period divided by the standard error of the adjusted returns across the rate changes.

Fed Motive and Returns Around Rate Changes

Table 3 examines the influence that the Fed's motive for a change has on stock returns around the announced change. The preannouncement returns associated with technical adjustments suggest these announcements, on average, are anticipated more widely than nontechnical changes. This observation is consistent with expectations, as technical adjustments, by definition, are made in response to changes that already have occurred in market rates. Therefore, market

¹²The more recent discount rate change event studies also have relied on a narrow event study window. For example, Baker and Meyer (1980) utilize an eleven day window, Pearce and Roley (1985) a five day window, and Smirlock and Yawitz (1985) a six day window.

movements may precede technical rate changes because the announcements lag other economic events, which also makes technical changes easier to predict.

Nontechnical rate changes appear to be much more of a surprise to the stock market, as there is little movement in stock prices prior to the change. In addition, for both increases and decreases the announcement period return is considerably larger for nontechnical changes than for technical changes. Again, this is consistent with expectations, as nontechnical rate changes represent an adjustment in Fed policy, whereas technical changes are designed to align the discount rate with market rates. While technical changes impact the market less than nontechnical adjustments, the announcement returns suggest that technical changes also provide information to the market.¹³

Finally, the postannouncement returns confirm that the market reacts quickly to rate change announcements, thus supporting the efficient market hypothesis. In addition, there is little difference in postannouncement market performance across Fed motives. It is interesting to note that the mean adjusted returns following rate increases are negative, however, while excess returns following rate decreases are positive.¹⁴

Overall, the findings in Table 3 are consistent with the following conclusions:

- Technical rate changes are anticipated more widely than nontechnical changes;
- The market reacts more strongly to the announcement of a nontechnical rate change;
- Although they are less newsworthy, technical rate changes also provide information to the market.

The results in Table 3 also were calculated with the November 1, 1978 nontechnical rate increase omitted. Roley and Troll (1984) and Wojnilower (1980) identify this rate change as an outlier; however, this observation is included in most analyses. Deleting this one observation has little impact on the pre- and postannouncement results, but the announcement period findings are affected substantially by its omission. As indicated in the footnote to Table 3, the

¹³In some cases, market participants do not believe the Fed's given motive for a change. For example, the discount rate was lowered from 12 percent to 11 percent on July 16, 1980 in what the Fed labelled a technical adjustment. An article in the *Wall Street Journal* the following day noted that analysts considered the move to come too close on the heels of the previous change to be simply technical.

¹⁴The analysis also was performed by partitioning the sample into three motives: technical, nontechnical, and combined. Combined changes are those that contain both technical and nontechnical aspects. Because the combined changes produce returns almost identical to the nontechnical group, they are included in the nontechnical partition and are not reported as a separate category. The consideration of two, rather than three, partitions also improves the exposition of the results and increases the number of observations in the subsamples.

t-statistics for the announcement period nearly double when this one observation is removed.

Given the impact of this one observation, it is not surprising that previous studies, such as Smirlock and Yawitz (1985), Pearce and Roley (1985), and Hafer (1986), find an insignificant announcement effect in the period prior to October 1979. These studies include this extreme observation and rely on rather small pre-October 1979 samples.

Fed Monetary Policy and Returns Around Rate Changes

Table 4 reports mean adjusted daily returns for the three monetary policy regimes identified by previous researchers: pre-October 1979 (pre-1979), October 1979-October 1982 (1979-1982), and post-October 1982 (post-1982). There is no obvious pattern with respect to the preannouncement returns. The pre-announcement return is the most pronounced for rate decreases in the pre-1979 period, but the preannouncement return is most pronounced for rate increases in the post-1982 period. The difference in preannouncement reactions is likely to be influenced strongly by the technical/nontechnical split implied by the Table 3 results.

The announcement period returns are surprising in their similarity across regimes. The mean announcement returns associated with rate decreases (Panel A) are virtually the same across regimes. The reaction to rate increases (Panel B) is also similar across regimes, although the reaction is stronger in the 1979-1982 period. When the November 1, 1978 outlier is omitted from the pre-1979 period, the pre-1979 results in Panel B are similar to the results in the later two periods.

Finally, the postannouncement results display little pattern with the exception that the pre-1979 and 1979-1982 periods exhibit postannouncement market moves consistent with the announcement period reaction. It appears that the slight movement in postannouncement adjusted returns (identified in Tables 2 and 3) occurred in these earlier periods.¹⁵

¹⁵The 1962-1967 period was analyzed separately to determine whether there was a difference between the pre- and post-1968 market reaction to rate changes as suggested by Froyen (1975) and Lombra and Torto (1977). The results for the 1962-1967 period are not reported in the analysis because they do not differ substantially from the results for the 1968-1979 period. The reaction to discount rate increases in the 1962-1967 period was stronger, while the reaction to rate decreases was weaker than in the 1968-1979 period. In addition, there are only five rate changes in the 1962-1967 period, and only one of the five is a rate decrease. Drawing conclusions from such a small sample is difficult.

Reactions to Rate Increases Versus Rate Decreases

The returns in Tables 2 through 4 are reported for discount rate increases and decreases separately to determine whether the excess returns differ from zero. Table 5 adopts the procedure utilized in past studies of testing for a difference in the reaction to rate increases versus decreases.

Both parametric and nonparametric statistics are utilized in testing for evidence of a differential stock reaction to rate increases versus rate decreases within alternative subsamples. Mean adjusted announcement period returns are examined to identify differences in the reactions to rate changes of opposite signs. The parametric test utilizes the dummy variable regression technique illustrated in equation (3).¹⁶

$$(3) \text{APMAR}_i = \alpha + \beta \text{Dir}_i + \varepsilon_i \quad (i = 1 \dots N)$$

where:

- APMAR_i = Announcement period mean adjusted return for rate change *i*;
- Dir_i = Direction dummy; equal to 1 for discount rate increases and 0 for rate decreases;
- N_i = Number of discount rate changes in subsample.

Ordinary least squares (OLS) is employed in estimating equation (3).

The Wilcoxon rank sum test is utilized as a nonparametric test for differences in the announcement period reaction to rate changes in different directions. The Wilcoxon test helps to determine the consistency of the market's reaction. Parametric test results may be influenced by the existence of outliers. For example, the mean reaction across groups may differ significantly due to a few extreme observations, while a pattern does not exist. The Wilcoxon test avoids the bias created by data outliers.

Table 5 reports the results of the difference-in-means test and the Wilcoxon test. To conserve space, only the coefficient on the direction dummy from equation (3) and its *t*-statistic are reported for the parametric test. The parametric results indicate a significant difference in the market's reaction to rate increases and rate decreases.¹⁷ Significant differences in stock reactions are identified

¹⁶This methodology is similar to the event-time methodology employed by previous studies of monetary policy announcements. (See Roley and Troll, 1984; Ulrich and Wachtel, 1981; Roley, 1983; Pearce and Roley, 1983; and Smirlock and Yawitz, 1985.)

¹⁷Equation (3) also was estimated with the size of the discount rate change and the time between rate changes as explanatory variables. Neither of the variables increased the explanatory power of the model. Therefore, it appears that the important characteristic of a discount rate change is its direction. The size and timing of the change do not add information once the direction is known.

across Fed monetary policy regimes and Fed motives. In addition, the financial firms react more strongly to discount rate changes than the market index.

The Wilcoxon statistics confirm the parametric results, as the test statistic is significant in the full sample and in each of the subsamples. Furthermore, when the November 1, 1978 outlier is omitted, the parametric and nonparametric statistics become more significant.

Reaction to Rate Changes Within Alternative Regimes

Next the procedure outlined by Smirlock and Yawitz (1985) is used to examine the impact of the Fed's motive within the alternative monetary policy regimes. This test differs from those reported in the previous tables, as the effects of monetary policy and motive are considered simultaneously. The methodology is detailed in equation (4):

$$(4) \text{APMAR}_i = \alpha + \beta_1 (\text{Tech}_i \times \text{Dir}_i) + \beta_2 (\text{NTech}_i \times \text{Dir}_i) + \epsilon_i$$

where:

APMAR_i = Announcement period mean adjusted return for rate change i ;

Tech_i = 1 if rate change i is technical and 0 if rate change i is nontechnical;

NTech_i = 1 if rate change i is nontechnical and 0 if rate change i is technical;

Dir_i = 1 if rate change i is an increase and -1 if rate change i is a decrease.

Table 6 reports the results of estimating equation (4) with OLS. To conserve space, only the coefficients on the independent variables and their t -statistics are reported.

Consistent with the results reported in the previous tables, the overall sample reports that both technical and nontechnical rate changes produce significantly different market reactions for rate decreases and increases, thus confirming the existence of news in both technical and nontechnical discount rate changes. Furthermore, the nontechnical variable is significant in each of the subsamples. The technical variable is significant only in the pre-1979 period and only for the finance index. It is not surprising to observe insignificant technical coefficients in the later periods because the sample sizes are small; there were only six technical changes in the 1979-1982 period and only two in the post-1982 period. Although the coefficients in the later two subperiods are insignificant, the coefficients are similar in size to those of the earlier period.

Overview of the Results

Tables 2 through 6 present announcement period return data that provides strong support for the claim that discount rate change announcements convey information to the market. The findings suggest that discount rate changes provide information to the market, irrespective of the monetary policy the Fed is following and their motive for the change. The strength and consistency of the market reaction strongly supports the claim that nontechnical rate changes convey more information to the market than technical rate changes. Contrary to previous findings, however, the results suggest that technical rate changes also produce a significant stock market response.

The current results also differ from past findings, as the stock market is observed to react similarly across monetary policy regimes. Past studies find the strongest reaction (and, in most studies, the only reaction) to rate changes in the 1979-1982 period. Roley and Troll (1984), Smirlock and Yawitz (1985), and Pearce and Roley (1985) find an insignificant market reaction to rate changes in the pre-1979 period, while Hafer (1986) and Hardouvelis (1987) report insignificant reactions in the post-1982 period.¹⁸

The current findings indicate that the 1979-1982 period experienced the strongest reaction to rate increases; however, the reaction to rate decreases was approximately the same in this period as the other periods. The finance index and market index experienced almost identical reactions to rate decreases across all three regimes. Furthermore, the nonparametric statistics in Table 5 confirm the similarity of announcement period returns across the three monetary policy regimes.

The pre- and postannouncement results provide evidence supporting several claims:

- The market partially anticipates discount rate changes;
- Technical rate changes are anticipated more widely than nontechnical changes;
- The market reacts quickly to rate change announcements. The slight evidence of postannouncement drift occurred in the periods before October 1982.

The identification of differential reactions across Fed motive suggests that the label the Fed attaches to discount rate changes influences the strength of the signal. Furthermore, as expected, rate changes initiated to impact economic conditions affect the stock market more than do rate changes made to align the

¹⁸Hafer's analysis included only five discount rate changes in the post-1982 period, while Hardouvelis studies four post-1982 changes. The small post-1982 samples may explain the reported lack of significance in these studies.

discount rate with market rates. However, a market reaction occurs, on average, even when the Fed labels the announcement as not newsworthy, as evidenced by the significant reaction to technical rate changes.

The difference between the current results and previous findings can be attributed to the following factors:

- The current sample is considerably larger than the samples studied previously;
- This research controls for data outliers in the statistical analysis. The impact of the November 1, 1978 discount rate change is considered separately due to its identification as an outlier in previous studies. A nonparametric test is also employed in analyzing the data;
- The announcement period is chosen carefully to identify the first opportunity the stock market has to trade on the rate change announcement;
- A financial index is studied to determine whether rate changes contain information. Financial firms are more sensitive to factors affecting interest rates. Therefore, a finance index is a better gauge of the news contained in a rate change announcement;
- This research examines discount rate increases and decreases separately.

Summary and Conclusions

The evidence presented in this analysis is consistent with the hypothesis that Federal Reserve discount rate change announcements contain information relevant for price formation. Discount rate decreases are met with significant positive stock market reactions, while increases are met with significant negative stock market reactions. This finding confirms the proposition that discount rate decreases are interpreted as good news, while increases are interpreted as bad news.

Because previous researchers' findings have been inconsistent, the result that significant reactions are identified irrespective of the Fed's motive for a discount rate change or the monetary policy they are following is of significant interest. An implication of this finding is that if researchers can predict technical rate changes as suggested, a profit opportunity may exist.

The evidence indicates, however, that the Fed's motive for a rate change does affect the strength of the signal. Changes in the discount rate that are initiated to correct a problem identified by the Fed (nontechnical changes) produce larger responses than do changes whose only purpose is to align the discount rate with market rates (technical changes).

Contrary to previous studies, evidence also is found that rate changes elicit similar responses in the stock market across different monetary policy regimes.

The 1979-1982 regime exhibits the strongest reaction to rate changes; however, the differential reaction is far less pronounced than previously claimed.

The preannouncement findings document a stock market response prior to discount rate changes, suggesting the market anticipates rate changes. As expected, the preannouncement movement is much stronger before technical rate changes. The postannouncement returns are generally consistent with the efficient market hypothesis.

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Table 1
Discount Rate Change Announcements

Effective Date ^a	Fed. Bank ^b	Discount Rate	Rate Change	Change Motive ^c
07/17/63	NY	3.5	0.5	N
11/24/64	NY	4	0.5	N
12/06/65	NY	4.5	0.5	N
04/07/67	NY	4	-0.5	N
11/20/67	NY	4.5	0.5	N
03/15/68	O	5	0.5	N
04/19/68	NY	5.5	0.5	N
08/16/68	O	5.25	-0.25	T
12/18/68	NY	5.5	0.25	N
04/04/69	NY	6	0.5	N
11/11/70	O	5.75	-0.25	T
12/01/70	O	5.5	-0.25	T
01/08/71	NY	5.25	-0.25	T
01/19/71	O	5	-0.25	T
02/13/71	O	4.75	-0.25	T
07/16/71	NY	5	0.25	N
11/11/71	O	4.75	-0.25	T
12/13/71	O	4.5	-0.25	N
01/15/73	NY	5	0.5	T
02/26/73	NY	5.5	0.5	N
04/23/73	O	5.75	0.25	T
05/11/73	NY	6	0.25	T
06/11/73	NY	6.5	0.5	N
07/02/73	NY	7	0.5	N
08/14/73	NY	7.5	0.5	T
04/25/74	NY	8	0.5	N
12/09/74	NY	7.75	-0.25	N
01/06/75	NY	7.25	-0.5	N
02/05/75	NY	6.75	-0.5	T
03/10/75	NY	6.25	-0.5	N
05/16/75	NY	6	-0.25	T
01/19/76	NY	5.5	-0.5	T
11/22/76	NY	5.25	-0.25	T
08/30/77	O	5.75	0.5	T
10/26/77	NY	6	0.25	T
01/09/78	NY	6.5	0.5	N
05/11/78	NY	7	0.5	T
07/03/78	NY	7.25	0.25	T
08/21/78	NY	7.75	0.5	N
09/22/78	NY	8	0.25	N
10/16/78	NY	8.5	0.5	N
11/01/78	NY	9.5	1	N
07/20/79	NY	10	0.5	N
08/17/79	NY	10.5	0.5	N
09/19/79	NY	11	0.5	T
10/08/79	NY	12	1	N
02/15/80	NY	13	1	N
05/29/80	O	12	-1	T
06/13/80	NY	11	-1	T
07/28/80	NY	10	-1	T

Table 1 (continued)
Discount Rate Change Announcements

Effective Date ^a	Fed. Bank ^b	Discount Rate	Rate Change	Change Motive ^c
09/26/80	NY	11	1	N
11/17/80	NY	12	1	N
12/05/80	NY	13	1	N
05/05/81	NY	14	1	N
11/02/81	NY	13	-1	T
12/04/81	NY	12	-1	T
07/20/82	NY	11.5	-0.5	N
08/02/82	NY	11	-0.5	N
08/16/82	NY	10.5	-0.5	N
08/27/82	NY	10	-0.5	T
10/12/82	NY	9.5	-0.5	N
11/22/82	NY	9	-0.5	N
12/14/82	O	8.5	-0.5	N
04/09/84	NY	9	0.5	T
11/21/84	NY	8.5	-0.5	N
12/24/84	NY	8	-0.5	N
05/20/85	NY	7.5	-0.5	N
03/07/86	NY	7	-0.5	N
04/21/86	NY	6.5	-0.5	T
07/11/86	NY	6	-0.5	N
08/21/86	NY	5.5	-0.5	N
09/04/87	NY	6	0.5	N
08/09/88	NY	6.5	0.5	N
02/24/89	NY	7	0.5	N
12/18/90	NY	6.5	-0.5	N

^aThe date the change in the rate became effective, as published in the *Federal Reserve Bulletin*

^bAn NY indicates that the New York District Federal Reserve Bank was a member of the group of district banks that initiated the change. An O indicates that the group of district banks initiating the change did not include the New York Fed

^cN = nontechnical; T = technical

Table 2
Mean Adjusted Returns Around Discount Rate Changes^a

Panel A: Rate Decreases

Event Day	Market Index		Cumulative Adjusted Return	Finance Index		Cumulative Adjusted Return
	Mean Adjusted Return	T-Statistic ^b		Mean Adjusted Return	T-Statistic ^c	
-5	0.1735	1.17	0.1735	0.2756	1.27	0.2756
-4	-0.0732	-0.51	0.1003	-0.1011	-0.46	0.1745
-3	0.2916	1.68***	0.3919	0.4225	1.76***	0.5970
-2	0.4452	2.56**	0.8370***	0.5570	2.55**	1.1539***
-1	0.2954	2.05**	1.1325**	0.3300	2.09**	1.4840**
0	0.3632	2.42**	1.4956**	0.5472	3.13*	2.0312**
1	0.0329	0.23	1.5286**	0.0664	0.35	2.0976**
2	0.1088	0.80	1.6374**	0.2181	1.36	2.3157**
3	0.0449	0.45	1.6822**	-0.0497	-0.37	2.2659**
4	0.2307	1.50	1.9130**	0.1792	0.87	2.4451**
5	0.2713	1.80***	2.1843**	0.2764	1.27	2.7215**
6	-0.1060	-1.02	2.0783**	-0.0661	-0.44	2.6554**

Panel B: Rate Increases

Event Day	Market Index		Cumulative Adjusted Return	Finance Index		Cumulative Adjusted Return
	Mean Adjusted Return	T-Statistic ^b		Mean Adjusted Return	T-Statistic ^c	
-5	-0.0679	-0.67	-0.0679	-0.1319	-1.31	-0.1319
-4	-0.1205	-0.95	-0.1884	-0.1142	-0.99	-0.2460
-3	-0.2066	-1.64	-0.3950	-0.2065	-1.70***	-0.4525***
-2	-0.1887	-1.50	-0.5836	-0.1665	-1.26	-0.6189***
-1	-0.3151	-2.36**	-0.8987**	-0.3954	-2.59**	-1.0144**
0	-0.4402	-2.36**	-1.3389*	-0.5226	-3.04*	-1.5370*
1	-0.4612	-2.28**	-1.8001*	-0.5274	-2.83*	-2.0647*
2	-0.0369	-0.26	-1.8370*	-0.0939	-0.63	-2.1586*
3	-0.0287	-0.29	-1.8657*	-0.1311	-1.57	-2.2897*
4	-0.3002	-1.98**	-2.1659*	-0.3749	-2.68*	-2.6646*
5	-0.1151	-0.88	-2.2810*	-0.0483	-0.41	-2.7129*
6	-0.0001	-0.05	-2.2873*	-0.0701	-0.49	-2.7829*

* Significant at the 1 percent level in a two-tailed test

** Significant at the 5 percent level in a two-tailed test

*** Significant at the 10 percent level in a two-tailed test

^aThere were 36 discount rate decreases and 39 increases during the period 1962-1990. The adjusted and cumulative adjusted returns are reported as percentages

^bThe market index is represented by the equally weighted CRSP index including dividends

^cThe finance index is an equally weighted index of firms in the SIC codes 6000-6400

Table 3
The Impact of Fed Motive on Returns Around Rate Changes

Panel A: Rate Decreases

Event Window	Mean Adjusted Daily Return (%) Market Index		Mean Adjusted Daily Return (%) Finance Index	
	Technical (N=18)	Nontechnical (N=18)	Technical (N=18)	Nontechnical (N=18)
Preannouncement (Days -5 through -1)	0.4397 (4.14)*	0.0133 (0.07)	0.5530 (3.65)*	0.0406 (0.19)
Announcement (Day 0 and 1)	0.2954 (1.68)	0.4391 (1.78)***	0.4986 (2.43)**	0.5881 (2.04)***
Postannouncement (Days +2 through +6)	0.0405 (0.41)	0.1474 (1.03)	-0.0063 (-0.05)	0.2119 (1.02)

Panel B: Rate Increases

Event Window	Mean Adjusted Daily Return (%) Market Index		Mean Adjusted Daily Return (%) Finance Index	
	Technical (N=10)	Nontechnical (N=29)	Technical (N=10)	Nontechnical (N=29)
Preannouncement (Days -5 through -1)	-0.2442 (-2.40)**	-0.1575 (-1.47)	-0.3028 (-2.76)*	-0.1684 (-1.69)
Announcement (Day 0 and 1)	-0.2807 (-1.31)	-0.5366 ^a (-2.23)**	-0.3718 (-1.67)	-0.6226 ^a (-2.86)*
Postannouncement (Days +2 through +6)	-0.2843 (-1.44)	-0.0885 (-0.83)	-0.2717 (-1.47)	-0.1623 (-1.67)

t-statistics in parentheses

* Significant at the 1 percent level in a two-tailed test

** Significant at the 5 percent level in a two-tailed test

*** Significant at the 10 percent level in a two-tailed test

^aThe announcement period results with the nontechnical increase on November 1, 1978 deleted are presented below. The preannouncement and postannouncement results are not materially impacted by omission of the November 1978 outlier

Event Window	Mean Adjusted Daily Return (%) Nontechnical (N=28)	
	Market Index	Finance Index
Announcement (Day 0 and 1)	-0.7880 (-5.39)*	-0.7389 (-5.48)*

Table 4
The Impact of Fed Policy Regime on Returns Around Rate Changes

Panel A: Rate Decreases

Event Window	Mean Adjusted Daily Return (%) Market Index			Mean Adjusted Daily Return (%) Finance Index		
	1962-1979 (N=16)	1979-1982 (N=9)	1982-1990 (N=11)	1962-1979 (N=16)	1979-1982 (N=9)	1982-1990 (N=11)
Preannouncement (Days -5 through -1)	0.3933 (2.12)**	0.1817 (0.83)	0.0206 (0.14)	0.4934 (2.41)**	0.2012 (0.61)	0.0890 (0.43)
Announcement (Day 0 and 1)	0.3838 (1.48)	0.4054 (1.70)	0.3120 (1.15)	0.5911 (2.11)***	0.4858 (1.54)	0.5210 (1.55)
Postannouncement (Days +2 through +6)	0.1890 (1.41)	0.0615 (0.29)	-0.0177 (-0.15)	0.2357 (1.31)	0.1020 (0.31)	-0.0899 (-0.80)

Panel B: Rate Increases

Event Window	Mean Adjusted Daily Return (%) Market Index			Mean Adjusted Daily Return (%) Finance Index		
	1962-1979 (N=29)	1979-1982 (N=6)	1982-1990 (N=4)	1962-1979 (N=29)	1979-1982 (N=6)	1982-1990 (N=4)
Preannouncement (Days -5 through -1)	-0.1904 (-1.86)***	-0.0372 (-0.17)	-0.3162 (-2.93)**	-0.1992 (-2.02)***	-0.1212 (-0.63)	-0.3518 (-3.09)**
Announcement (Day 0 and 1)	-0.3099 ^a (-1.30)	-1.0346 (-3.82)*	-0.7937 (-3.77)*	-0.4293 ^a (-1.97)***	-1.0542 (-3.92)*	-0.7496 (-3.72)**
Postannouncement (Days +2 through +6)	-0.1220 (-1.12)	-0.4008 (-1.36)	0.1335 (1.10)	-0.1524 (-1.59)	-0.5422 (-2.01)***	0.0624 (0.56)

t-statistics in parentheses

* Significant at the 1 percent level in a two-tailed test

** Significant at the 5 percent level in a two-tailed test

*** Significant at the 10 percent level in a two-tailed test

^aThe announcement period results with the nontechnical increase on November 1, 1978 deleted are presented below. The preannouncement and postannouncement results are not materially impacted by omission of the November 1978 outlier

Event Window	Mean Adjusted Daily Return (%) 1962-1979 (N = 28)	
	Market Index	Finance Index
Announcement (Day 0 and 1)	-0.5878 (-3.79)*	-0.5041 (-3.56)*

Table 5
Tests of the Impact of Fed Policy and Motive on Discount Rate Change
Announcement Effects

Entire Sample					
Sample ^a	Difference in Means Test		Wilcoxon Rank Sum Test		Sample Size
	Market Index	Finance Index	Market Index	Finance Index	
(with outlier)	-0.0084 (-3.47)*	-0.0110 (-4.50)*	1775 (4.31)*	1804 (4.62)*	75
(w/o outlier)	-0.0099 (-5.21)*	-0.0122 (-5.74)*	1775 (4.59)*	1804 (4.90)*	74
Monetary Policy Regimes					
Sample ^a	Difference in Means Test		Wilcoxon Rank Sum Test		Sample Size
	Market Index	Finance Index	Market Index	Finance Index	
1962-79 (with outlier)	-0.0069 (-1.86)***	-0.0102 (-2.84)*	479 (2.61)**	505 (3.24)*	45
1962-79 (w/o outlier)	-0.0089 (-3.29)*	-0.0118 (-4.01)*	479 (2.88)*	505 (3.52)*	44
1979-1982	-0.0144 (-3.93)*	-0.0154 (-3.45)*	96 (2.77)**	92 (2.30)**	15
1982-90	-0.0111 (-2.33)**	-0.0127 (-2.18)**	104 (2.02)***	106 (2.22)**	15
Fed Motives					
Sample ^a	Difference in Means Test		Wilcoxon Rank Sum Test		Sample Size
	Market Index	Finance Index	Market Index	Finance Index	
Technical	-0.0058 (-2.02)***	-0.0087 (-2.70)**	300 (1.82)***	313 (2.47)**	28
Nontechnical (with outlier)	-0.0098 (-2.69)*	-0.0121 (-3.39)*	596 (3.58)*	600 (3.65)*	47
Nontechnical (w/o outlier)	-0.0118 (-4.55)*	-0.0138 (-4.68)*	596 (3.88)*	600 (3.96)*	46

Test statistics in parentheses.

* Significant at the 1 percent level in a two-tailed test

** Significant at the 5 percent level in a two-tailed test

*** Significant at the 10 percent level in a two-tailed test

^aThe November 1, 1978 nontechnical increase in the discount rate is treated as an outlier in previous studies. The relevant results with this observation included and excluded are reported

Table 6
The Impact of Fed Motive on Discount Rate Change Announcement Effects
Within Alternative Monetary Policy Regimes

Entire Sample					
Sample ^a	Technical Market Index	Coefficient Finance Index	Nontechnical Market Index	Coefficient Finance Index	Sample Size
(with outlier)	-0.0030 (-1.48)	-0.0045 (-2.20)**	-0.0049 (-3.16)*	-0.0061 (-3.88)*	75
(w/o outlier)	-0.0032 (-2.04)**	-0.0046 (-2.64)*	-0.0060 (-4.97)*	-0.0070 (-5.11)*	74
Monetary Policy Regimes					
Sample ^a	Technical Market Index	Coefficient Finance Index	Nontechnical Market Index	Coefficient Finance Index	Sample Size
1962-79 (with outlier)	-0.0027 (-0.99)	-0.0050 (-1.90)***	-0.0043 (-1.57)	-0.0052 (-2.00)**	45
1962-79 (w/o outlier)	-0.0027 (-1.43)	-0.0050 (-2.37)**	-0.0062 (-3.18)*	-0.0068 (-3.17)*	44
1979-1982	-0.0048 (-1.26)	-0.0036 (-0.79)	-0.0084 (-3.35)*	-0.0097 (-3.25)*	15
1982-90	-0.0046 (-0.77)	-0.0045 (-0.61)	-0.0057 (-2.11)***	-0.0067 (-2.03)***	15

Test statistics in parentheses.

* Significant at the 1 percent level in a two-tailed test

** Significant at the 5 percent level in a two-tailed test

*** Significant at the 10 percent level in a two-tailed test

^aThe November 1, 1978 nontechnical increase in the discount rate is treated as an outlier in previous studies. The relevant results with this observation included and excluded are reported

Figure 1
CMARs Around Rate Decreases

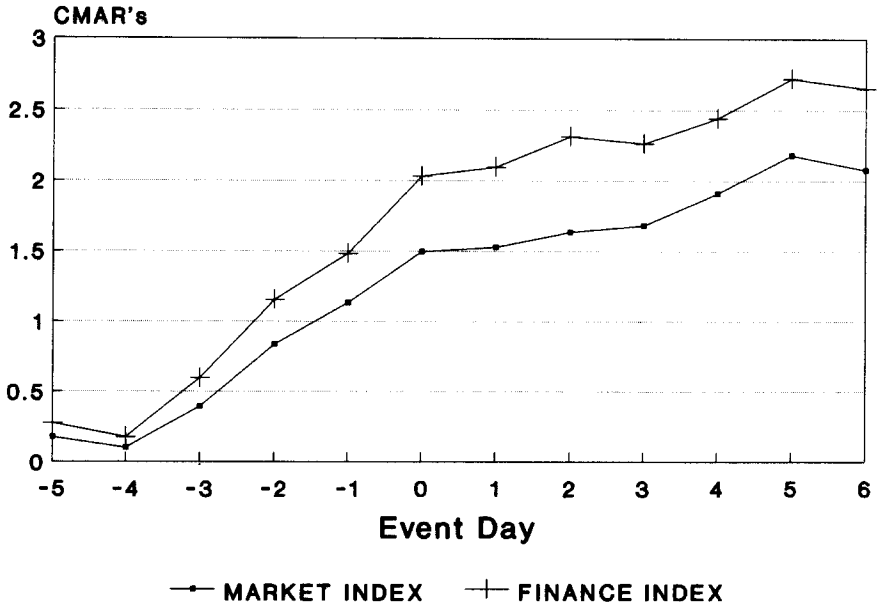


Figure 2
CMARs Around Rate Increases

