Do Changes in the Discount Rate and Fed Funds Rate Affect Financial Market Returns?

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Abstract

This study examines the effect that changes in the discount rate and changes in the federal funds rate have on the performance of the stock market and the government bond market. We find that the treasury bill market reacts more than both the treasury bond and stock market to rate change announcements. Further, all three markets interpret a discount rate change no differently than a change in the federal funds rate.

I. Introduction

The discount rate is the rate charged by the Federal Reserve when making loans to member banks. This rate tends to remain constant for extended periods, then changes in large, discrete amounts, usually by 25 to 50 basis points. It is widely held that discount rate changes send a signal concerning the future monetary policy intentions of the Federal Reserve.

The Federal funds rate is somewhat of a misnomer in that these loans are not made by the Federal Reserve or even the federal government. Instead, the fed funds rate is the rate that banks charge other banks. The primary reason banks borrow in the fed funds markets is to fulfill the reserve requirement set forth by the Federal Reserve. This market is extremely sensitive to the credit needs of banks, so the interest on these loans is an indicator of the tightness of credit market conditions in the banking system and the stance of monetary policy.

Since both the discount rate and the fed funds rate send strong signals concerning the future direction of the economy, it is reasonable to expect that the financial markets would react to changes in these rates. The purpose of this study is to determine the announcement effect, if any, of changes in the above two rates on the performance of the stock market and both the treasury bill and treasury bond markets.

Section II provides a literature review with evidence in support of and against an announcement effect. The data sample is discussed in Section III. Presented in Section IV is the methodology used in the paper. Section V shows the results of regressions used to determine the effects of discount rate and federal funds rate changes on the treasury bill, treasury bond, and stock market. Finally, conclusions and a summary are presented in Section VI.

II. Literature Review

Several studies have examined the impact that single Federal Reserve policy changes have had on certain sectors of the economy. However, to date, no study

has considered the simultaneous effect of numerous Fed policy changes across the bond and stock market.

Why There Might Be No Announcement Effect:

Waud (1970) examines the announcement effect of Federal Reserve discount rate changes and finds that while there is a significant effect at time zero, there is also leakage and/or anticipation. He attributes this ability of the market to anticipate rate changes because of the regularly scheduled meetings of the Federal Open Market Committee (FOMC).

A second reason why the announcement effect may appear insignificant is due to regulatory lags. It is very plausible that by the time the Federal Reserve is able to react to changing market conditions, and thus alter the monetary base via the discount rate, banks have already reacted by adjusting their willingness to loan at previous rates.

Sweeney and Warga (1986) suggest that when analyzing the effects of rate changes on the stock market, caution should be taken to consider the differential reaction by firms in various industries. For example, stocks such as utilities are more interest rate sensitive and should, therefore, be more affected by both discount rate and fed funds rate changes.

Finally, there exists a long standing economic theory which suggests that while both the stock and bond markets should be affected by monetary policy rate changes, these reactions should not be detectable with standard event study methodology. Milton Friedman, founder of the Monetarist school of thought, argues that when the discount rate is decreased, the money supply increases causing personal wealth to eventually increase. Individuals will then put excess money balances on deposit at financial institutions where the funds will gradually be loaned out to firms. The investment by firms will inject funds into the economy and an increase in aggregate output will result. This process will not occur over night. Therefore, there will not be a timely correlation between altering either the fed funds or discount rate. Jenson and Johnson (1995) consider this possibility and analyze the long term effects in the stock market of changes in the discount rate. Over the period from 1962 through 1991, they find that the stock market did experience increases in long term returns during periods following discount rate decreases.

Why There Might Be An Announcement Effect:

If changes in the discount rate do convey future monetary policy intentions of the Federal Reserve and if these signals are not misinterpreted or anticipated, then financial markets should react accordingly. This reaction will be instantaneous according to the semi-strong form of the Efficient Market Hypothesis. Baker and Meyer (1980) study the impact of discount rate changes from 1953 to 1978 on treasury bills and conclude that the market for treasury bills is in fact efficient.

A second reason that changes in the fed funds and discount rate might cause a reaction from the financial markets is because banks are directly affected by these changes. Keynes (1936) discusses how changes in these rates affect both the amount banks are willing to loan and the rate at which banks are willing to loan. As

these two rates increase, it is more costly for banks to borrow. These costs are passed on to businesses and consumers via higher interest rates. Higher interest rates cause a decrease in investment and a corresponding slow down in the economy. Unlike the Monetarists, Keynesians see the reaction as occurring in a timely manner. Clearly, as interest rates increase, bond prices decrease. Therefore a negative relationship exists between returns in the bond market and changes in either the federal funds rate or the discount rate.

Changes in the discount rate by the Federal Reserve only provide banks with an incentive to alter interest rates, but does not mandate a change. Since the ultimate decision to raise or lower interest rates offered on loans and the magnitude of such changes is determined solely by banks, it is necessary to consider the public's ability to anticipate the reactions of banks to the announcement of such policy changes.

Diamond (1984, 1991), Ramakrishnan and Thakor (1984), Boyd and Prescott (1986), James (1987), Lummer and McConnell (1989), James and Weir (1990), Slovin and Young (1990), and Slovin, Sushka and Hudson (1988, 1990) have all found that banks possess private information about corporate borrowers that is not available to the public financial markets. If banks have an informational advantage, then a change in their loan rates should be treated as news to the financial markets and the markets should show significant announcement effects.

Should this reaction carry over into the stock market? Smirlock and Yawitz (1985) argue in favor of two reasons why it should. First, changing interest rates will change profitability forecasts surrounding prospective investment opportunities for all corporations, as well as their weighted average cost of capital used to evaluate the projects. Secondly, rate changes will further affect investors' expectations of future corporate profitability. Because there are numerous possible explanations surrounding whether or not changes in the discount rate and federal funds rate should cause a significant announcement effect, the debate must be examined empirically.

III. Data

Jenson and Johnson (1995) examine discount rate changes over a 30 year period from 1962 through 1991. During that entire time, only 39 increases and 39 decreases are observed. Baker and Meyer (1980) study the changes that occurred from 1953 through 1978. Only 61 observations are noted. The discount rate clearly does not change often. One of the problems associated with analyzing the effect of discount rate changes is a lack of sample size. To mitigate this shortcoming, researchers extend the study back many years. This, however, causes another problem. Observations should be broken down into subsets that correspond to the terms of the Federal Reserve Chairman. Newly elected Federal Reserve Chairmen often have radically different views on monetary policy and its role in the economy. Failure to consider differing Chairmen viewpoints is equivalent to assuming that the financial markets respond to changes in the discount rate independent of their belief concerning the future intentions of the Federal Reserve.

Alan Greenspan took office in 1988. From 1987 until 1993, there were no changes in the discount rate. During 1994, the discount rate has changes four times. Consistent with the contention that discount rate changes can not be inter-

preted independently of the Chairman of the Federal Reserve, this study examines only those changes that occurred under the current chairman's tenure. Over this period, only rate increases are observed.

IV. Methodology

To examine the announcement effect of both federal funds rate changes and discount rate changes on the treasury bond and stock markets, classical event study methodology is used[1]. Any event study is implicitly testing two hypotheses. First, is there any market reaction to the event in question? Second, are the markets efficiently absorbing the information[2]?

To examine expected returns for both rate changes, the single index market model (SIMM) is used based on the following equation[3]:

$$E(R)_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \quad (1)$$

where,

$E(R)_{jt}$ = expected return for asset j at time t,

R_{mt} = the return on the market at time t,

α_j = standard regression intercept,

β_j = standard regression beta for asset j,

ε_{jt} = standard regression error term.

The event window for examining discount rate changes is from 15 days before to 15 days after the announcement date. The estimation period includes the 30 days immediately preceding the event window. Because the changes in the federal funds rate are much closer together, the estimation period ends just six days prior to the event window. The event window is reduced to include only 11 days surrounding the announcement date. This is done to prevent the overlap that would have resulted in an impure sample.

The market return used to examine the effects on treasury bills and treasury bonds is the Shearson Leahman Bond Index. For analyzing the effect on common stocks, the S&P 500 index is regressed against the Dow Jones World Stock Market Index. Excess returns are then calculated based on the equation:

$$XR_{jt} = R_{jt} - E(R)_{jt} \quad (2)$$

where,

XR_{jt} = excess return of asset j at time t,

R_{jt} = realized return of asset j at time t,

$E(R)_{jt}$ = expected return for asset j at time t.

V. Results

Table 1 shows the average excess returns and cumulative excess returns for treasury bills, treasury bonds, and the stock market surrounding the announcement of changes in the discount rate. For T-Bills, on the announcement day (t=0), there

is an average excess return of -.79312. This negative reaction is consistent with the idea that as the discount rate is increased, interest rates increase causing a decrease in the price of bonds (and a corresponding decrease in the return from bonds). Between days one and four, however, the return becomes positive and significant.

Table 1
Excess Returns and Cummulative Excess Returns for Treasury Bills, Treasury Bonds, and the Stock Market for all Discount Rate Changes.

	T-BILL		T-BOND		S&P500	
DATE	EXCESS RETURNS	CUM EXCESS RETURNS	EXCESS RETURNS	CUM EXCESS RETURNS	EXCESS RETURNS	CUM EXCESS RETURNS
t=-15	-0.0004	-0.0004	-0.0454	-0.0454	0.2557	0.2557
t=-14	0.0065	0.0061	0.5747	0.5293	0.1924	0.4481
t=-13	0.0388	0.0449	-0.7745	-0.2452	0.5400	0.9881
t=-12	0.0324	0.0773	-0.2298	-0.4750	0.1224	1.1105
t=-11	-0.0036	0.0737	-0.3179	-0.7929	0.2165	1.3270
t=-10	0.0031	0.0769	-0.0054	0.7982	-0.2147	1.1123
t=-9	-0.0091	0.0678	-0.3335	-1.1317	0.2833*	1.3956
t=-8	0.0031	0.0709	0.2923	-0.8394	-0.6162	0.7794
t=-7	-0.0343	0.0365	0.4511	-0.3883	-0.2203	0.5591
t=-6	-0.0037	0.0328	-0.6610	1.0493	0.0338	0.5930
t=-5	0.0304*	0.0632	0.3025	-0.7468	0.2744	0.8674
t=-4	0.0237	0.0869	-0.4354	-1.1822	-0.1818	0.6855
t=-3	0.0317	0.1186	0.1743	-1.0079	-0.2531	0.4324
t=-2	0.0244	0.1430	-0.9803	-1.9882	0.7444*	1.1769
t=-1	-0.0036	0.1394	-0.5761	-2.5643	-0.1146	1.0623
t=0	-0.0238	0.1156	-1.2643	-3.8286	0.7688	1.8311
t=1	0.0465**	0.1621*	0.7130	-3.1156	-0.0716	1.7596
t=2	0.0512**	0.2133**	0.5399	-2.5757	0.0235	1.7831
t=3	0.0248***	0.2381**	-0.0047	-2.5804	-0.4788	1.3042
t=4	0.0457*	0.2839*	0.0153	-2.5652	-0.8386	0.4656
t=5	0.0439	0.3277	-0.1798	-2.7450	0.6095**	1.0751
t=6	0.0053	0.3330	0.0882	-2.6567	0.6559	1.7310
t=7	0.0253	0.3583	0.8411	-1.8156	0.1571	1.8881
t=8	-0.0340	0.3243	-0.1312	-1.9469	0.5054	2.3936
t=9	-0.0005	0.3238	0.1035	-1.8434	-0.1454	2.2482
t=10	0.0093	0.3331	-0.4406	-2.2839	-0.1669	2.0812
t=11	-0.0096	0.3235	-0.9149	-3.1989	0.2847	2.3660
t=12	-0.0331	0.2904	0.1939	-3.0050	0.2336	2.5996
t=13	0.0581	0.3486	0.0795	-2,9254	-0.1699	2.4297
t=14	0.0497**	0.3983	0.4400	-2.4855	-0.2665	2.1632
t=15	-0.2534	0.1448	0.4857	-1.9998	-0.6553	1.5079

* = significant at α = .10
** = significant at α = .05
*** = significant at α = .01

The effect on treasury bonds is less definitive. There is again a negative excess return on the announcement date, but no significance is observed either on or after day zero. The reaction of the stock market to the announcement of discount rate increases is positive, but not significant. Therefore, it appears that the changing of the discount rate has a greater impact on the short-term debt market than on the long-term debt market or on the stock market.

Table 2 shows the average excess returns and cumulative excess returns for treasury bills, treasury bonds, and the stock market surrounding the announcement of changes in the federal funds rate. There is a positive and significant excess re-

Table 2
Excess Returns and Cummulative Excess Returns for Treasury Bills, Treasury Bonds, and the Stock Market for all Federal Funds Rate Changes

	T-BILLS		T-BONDS		S&P500	
DATE	EXCESS RETURNS	CUM EXCESS RETURNS	EXCESS RETURNS	CUM EXCESS RETURNS	EXCESS RETURNS	CUM EXCESS RETURNS
t= -5	0.0447	0.0447	0.7175	0.7175	0.1087	0.1087
t= -4	0.0107	0.0555	-0.3619	0.3557	-0.3627	-0.2540
t= -3	0.0151	0.0706	-0.5075	-0.1519	0.4546	0.2006
t= -2	0.0280	0.0986	-0.1594	-0.3112	-0.3383	-0.1377
t= -1	0.0029	0.1014	0.4315	0.1202	0.1391	0.0015
t= 0	0.0106	0.1121	-0.1426	-0.0224	-0.0637	-0.0622
t= 1	0.0427*	0.1547	-0.4753	-0.4977	-0.5048	-0.5671
t= 2	0.0250	0.1798	-0.1057	-0.6034	0.4972	-0.0699
t= 3	0.0163	0.1961	0.1551	-0.4482	-0.0574	-0.1273
t= 4	0.0054	0.2014	-0.7722	-1.2205	-0.0732	-0.2005
t= 5	0.0223	0.2238	-0.0654	-1.2858	0.2895	0.0890

* = significant at α = .10
** = significant at α = .05
*** = significant at α = .01

turn observed after the announcement of a federal funds rate change. This result is consistent with that noted from discount rate changes. The effect on both treasury bonds and the stock market is negligible. There is no significant trend in any of the three market's cumulative excess returns for either type of event.

VI. Summary and Conclusions

This paper studied the effects that changes in the federal funds rate and changes in the discount rate have on the stock market and the government bond markets. To date, no other study has considered these two events across markets.

The results reveal three major conclusions. First, no significant announcement effect is noted in any of the markets studied. Regulatory lags and announce-

ment anticipation are posited to be the cause. Second, for the minor reactions that did occur, the treasury bill market reacted more than either the treasury bond or the stock market. Finally, all market reactions were similar for both discount rate and federal funds rate changes. Thus, changes in the federal funds rate and changes in the discount rate are both interpreted in a similar manner by the financial markets.

Further research should be conducted to determine the various markets' reaction during different Federal Reserve Chairman terms. While the sample size will be small, there is reason to believe that market participants will react differently as rate changes send a signal concerning the Fed's future intentions surrounding monetary policy.

Footnotes

1. See for example, Fama, Fisher, Jenson, and Roll (1969), Ball and Brown (1968), Scholes (1972), Petitt (1972), and Cornell (1979).

2. For a general overview of the theory and empirical research on efficient markets, see Fama (1970, 1990), Dyckman, Downes, and Magee (1975), and Lorie and Hamilton (1973).

3. Mean-adjusted returns were also examined. Results under both methods are consistent and lead to the same general conclusions. For a further understanding of the differences between the two methods, see Brown and Warner (1980, 1985) and Dyckman, Philbrick, and Stephan (1984).

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