

How the Fed Sets the Federal Funds Rate Target

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I. Introduction

One of the rare moments of high drama in economics is when the Federal Reserve or the Fed announces its decision about a change in the federal funds rate. Headlines in the *New York Times* have cautioned “Wall Street May See Volatile Week.”¹ The recent search for a neutral federal funds rate that is neither expansionary nor contractionary has prompted headlines like “Neutral Isn’t Easy to Define.”² Uncertainty over the actions of the Federal Open Market Committee (FOMC) has prompted analysts to publish advice columns entitled “Interest Rate Turbulence: What’s a Bond Investor to Do?”³ Finally, the Federal Reserve’s decision carries an announcement effect that may signal the Fed’s intentions whether future monetary policy will be tight or easy. However, as headlines like “Fed’s Restrained Pace on Rates Inspires Only a Limp Rally” attest, the Fed’s actions seldom please everyone.⁴

This paper reports the results of a statistical model that describes how the Fed changes its target for the federal funds rate. Past research of Fed behavior has used the Taylor rule which models the actual federal funds rate as a function of inflation, unemployment, and the gap between potential and actual GDP.⁵ Rather than explaining the actual federal funds rate, this paper estimates several regression models that explain changes in the target that the Fed sets for the federal funds rate.

The data sample consists of 254 decisions made by the FOMC between July 27, 1983 and February 2, 2005. In 142 of these meetings, the FOMC decided to change its target for the federal funds rate. This sample coincides with the time when the Fed returned to targeting the federal funds rate after it had experimented with targeting nonborrowed reserves between October 1979 and October 1982. During this time period, there was a change in the chairman of the Board of Governors and the FOMC.

¹ *New York Times*, March 28, 2005.

² *New York Times*, March 20, 2005.

³ *New York Times*, March 6, 2005.

⁴ *New York Times*, February 3, 2005.

⁵ See Taylor (1993).

Paul Volker was chairman of the Board of Governors and the FOMC until August 11, 1987. After that date, Alan Greenspan began his term as chairman of the Board of Governors and the FOMC.

Regression results show that the Fed changes its target for the federal funds rate in response to changes in unemployment and inflation. The paper presents statistical evidence that the change in the Fed's target for the federal funds rate is inversely related to changes in the unemployment rate since the last FOMC meeting. There is also considerable statistical evidence that the Fed's federal funds target is directly related to measures that signal future inflation such as changes in the yield on long-term government bonds, changes in the real oil price, and changes in consumer confidence.

There is evidence of policy persistence and rigidity in setting targets as positive changes in the target are more likely to follow past positive changes and reductions in the targeted rate are more likely to follow a previous reduction. The change in the federal funds target is directly related to the gap between the current federal funds rate and the target set at the previous FOMC meeting. For example, if the current federal funds rate is significantly greater than the targeted level, it is more likely the FOMC will increase the target. However, other variables of interest, such as the percentage change in the Dow Jones Industrial index, the actual change in the inflation rate, and the change in the gap between actual and long-run disposable income have no statistically significant effect on changes in the targeted level of the federal funds rate.

Following this introduction, the second section of this paper reviews the literature regarding Fed behavior and setting a target for the federal funds rate. The third section of the paper describes how the targeted level of the federal funds rate has changed over the last twenty years. Data and model specifications are described in the fourth section of the paper, while the fifth section of the paper presents the estimation results. The final section of the paper contains a brief summary of the results and some concluding thoughts.

II. Literature Review

Rudebusch (1995) proposes a model that attempts to reconcile term structure evidence with the Fed's targeting behavior. His results indicate that the Fed's targeting behavior can be described by four important characteristics. First, deviations of the spot federal funds rate from the target rate do occur but tend to disappear within one day. Second, targets tend to be adjusted slowly and are seldom reversed. So, for example, if a target increase has occurred there is a greater probability that an additional increase will follow. Third, the Fed tends to set the target at a level that it expects to maintain, and fourth, the target is set in accordance with the long-run economic objectives of the Fed. These long-run objectives can be many and varied. As the goal of this investigation was primarily aimed at reconciling the information available from the term structure with the Fed's targeting behavior, Rudebusch opted not to model long-run economic objectives, choosing instead to simulate an entire term structure from his observations of and resulting assumptions about the Fed's targeting behavior. The periods examined were September 1974 to September 1979 and March 1984 to September 1992.

Michael Dueker (1999) used an ordered probit technique based on a Taylor-rule model with a partial adjustment mechanism to predict target changes in the Fed funds rate. His model which used monthly observations for the period between January 1985 and December 1998 was compared to a similar, linear model. Both models produced results indicating the importance of the output gap in predicting target changes and both also showed evidence that the target is changed in a way that Taylor defines as inflation fighting (*i.e.* the long-run response of the target rate to a one unit change in inflation is greater than 1). However, the estimated coefficient for inflation in the ordered probit model was significant while it was insignificant in the linear model.

In a working paper, Hamilton and Jorda (2000) use a variation on the ACD (autoregressive conditional duration) model to predict the timing of a change in the federal funds rate target. Difficulties with estimation created the necessity of splitting the estimation into two distinct time periods. First, for the period between March 1, 1984 and November 23, 1989, the only variables found to significantly

affect the probability of a change in the Fed funds target (other than simple lagged durations) were the occurrence of an FOMC meeting in the prior week and the lagged value of the effective Federal funds rate. For the period between November 30, 1989 and June 5, 1997 the significant variables were the occurrence of an FOMC meeting during the week in question and the absolute value of the spread between the effective Federal Funds rate and the six month Treasury bill rate. For the ordered probit, all changes in the target were collapsed into five categories—two positive, two negative and zero. Interestingly, they found that most of the variables that affected the timing of a change had no significant effect on the size of the change. Instead, the two variables that had the most influence on the size of the change were: (1) a previous change in the target (*i.e.* if the target had been previously increased, the likelihood of a current increase is greatly elevated), and (2) the lagged spread between the Fed funds rate and the six month Treasury bill rate. For the most part, variables representing long-run economic objectives were of little statistical value in the various specifications.

Khoury (1990) attempted to make sense of a large number of studies purporting to clarify the Fed's reaction to changes in various measures of economic conditions. What separates Khoury's effort from those previously described is his willingness to test a large number of variables often used to describe macroeconomic conditions and his singular emphasis on macroeconomic indicators. The articles described above tend to emphasize the importance of the timing of decisions and the Fed's desire to smooth out changes in the target by stepping through small increments (sometimes referred to as "inertial" behavior). Khoury used a technique by Leamer (1978) called "specification search" to determine the robustness of various macroeconomic indicators. After application of the technique, only one variable, GDP, was found to be a robust indicator of Fed behavior. It should, however, be mentioned that of 42 reaction function studies examined by Khoury, only one used the federal funds target rate as a dependent variable.

Thornton (2000) investigates quite a different question regarding the federal funds rate target. The primary purpose of his research was to determine whether the market responds to actual changes in

the federal funds target rate or if it is simply the *market's* belief that the target has changed that generates observed changes in market interest rates. His conclusions in this regard are not encouraging. He finds that market rates are not determined by open market operations and, hence, not determined by the setting of the federal funds rate target. In addition he finds that they are not determined by announcement effects (he refers to this as open mouth operations). His conclusion is that some target changes are endogenous and some are exogenous making analysis of the relationship between the target rate and the federal funds rate quite complex and, consequently, difficult to untangle.

III. Meetings of the FOMC and Changes in the Target Federal Funds Rate: 1983–2005

Table 1 lists the dates of the 254 FOMC meetings between July 1983 and February 2005. Also listed in Table 1 is the target that the FOMC set for the federal funds rate during its meeting and whether this target level has increased, decreased, or remained unchanged from the previous FOMC meeting.⁶ The largest federal funds rate target was the one of 11.5625 percent set on August 9, 1984. The smallest target that the FOMC set for the federal funds rate was the 1 percent level that was in place between June 25, 2003 and June 30, 2004. During this time period, the actual federal funds rate was the lowest it had been in over forty years.

Most of these meetings occurred on regularly scheduled dates specified in advance.⁷ Federal law requires the FOMC to meet in Washington D.C. at least four times a year and since the 1980s, the FOMC has usually had eight regularly scheduled meetings a year. Pressing economic problems has sometimes prompted the FOMC to hold an unscheduled meeting either in person or over the phone. Table 1 denotes these unscheduled meetings with an asterisk by the date of the meeting.

Charts showing the daily effective federal funds rate and the targeted level of the federal funds rate are found in Figures 1 - 3. Figure 1 shows the actual daily federal funds rate and its targeted level

⁶ The dates of the meetings and the level of the federal funds rate target come from Rudebusch (1995), Thornton (2000), Hamilton (2000), and the Federal reserve's webpage, <http://www.federalreserve.gov/fomc/fundsrate.htm>.

⁷ See <http://www.minneapolisfed.org/info/policy/dates-hist.cfm> for the dates of regularly scheduled FOMC meetings between 1970 and now.

for the 1980s. Likewise, Figure 2 shows the data for the 1990s, while the data for the last five years are plotted in Figure 3.

The frequency of meetings and how often the federal funds target is changed depends on the underlying economic conditions and membership of the FOMC. For example, during 1984 when Paul Volker was chair, the FOMC met 23 times and it changed its federal funds target in 20 of those meetings. On the other hand, during 1993 under Alan Greenspan’s chairmanship, the FOMC only met during its eight regularly scheduled meetings, and it never changed its targeted federal funds rate of 3 percent.

Table 1 clearly shows how the business cycle affects targeting of the federal funds rate. During the recessionary period of 1991, the FOMC met 18 times and it cut the federal funds target 10 times from 6.75 percent to 4 percent. The terrorist attacks on 9-11 were bracketed by the recession of 2001. During that year, the FOMC met 11 times and it cut the federal funds target every time reducing it from 6 percent to 1.75 percent.

III. Model Specification and Data

A simple theoretical model to motivate discussion

Assume the Fed sets the federal funds rate target in an attempt to minimize a loss function. For simplicity, assume the loss function penalizes diverging from a desired inflation rate (π_d) and a desired unemployment rate (u_d). Both π_d and u_d are set at levels that are conducive to achieving the Federal Reserve’s often mutually exclusive goals of high employment, economic growth, price stability, stable financial and foreign exchange market stability and interest rate stability. The loss function, L , is

$$L = \alpha[u_t(r_T, \gamma) - u_d]^2 + \beta[\pi_t(r_T, \delta) - \pi_d]^2 \quad (1)$$

where α and β are two positive, exogenous parameters. Referring to equation (1), u_t is the actual unemployment rate and π_t is the actual inflation rate, both of which are functions of the Fed’s target for the federal funds rate, r_T . The actual unemployment rate is also a function of γ , a vector of exogenous

variables, and the actual inflation rate is also a function of $\underline{\delta}$, another vector of exogenous variables. It is possible that both $\underline{\gamma}$ and $\underline{\delta}$ contain common exogenous variables. The bracketed terms in equation (1) are both squared to equally punish actual unemployment and inflation rates that are either too high or too low relative to their desired levels.

The FOMC sets its federal funds rate target (r_T) to minimize its loss function. The first order condition is

$$\frac{dL}{dr_T} = 2\alpha[u_t(r_T, \underline{\gamma}) - u_d]u_t'(r_T, \underline{\gamma}) + 2\beta[\pi_t(r_T, \underline{\delta}) - \pi_d]\pi_t'(r_T, \underline{\delta}) = 0 \quad . \quad (2)$$

The FOMC's optimal target for the federal funds rate is r_T^* which minimizes the loss function and is a function of the model's exogenous variables or $r_T^* = r(\alpha, \beta, \underline{\delta}, \underline{\gamma}, u_d, \pi_d)$. As the Fed receives information that indicates changes in the actual unemployment or inflation rate, it changes its federal funds target to reduce the deviation from either u_d or π_d .

Two possible endogenous variables

To find the factors that influence changes in the Federal Reserve's targeted level of the federal funds rate, two different dependent variables are used. The first dependent variable, DTARGET, measures the change in the targeted level of the federal funds rate from the previous FOMC meeting to the current FOMC meeting. If r_T^* is the federal funds target set during the current meeting and $r_{T,-1}^*$ was the target set during the previous FOMC meeting, then $DTARGET = r_T^* - r_{T,-1}^*$.

However, if the Fed reduced its federal funds target 50 basis points from 6.50 percent to 6.00 percent, it may not have the same effect if the Fed's 50 basis point reduction was from 1.50 percent to 1.00 percent. It may be easier and more likely for the Fed to reduce its target federal funds rate by 1 percent or 100 basis points if the current federal funds rate was 5.50 percent rather than 1.50 percent. Since the change in the federal funds rate target may be determined by its current level, another possible

dependent variable is the percentage change in the targeted level of the federal funds rate since the previous FOMC meeting or PDTARGET. Here PDTARGET is defined as

$$\text{PDTARGET} = 100 \times \frac{r_T^* - r_{T,-1}^*}{r_{T,-1}^*}. \quad (3)$$

Specifying two regression models

The set of explanatory variables that explain changes in the FOMC's target federal funds rate is not known with certainty. This paper tests a series of explanatory variables that theoretically affect the Fed's target for the federal funds rate. These variables capture changes in the unemployment rate, changes in the inflation rate, the rigidity of monetary policy, and whether the economy is experiencing expansion or contraction. Using the first dependent variable introduced above, DTARGET, the first set of equations estimated have the following general functional form

$$\text{DTARGET} = \alpha_0 + \alpha_1 \text{DTARGET}_{-1} + \alpha_2 \text{DU} + \alpha_3 \text{DG10} + \alpha_4 \text{PDROILP} + \alpha_5 \text{GAP} + \alpha_6 \text{PDCON} + \alpha_7 \text{NOTSCH} + \alpha_8 \text{DYGAP} + \varepsilon. \quad (4)$$

In the above equation, DTARGET₋₁ is the change in the targeted level of the federal funds rate that occurred during the previous meeting of the FOMC.

The second set of equations was estimated using the second dependent variable discussed above, PDTARGET. These regressions have the same independent variables as equation (4) or

$$\text{PDTARGET} = \beta_0 + \beta_1 \text{PDTARGET}_{-1} + \beta_2 \text{DU} + \beta_3 \text{DG10} + \beta_4 \text{PDROILP} + \beta_5 \text{GAP} + \beta_6 \text{PDCON} + \beta_7 \text{NOTSCH} + \beta_8 \text{DYGAP} + \mu. \quad (5)$$

PDTARGET₋₁ equals the percentage change in the targeted level of the federal funds rate that was chosen during the previous FOMC meeting. The independent variables used in equations (4) and (5) will be defined below and the *a priori* signs of estimated slope coefficients will be discussed.

The effect of policy persistence and unscheduled FOMC meetings

Both Rudebusch and Hamilton argue the Fed's behavior exhibits policy persistence and rigidity. This implies that an increase in the federal funds targeted rate is more likely to follow a previous

increase and a decrease in the federal funds target follows a previous decrease in the target. Therefore DTARGET and DTARGET₋₁ should be directly related, as are PDTARGET and PDTARGET₋₁, and both α_1 and β_1 are expected to be positive.

Theory can not predict the sign of the regression coefficient associated with NOTSCH, the binary variable indicating the FOMC meeting wasn't regularly scheduled. The FOMC is equally likely to have an emergency meeting to raise interest rates in an attempt to slow the economy down and avoid inflation or to lower interest rates to stimulate the economy during recessionary periods. Consequently the signs associated with both α_7 and β_7 are indeterminate.

The gap between the actual and targeted level of the federal funds rate

One measure that indicates the willingness of the Fed to change its targeted level of the federal funds rate is how far the current federal funds rate diverges from the targeted federal funds rate adopted during the previous FOMC meeting. The independent variable GAP equals the actual federal funds rate on the day prior to the current FOMC meeting minus the targeted level of the federal funds rate set at the previous meeting.

As GAP increases, this is evidence of further inflationary pressures and a need for the Fed to further tighten the money supply. Likewise, a falling or negative gap signals the need for easier monetary policy and the Fed will reduce its federal fund's target. Consequently the dependent variables in equations (4) and (5) should be directly related to GAP and both α_5 and β_5 are expected to be positive.

The effect of changes in unemployment

DU measures the change in the unemployment rate between the current and previous FOMC meeting.⁸ Changes in the Fed's target for the federal funds rate and changes in the unemployment rate should be inversely related. Significant increase in the unemployment rate suggests the Fed will stimulate the economy with open market purchases that increases reserves and reduces the federal funds

⁸ The monthly unemployment rate was obtained from FRED at the Federal Reserve Bank of St. Louis webpage at <http://research.stlouisfed.org/fred2/>.

rate. Conversely, as the unemployment rate falls to new lower levels, the resulting tighter labor market leads to higher wages and an increase in inflation. The Fed will counter this potential increase in inflation by conducting open market sales that reduce the amount of reserves and increases the federal funds rate. The predicted inverse relationship between the unemployment rate and the Fed' target for the federal funds rate suggests that both α_2 and β_2 are less than zero.

The effect of changes in inflation

The model specified in equations (4) and (5) include several variables measuring the change in inflation. The variable DG10 measures the change in the interest rate on the federal government's 10-year bond between the current and previous meetings of the FOMC. An increase in DG10 suggests the bond market predicts inflation in the long run. To counter this future inflation, the Fed will raise its target for the federal funds rate.

Another measure of potential inflation is the PDROILP, the percentage change in real oil prices between the current and the previous FOMC meetings. Increases in the real price of oil signals future inflation, and the Fed will mitigate these inflation pressures by increasing interest rates. One may argue that higher real oil prices are a negative supply shock which results in a higher price level and a lower level of real GDP similar to the stagflation experienced in the 1970s. In this case, one would expect the Fed to counter a contractionary gap by reducing interest rates. However, in the current sample, higher oil prices are less likely to derail an economic recovery and more likely to result in inflationary pressures, implying that the Fed will raise interest rates to counter the rising inflation.

Another signal of future inflation may be an increase in consumer confidence. An increase in consumer confidence leads to increased spending and upward pressure on prices. PDCON measures the percentage change in the index of consumer confidence since the last FOMC meeting. Again the Fed will offset the inflationary pressures of increased consumer confidence by increasing interest rates.

The last measure of potential inflation included in equation (3) is DYGAP which measures the change in the percentage difference between the actual and long-run value of real monthly disposable

income.⁹ This monthly data series should work like the quarterly estimates of the gap between actual and potential GDP. If actual monthly income exceeds its long-run value, then the Fed will increase interest rates to reduce inflationary pressures. Conversely, if the actual level of monthly income is below its long-run level, the Fed will stimulate the economy by conducting open market purchases that reduces interest rates.

Therefore, the Fed's response to changes in inflation is captured in the model by including variables that measure the change in long-term interest rates (DG10), the change in real oil prices (DROILP), the percentage change in consumer confidence (PDCON), and the change in the percentage gap between actual and long-run monthly real disposable income (DYGAP). The change in the Fed's target for the federal funds rate should be directly related to each of these variables. Consequently, four of the regression slope parameters in equation (4) - - α_3 , α_4 , α_6 , and α_8 - - are all expected to be positive, as are β_3 , β_5 , β_6 , and β_8 , the regression slope parameters associated with variables that capturing the effects of inflation in equation (5).¹⁰ Table 2 lists the variables listed in equations (4) and (5) and summarizes the discussion regarding the a priori signs that are expected for each regression coefficient. The estimation results for equation (4) are reported in Table 3 while the estimation results for equation (5) are listed in Table 4.

IV. Estimation Results

Tables 3 and 4 provide statistical evidence that changes in unemployment and expected inflation causes the FOMC to alter its target for the federal funds rate. The six regressions reported in Tables 3 and 4 exhibit remarkable explanatory power. R^2 s range from 0.473 to 0.546 which is high considering the limited range of the dependent variables and the number of times the dependent variable was equal

⁹ Estimates of the long-run values of monthly disposable income were found by applying a Hodrick-Prescott (1997) filter to the actual time series of monthly real disposable income.

¹⁰ Monthly data for the yield for the federal government's constant maturity ten-year bond, oil prices, the index of consumer confidence, and real monthly disposable income were once again obtained from the Federal Reserve Bank of St. Louis' FRED database at <http://research.stlouisfed.org/fred2/>.

to zero. The F-tests that all the slope coefficients are simultaneously equal to zero are always rejected at the one-percent level. The regressions are corrected for first-order autocorrelation.

Changes in the targeted level of the federal funds rate is directly related to changes in the following variables: (1) the yield on long-term government bonds, (2) the percentage change in consumer confidence, and (3) the gap between the current federal funds rate and the previous target. As reported in Tables 3 and 4, the regression slope coefficients associated with these explanatory variables are statistically significant at the five-percent level or better. Changes in the target for the federal funds rate are also directly related to changes in the real price of oil. Using a one-tail test, the null hypothesis that the slope coefficient for this independent variable is nonpositive is rejected at the ten percent level or better.

The slope coefficient for changes in the unemployment rate is also negative, as expected. The null hypothesis that these slope is nonnegative is rejected at the five-percent level for the regressions reported in Table 3 and at the one-percent level for the regressions reported in Table 4. The current change in the federal funds target is directly related to the previous change in the targeted level. This coefficient ranged between -0.612 and -0.615 in Table 3 and the null hypothesis that this variable is nonnegative is rejected at the five-percent level. The coefficient for the same independent variable ranges between 0.660 and 0.662 in Table 4. The null hypothesis that these slope estimates are nonnegative is rejected at the one-percent level.

Referring once again to Tables 3 and 4, when the binary variable indicating a nonscheduled FOMC meeting is included in the regression, its slope coefficient is not statistically different from zero. When the difference between actual monthly income and estimates of the long-run level of monthly income is included in the model specification, the slope coefficient is also not statistically significant.

Other theoretically plausible independent variables were included in the regressions; however, these variables never had a statistically significant impact. When inflation was calculated using the CPI for all items and urban consumers, the change in the inflation rate was always statistically insignificant.

The percentage change in the Dow Jones Industrials was always statistically insignificant. Between two FOMC meetings, the daily federal funds rate was regressed on time in a univariate regression model that estimated an intercept and slope coefficients. When either the estimate of the slope coefficient or its t-statistic was included in the models estimated in Tables 3 and 4, the resulting slope coefficient wasn't statistically different from zero.

V. Concluding Thoughts

The Fed changes its targeted level of the federal funds rate in response to changes in economic data. During periods of heightened inflationary pressures, the Fed raises its target for the federal funds rate, signaling tighter monetary policy. Rising unemployment rates and falling real GDP imply the Fed will respond with an easier monetary policy, signaled by a decrease in its federal funds target. Using statistical evidence from simple regressions, this paper shows that the targeted level of the federal funds rate is inversely related to changes in the unemployment rate. There is also statistical evidence that the Fed will increase its target for the federal funds rate in the face of rising inflation. This is evidenced by the statistically significant, direct relationship between changes in the targeted level and changes in long-term interest rates, changes in the real price of oil, and the percentage change in consumer confidence. If the current federal funds rate significantly drifts away from its previously targeted level, the Fed will adjust its target accordingly. Finally, persistence and rigidity in monetary policy is found as there is a direct relationship between the current and previous changes in the target.

While this paper answers some initial questions, further work is needed. The determinants of changes in the federal funds rate need to be estimated using real time data available to decision makers at the time targets were set. The correct specification and the proper set of independent variables can be finalized using the sensitivity analysis suggested by Leamer (1978). One needs to determine whether increases and decreases in the targeted level of the federal funds rate are symmetric. In other words, will an increase in the unemployment rate from 5 to 6 percent cause the same change in the federal funds target in absolute value as a fall in the unemployment rate from 5 to 4 percent? Finally, the unique

statistical characteristics of changes in the federal funds rate target deserve additional thought. For example, a different estimation technique, one that corrects for the limited nature of the dependent variables, might provide better results. Nonetheless, this initial effort reveals that the Fed does follow rules, and it changes the targeted level of the federal funds rate in a predictable way.

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Table 1
Federal Funds Rate Target Set By Federal Reserve

Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate	Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate
7/27/83*	9.4375		3/21/85*	8.6250	↑
8/17/83*	9.5625	↑	3/26/85	8.5000	↓
8/23/83	9.5000	↓	4/18/85*	8.3750	↓
10/4/83	9.3750	↓	4/25/85*	8.2500	↓
11/15/83	9.3750	NO Δ	5/16/85*	8.1250	↓
12/20/83	9.3750	NO Δ	5/20/85*	7.7500	↓
1/31/84	9.3750	NO Δ	5/21/85	7.7500	NO Δ
3/1/84*	9.5000	↑	7/10/85	7.6875	↓
3/15/84*	9.8750	↑	7/25/85*	7.7500	↑
3/22/84*	10.0000	↑	8/20/85	7.8125	↑
3/27/84	10.2500	↑	8/29/85*	7.8750	↑
4/5/84*	10.5000	↑	9/6/85*	8.0000	↑
5/22/84	10.5000	NO Δ	10/1/85	8.0000	NO Δ
6/14/84*	10.6250	↑	11/5/85	8.0000	NO Δ
6/21/84*	11.0000	↑	12/17/85	7.7500	↓
7/17/84	11.2500	↑	2/12/86	7.7500	NO Δ
8/9/84*	11.5625	↑	3/7/86*	7.2500	↓
8/21/84	11.5625	NO Δ	4/1/86	7.2500	NO Δ
8/30/84*	11.4375	↓	4/10/86*	7.1250	↓
9/20/84*	11.2500	↓	4/17/86*	7.0000	↓
9/27/84*	11.0000	↓	4/24/86*	6.7500	↓
10/2/84	10.5625	↓	5/20/86	6.8125	↑
10/11/84*	10.5000	↓	6/5/86*	6.8750	↑
10/18/84*	10.0000	↓	7/9/86	6.3750	↓
11/7/84	9.5000	↓	8/14/86*	6.3125	↓
11/23/84*	9.0000	↓	8/19/86	5.8750	↓
12/6/84*	8.7500	↓	9/23/86	5.8750	NO Δ
12/18/84	8.5000	↓	11/5/86	5.8750	NO Δ
12/27/84*	8.1250	↓	12/4/86*	6.0000	↑
1/24/85*	8.2500	↑	12/16/86	6.0000	NO Δ
2/13/85	8.3750	↑	2/11/87	6.0000	NO Δ
2/21/85*	8.5000	↑	3/31/87	6.0000	NO Δ

* denotes a meeting of the Federal Open Market Committee that was not regularly scheduled. ↑ indicates the Federal Reserve raised its target for the federal funds rate, ↓ denotes a decrease in the target, and NO Δ implies the targeted level for the federal funds rate remained unchanged.

Table 1 (Continued)
Federal Funds Rate Target Set By Federal Reserve

Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate	Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate
4/30/87*	6.5000	↑	1/5/89*	9.0000	↑
5/19/87	6.7500	↑	2/8/89	9.0625	↑
7/2/87*	6.6250	↓	2/14/89*	9.3125	↑
7/7/87	6.6250	NO Δ	2/23/89*	9.5625	↑
8/18/87	6.6250	NO Δ	2/24/89*	9.7500	↑
8/27/87*	6.7500	↑	3/28/89	9.7500	NO Δ
9/3/87*	6.8750	↑	5/4/89*	9.8125	↑
9/4/87*	7.2500	↑	5/16/89	9.8125	NO Δ
9/22/87	7.3125	↑	6/6/89*	9.5625	↓
10/22/87*	7.1250	↓	7/6/89	9.3125	↓
10/28/87*	7.0000	↓	7/27/89*	9.0625	↓
11/3/87	6.8125	↓	8/10/89*	9.0000	↓
12/16/87	6.8125	NO Δ	8/22/89	9.0000	NO Δ
1/28/88*	6.6250	↓	10/3/89	9.0000	NO Δ
2/10/88	6.5000	↓	10/19/89*	8.7500	↓
3/29/88	6.7500	↑	11/6/89*	8.5000	↓
5/9/88*	7.0000	↑	11/14/89	8.5000	NO Δ
5/17/88	7.0000	NO Δ	12/19/89	8.2500	↓
5/25/88*	7.2500	↑	2/7/90	8.2500	NO Δ
6/22/88*	7.5000	↑	3/27/90	8.2500	NO Δ
6/30/88	7.5000	NO Δ	5/15/90	8.2500	NO Δ
7/19/88*	7.6875	↑	7/3/90	8.2500	NO Δ
8/8/88*	7.7500	↑	7/13/90*	8.0000	↓
8/9/88*	8.1250	↑	8/21/90	8.0000	NO Δ
8/16/88	8.1250	NO Δ	10/2/90	8.0000	NO Δ
9/20/88	8.1250	NO Δ	10/29/90*	7.7500	↓
10/20/88*	8.2500	↑	11/13/90	7.5000	↓
11/1/88	8.2500	NO Δ	12/7/90*	7.2500	↓
11/17/88*	8.3125	↑	12/18/90	7.0000	↓
11/22/88*	8.3750	↑	1/9/91*	6.7500	↓
12/14/88	8.6875	↑	2/1/91*	6.2500	↓
12/29/88*	8.7500	↑	2/6/91	6.2500	NO Δ

* denotes a meeting of the Federal Open Market Committee that was not regularly scheduled. ↑ indicates the Federal Reserve raised its target for the federal funds rate, ↓ denotes a decrease in the target, and NO Δ implies the targeted level for the federal funds rate remained unchanged.

Table 1 (Continued)
Federal Funds Rate Target Set By Federal Reserve

Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate	Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate
3/8/91*	6.0000	↓	11/16/93	3.0000	NO Δ
3/26/91	6.0000	NO Δ	12/21/93	3.0000	NO Δ
4/30/91*	5.7500	↓	2/4/94	3.2500	↑
5/14/91	5.7500	NO Δ	3/22/94	3.5000	↑
7/3/91	5.7500	NO Δ	4/18/94*	3.7500	↑
8/6/91*	5.5000	↓	5/17/94	4.2500	↑
8/20/91	5.5000	NO Δ	7/6/94	4.2500	NO Δ
9/19/91*	5.2500	↓	8/16/94	4.7500	↑
10/1/91	5.2500	NO Δ	9/27/94	4.7500	NO Δ
10/31/91*	5.0000	↓	11/15/94	5.5000	↑
11/5/91	5.0000	NO Δ	12/20/94	5.5000	NO Δ
11/6/91*	4.7500	↓	2/1/95	6.0000	↑
12/6/91*	4.5000	↓	3/28/95	6.0000	NO Δ
12/17/91	4.5000	NO Δ	5/23/95	6.0000	NO Δ
12/20/91*	4.0000	↓	7/6/95	5.7500	↓
2/5/92	4.0000	NO Δ	8/22/95	5.7500	NO Δ
3/31/92	4.0000	NO Δ	9/26/95	5.7500	NO Δ
4/9/92*	3.7500	↓	11/15/95	5.7500	NO Δ
5/19/92	3.7500	NO Δ	12/19/95	5.5000	↓
7/1/92	3.7500	NO Δ	1/31/96	5.2500	↓
7/2/92*	3.2500	↓	3/26/96	5.2500	NO Δ
8/18/92	3.2500	NO Δ	5/21/96	5.2500	NO Δ
9/4/92*	3.0000	↓	7/3/96	5.2500	NO Δ
10/6/92	3.0000	NO Δ	8/20/96	5.2500	NO Δ
11/17/92	3.0000	NO Δ	9/24/96	5.2500	NO Δ
12/22/92	3.0000	NO Δ	11/13/96	5.2500	NO Δ
2/3/93	3.0000	NO Δ	12/17/96	5.2500	NO Δ
3/23/93	3.0000	NO Δ	2/5/97	5.2500	NO Δ
5/18/93	3.0000	NO Δ	3/25/97	5.5000	↑
7/7/93	3.0000	NO Δ	5/20/97	5.5000	NO Δ
8/17/93	3.0000	NO Δ	7/2/97	5.5000	NO Δ
9/23/93	3.0000	NO Δ	8/19/97	5.5000	NO Δ

* denotes a meeting of the Federal Open Market Committee that was not regularly scheduled. ↑ indicates the Federal Reserve raised its target for the federal funds rate, ↓ denotes a decrease in the target, and NO Δ implies the targeted level for the federal funds rate remained unchanged.

Table 1 (Continued)
Federal Funds Rate Target Set By Federal Reserve

Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate	Date of FOMC Meeting	Federal Funds Rate Target	Change in Targeted Rate
9/30/97	5.5000	NO Δ	5/15/01	4.0000	↓
11/12/97	5.5000	NO Δ	6/27/01	3.7500	↓
12/16/97	5.5000	NO Δ	8/21/01	3.5000	↓
2/4/98	5.5000	NO Δ	9/17/01*	3.0000	↓
3/31/98	5.5000	NO Δ	10/2/01	2.5000	↓
5/19/98	5.5000	NO Δ	11/6/01	2.0000	↓
7/1/98	5.5000	NO Δ	12/11/01	1.7500	↓
8/18/98	5.5000	NO Δ	1/30/02	1.7500	NO Δ
9/29/98	5.2500	↓	3/19/02	1.7500	NO Δ
10/18/98*	5.0000	↓	5/7/02	1.7500	NO Δ
11/17/98	4.7500	↓	6/26/02	1.7500	NO Δ
12/22/98	4.7500	NO Δ	8/13/02	1.7500	NO Δ
2/3/99	4.7500	NO Δ	9/24/02	1.7500	NO Δ
3/30/99	4.7500	NO Δ	11/6/02	1.2500	↓
5/18/99	4.7500	NO Δ	12/10/02	1.2500	NO Δ
6/30/99	5.0000	↑	1/29/03	1.2500	NO Δ
8/24/99	5.2500	↑	3/18/03	1.2500	NO Δ
10/5/99	5.2500	NO Δ	5/6/03	1.2500	NO Δ
11/16/99	5.5000	↑	6/25/03	1.0000	↓
12/21/99	5.5000	NO Δ	8/12/03	1.0000	NO Δ
2/2/00	5.7500	↑	9/16/03	1.0000	NO Δ
3/21/00	6.0000	↑	10/28/03	1.0000	NO Δ
5/16/00	6.5000	↑	12/9/03	1.0000	NO Δ
6/28/00	6.5000	NO Δ	1/28/04	1.0000	NO Δ
8/22/00	6.5000	NO Δ	3/16/04	1.0000	NO Δ
10/3/00	6.5000	NO Δ	5/4/04	1.0000	NO Δ
11/15/00	6.5000	NO Δ	6/30/04	1.2500	↑
12/19/00	6.5000	NO Δ	8/10/04	1.5000	↑
1/3/01*	6.0000	↓	9/21/04	1.7500	↑
1/31/01	5.5000	↓	11/10/04	2.0000	↑
3/20/01	5.0000	↓	12/14/04	2.2500	↑
4/18/01*	4.5000	↓	2/2/05	2.5000	↑

* denotes a meeting of the Federal Open Market Committee that was not regularly scheduled. ↑ indicates the Federal Reserve raised its target for the federal funds rate, ↓ denotes a decrease in the target, and NO Δ implies the targeted level for the federal funds rate remained unchanged.

Table 2
Regression Specification and Expected Signs of Regression Coefficients

Equation(4)		
$DTARGET = \alpha_0 + \alpha_1 DTARGET_{-1} + \alpha_2 DU + \alpha_3 DG10 + \alpha_4 PDROILP + \alpha_5 GAP + \alpha_6 PDCON + \alpha_7 NOTSCH + \alpha_8 DYGAP + \varepsilon$		
Dependent Variable = DTARGET = Δ in the Federal Funds Target Since Previous FOMC Meeting		
Explanatory Variables	Expected Sign	
DTARGET ₋₁ = Δ in Federal Funds Target that Occurred Last FOMC Meeting	$\alpha_1 > 0$	
DU = Δ in Unemployment Rate Since Last FOMC Meeting	$\alpha_2 < 0$	
DG10 = Δ in 10-Year Treasury Rate Since Last FOMC Meeting	$\alpha_3 > 0$	
PDROILP = % Δ in Real Oil Price Since Last FOMC Meeting	$\alpha_4 > 0$	
GAP = Current Federal Funds Rate – Federal Funds Target Set Last FOMC Meeting	$\alpha_5 > 0$	
PDCON = % Δ in Consumer Confidence Since Last FOMC Meeting	$\alpha_6 > 0$	
NOTSCH = Current FOMC Meeting Was Unscheduled	?	
DYGAP = Δ in Gap Between Income and Long-Run Level Since Last FOMC Meeting	$\alpha_8 > 0$	
Equation (5)		
$PDTARGET = \beta_0 + \beta_1 PDTARGET_{-1} + \beta_2 DU + \beta_3 DG10 + \beta_4 PDROILP + \beta_5 GAP + \beta_6 PDCON + \beta_7 NOTSCH + \beta_8 DYGAP + \mu$		
Dependent Variable = PDTARGET = % Δ in the Federal Funds Target Since Previous FOMC Meeting		
Explanatory Variables	Expected Sign	
PDTARGET ₋₁ = Δ in Federal Funds Target that Occurred Last FOMC Meeting	$\beta_1 > 0$	
DU = Δ in Unemployment Rate Since Last FOMC Meeting	$\beta_2 < 0$	
DG10 = Δ in 10-Year Treasury Rate Since Last FOMC Meeting	$\beta_3 > 0$	
PDROILP = % Δ in Real Oil Price Since Last FOMC Meeting	$\beta_4 > 0$	
GAP = Current Federal Funds Rate – Federal Funds Target Set Last FOMC Meeting	$\beta_5 > 0$	
PDCON = % Δ in Consumer Confidence Since Last FOMC Meeting	$\beta_6 > 0$	
NOTSCH = Current FOMC Meeting Was Unscheduled	?	
DYGAP = Δ in Gap Between Income and Long-Run Level Since Last FOMC Meeting	$\beta_8 > 0$	

Table 3
 Factors that Affect the Changes in the Federal Reserve's Target of the Federal Funds Rate
 Dependent Variable = Change in the Federal Funds Target Occurring in Current FOMC Meeting (DTARGET)

Explanatory Variables	Model 1	Model 2	Model 3
Intercept	-0.010 (0.006)	-0.002 (0.009)	-0.001 (0.009)
Δ in Federal Funds Target that Occurred Last FOMC Meeting (DTARGET ₋₁)	0.612* (0.043)	0.612* (0.043)	0.615* (0.043)
Δ in Unemployment Rate Since Last FOMC Meeting (DU)	-0.111†† (0.059)	-0.103†† (0.059)	-0.104†† (0.059)
Δ in 10-Year Treasury Rate Since Last FOMC Meeting (DG10)	0.125* (0.026)	0.127* (0.026)	0.127* (0.026)
% Δ in Real Oil Price Since Last FOMC Meeting (PDROILP)	0.002*** (0.001)	0.001*** (0.001)	0.001*** (0.001)
Current Federal Funds Rate – Federal Funds Target Set Last FOMC Meeting (GAP)	0.161* (0.026)	0.160* (0.026)	0.158* (0.026)
% Δ in Consumer Confidence Since Last FOMC Meeting (PDCON)	0.005** (0.002)	0.004** (0.002)	0.004** (0.002)
Current FOMC Meeting Was Unscheduled (NOTSCH)		-0.026 (0.017)	-0.026 (0.017)
Δ in Gap Between Income and Long-Run Level Since Last FOMC Meeting (DYGAP)			-0.006 (0.012)
First-Order Autoregressive Error Term [AR(1)]	-0.561 (0.056)	-0.559 (0.057)	-0.561 (0.056)
R ²	0.541	0.546	0.546
F	41.502‡	36.765‡	32.601‡
DW	2.035	2.030	2.031

*, **, and *** indicate the null hypothesis that the coefficient is less than or equal to zero is rejected at the 1, 5, or 10 percent level, respectively. †† indicates the null hypothesis that the coefficient is greater than or equal to zero is rejected at the 5 percent level. ‡ indicates the null hypothesis that all the slope coefficients are simultaneous equal to zero is rejected at the 1 percent level. FOMC = Federal Open Market Committee.

Table 4
 Factors that Affect the Percentage Change in the Federal Reserve's Target of the Federal Funds Rate
 Dependent Variable = Percentage Change in the Federal Funds Target Occurring in Current FOMC Meeting (PDTARGET)

Explanatory Variables	Model 1	Model 2	Model 3
Intercept	-0.174 (0.175)	0.037 (0.235)	0.031 (0.236)
% Δ in Federal Funds Target that Occurred Last FOMC Meeting (PDTARGET ₋₁)	0.662* (0.046)	0.663* (0.046)	0.660* (0.047)
Δ in Unemployment Rate Since Last FOMC Meeting (DU)	-5.060† (1.631)	-4.852† (1.638)	-4.830† (1.644)
Δ in 10-Year Treasury Rate Since Last FOMC Meeting (DG10)	1.955* (0.715)	1.991* (0.715)	1.978* (0.718)
% Δ in Real Oil Price Since Last FOMC Meeting (PDROILP)	0.051** (0.028)	0.047** (0.028)	0.048** (0.028)
Current Federal Funds Rate – Federal Funds Target Set Last FOMC Meeting (GAP)	2.723* (0.667)	2.703* (0.667)	2.734* (0.673)
% Δ in Consumer Confidence Since Last FOMC Meeting (PDCON)	0.124** (0.057)	0.115** (0.057)	0.112** (0.058)
Current FOMC Meeting Was Unscheduled (NOTSCH)		-0.640 (0.475)	-0.632 (0.476)
Δ in Gap Between Income and Long-Run Level Since Last FOMC Meeting (DYGAP)			0.123 (0.323)
First-Order Autoregressive Error Term [AR(1)]	-0.467 (0.062)	-0.464 (0.063)	-0.462 (0.063)
R ²	0.473	0.477	0.477
F	31.376‡	27.772‡	24.616‡
DW	2.024	2.019	2.019

* and ** indicate the null hypothesis that the coefficient is less than or equal to zero is rejected at the 1, or 5 percent level, respectively. † indicates the null hypothesis that the coefficient is greater than or equal to zero is rejected at the 1 percent level. ‡ indicates the null hypothesis that all the slope coefficients are simultaneous equal to zero is rejected at the 1 percent level. FOMC = Federal Open Market Committee.

Figure 1
Actual and Targeted Federal Funds Rate: 1980s

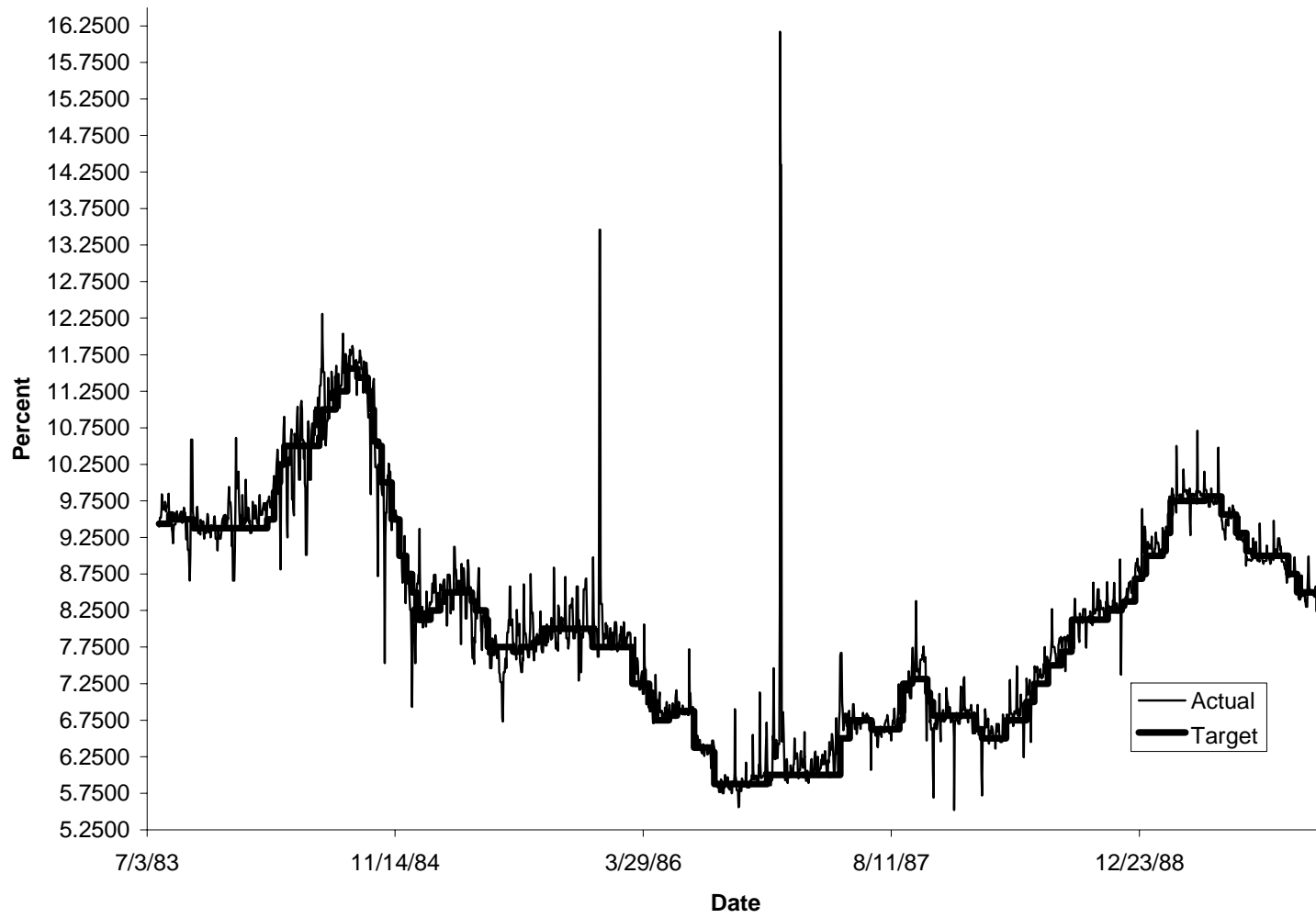


Figure 2
Actual and Targeted Federal Funds Rate: 1990s

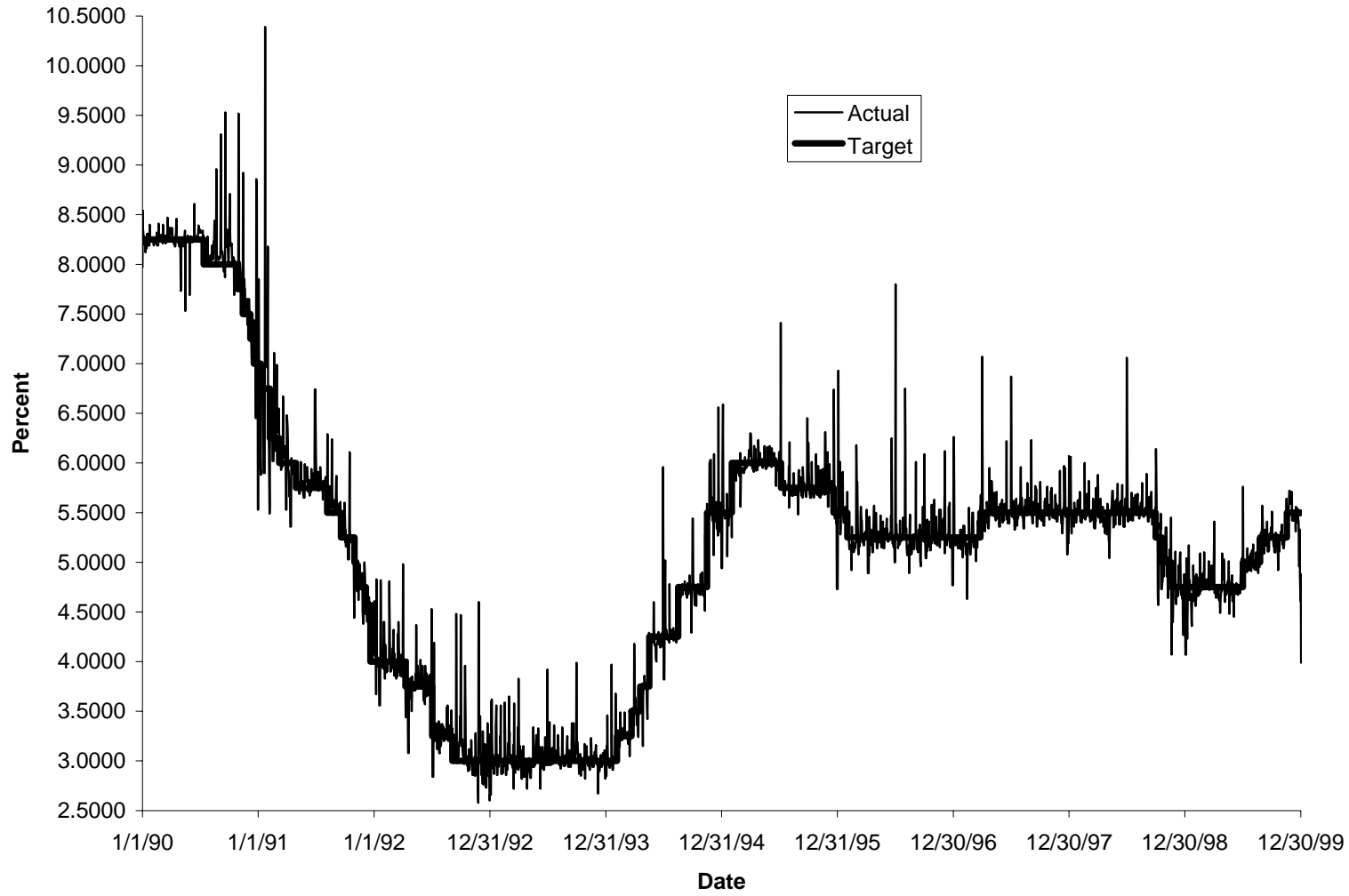


Figure 3
Actual and Targeted Federal Funds Rate: 2000s

