THE STOCK MARKET'S REACTION TO CHANGES IN THE DISCOUNT RATE: DO ANNOUCMENTS OF CHANGES ALLOW FOR ABNORMAL RETURNS?

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ABSTRACT

Many studies have been done to determine if changes in monetary policy affects the stock market. FOMC meetings are considered very important days of economic news and studies have been trying to link if a change in the discount rate increases volatility in the stock market allowing for abnormal returns. This study focuses on the impact of changes in the discount rate on regularly scheduled FOMC meetings and whether or not it affects the Dow Jones Industrial Average. The nature of my study is to run a regression with the changes of the DJIA as the dependant variable and several explanatory variables with the main variable being changes of the discount rate. The result of running my regression shows what many other studies previously done before concludes, that there is no relationship between changes of the discount rate and the DJIA. The T-tests show that there is no relationship between changes in the discount rate, whether or not the economy was in a recession or contraction, if an FOMC meetings was held no matter if a change in the discount rate occurred and if it is pre-1995 or post-1995 to the DJIA. Many reasons can explain this. For example the market could have already adjusted to the impending change in discount rate.

Introduction

Many studies have been done in the past to try to ascertain whether or not changes in the discount rate can increase volatility of the stock market. Thus if an accurate prediction of how the FOMC will change the discount rate can be made, can abnormal returns also be made? According to Rattner (2002) the efficient market hypothesis, or EMH, states that investors are unable to outperform the market on a consistent basis. The theory states that security pricing reflects all known information, which is obtained quickly and enables a company's stock prices to adjust rapidly. So is there a chance that announcements in changes of monetary policy will make the stock market volatile enough that abnormal returns can be made? This study focuses on the discount rate. Using changes the Dow Jones Industrial Average as the dependant variable; I will run a regression to see if a change of the discount rate affects the stock market.

I attempt to try to provide statistical evidence that the stock market, the DJIA in particular is affected the day that the Fed announces changes in the discount rate. There are many things that can affect how the stock market moves. For example, investor psychology, economic indicators, events in the world, major events in corporate America all have an impact on how the stock market moves. I decided to use statistical regression because similar previous studies are all mostly done with regression analysis. Regression analysis also is

appropriate because it can tell us if there is a relationship or lack of between how the Dow Jones moves and our explanatory variables.

Intuitively, when the Federal Reserve cuts the discount rate, we expect the net present value of corporate securities to increase -- that is stocks should jump. This study will try to determine if this is true. According to the efficient market hypothesis announcement changes in monetary policy should not have an effect on the stock market. In this research study, I will consider FOMC meetings and changes in the discount rate as anomalies which conflicts with the efficient market theory. My first explanatory variable is the change in the discount rate. If the t-test shows that this variable is statistically significant then it will show that changes in the discount rate does in fact affect the stock market and shows one of the failings of the efficient market hypothesis.

Other variables included in my research are whether or not during the day the FOMC meets if any changes are made. We can use this variable to compare if what move the stock market are really the changes the Fed makes or if it is exclusively the change in the discount rate. I will also investigate if whether or not the economy is in a recession makes a difference in how the stock market reacts and if the stock market reactions differed after the 1995 technology boom when the DJIA hit all time highs. These final two explanatory variables can show how investors perceive the stock market during those specific times and how differently they perceive changes in monetary policy.

Again, the objective of this study is to see if changes in the discount rate affects the DJIA in such a way that abnormal returns can be made. It is also a

good starting point to how efficient the stock market it will at least give us an idea if the markets are strong-form efficient, semi-strong efficient or weak efficient. If we find that changes in the discount rate do not affect the DJIA then we can assume that the markets are efficient and that abnormal returns cannot be made. If changes in the discount rate do affect the DJIA we can assume that the markets are not efficient and that above normal returns can be made on the day that the Fed announces its changes.

Literature Review

There are many studies that try to determine the relationship between monetary policy and the impact it has on the stock markets. The nature of my study is different from previous work done on announcement effects because I am using the Dow Jones as the dependent variable and the discount rate as an explanatory variable. Instead of focusing on the long run or the short run I plan to do my study on the opening day of the announcement to the closing of that day. I will also incorporate some other explanatory variables that might be useful in explaining how the stock market works in relationship to the discount rate. For example the other explanatory variables I am including is if there was a FOMC meeting no matter if they changed the discount rate, whether or not the change is during an expansion or contraction or if it is after 1995. Bomfim (2000) states that only in the last few years have the majority of policy decisions have actually been made at FOMC regularly scheduled meetings. Prior to this changes in monetary policy could be made anytime during the year. So in this study I will focus on the time between 1992 to 2002. As other studies have used the unemployment rate

or monetary policy as a whole in relation to the long run or short run I plan to focus on the discount rate and how on the day of the Federal Reserve's announcement it affects the Dow Jones.

Numerous studies have focused on monetary policy, other macroeconomic variables and how it affects the stock market in the short and long run. These include studies on the effect of unemployment and monetary policies as a whole. In one previous paper by John Boyd, Ravi Jagannathan and Jian Hu, the experiment revolved around the unemployment announcement. They found that an increase in unemployment is "good news" during economic expansions and "bad news" during economic contractions for the stock market. The rationale for this is that the announcement of growing unemployment typically indicates a decline in interest rates and a decline in corporate earnings and dividends. Whether or not the interest rate effect outweighs the corporate earnings effect depends on the type of stock. They also used whether or not it was an expansionary period or a contraction period. Another study by J. Durham was on the effect of monetary policy on monthly and quarterly stock market returns. This study found that using the discount rates as the main policy indicator has found that by using cross sectional variance suggest that there is a weakening relationship between monetary policy and short and long run stock market performance. This study also incorporated the monetary policy announcements of 16 countries and their stocks.

Other studies done that I looked at were about market efficiency. An article done is Business Times did a study on how market efficiency has changed

over the years. 30 years ago evidence of statistical studies revealed that prices are similar to random walks. Now there is growing evidence that markets are not completely efficient and that abnormal returns can happen.

There are not many studies that are similar to the one that I did. A study done by Michael Seiler asked the question whether the discount rate and fed funds rate affect financial market returns. His study was to determine the simultaneous effect of numerous fed policy changes across the bond and stock market. He takes into consideration who is chairman of the fed because he believes that it is important to note who was chairman and what their view on monetary policy was. His conclusion was that there was no significant announcement effect and that regulatory lags and announcement anticipation are the cause.

Data and Methodology

There are many macroeconomic variables that I could have chose from that might influence the stock market movement, but I chose the discount rate for many reasons. First of all, there is a lot of information about the discount rate. Secondly, according to the Federal Reserve Bank of New York, the discount rate is important for two reasons. One, it affects the cost of reserves borrowed from the Federal Reserve and two, changes in the rate can be interpreted as an indicator of monetary policy. Increases in the discount rate generally reflect the Federal Reserve's concern over inflationary pressures, while decreases often reflect a concern over economic weakness.

Changes in the discount rate in this study start from February 1992 to January 2002. This allows me a large enough sample to run my regression. Periods before 1992 are hard to run an analysis on because changes in the discount rate could be made anytime the Fed deemed it was necessary to be changed. By using the period after 1992 when changes were made only on days that the Fed was scheduled to meet gives us the opportunity to see if it is the changes of the discount rate affects the stock market or if it is the FOMC meeting which is always considered big economic news days. If we include periods before this when they changed the discount rate at any convenient time and when they did announce it on scheduled meetings it would be hard to differentiate what actually caused the change in the DJIA.

Our focus in this paper is to examine how stocks respond to announcements of changes in the discount rate. To do this I used the change between the closing of the day before and the closing of the DJIA on the day that the Fed announced their results. For my explanatory variables I calculated the change in the in the discount rate. I used dummy variables to explain whether or not the economy was in a recession or an expansion or if it was pre or post 1995. These two variables will give us a closer look into the relationship between monetary policy and the stock market. For example, there is an obvious difference in how the Fed conducts monetary policy during a expansion than when its in a contraction. The state of the economy sets the goals that the Fed wants to set. The post 1995 variable will show if the stock market reacts differently to changes in the discount rate during a time when the stock market

was abnormally high due to many high growth technology companies when double or even triple digit returns were not uncommon. According to Business Magazine, the ratio of stock prices to corporate earnings peaked in March 2000 at more than thirty to one. This ratio was more than twice the historic average, which have been approximately 14.5 to 1 over the last fifty years.

Regression Results

To run this regression I used Microsoft Excel at a 95% confidence level. Ignoring heteroskedasticity and autocorrelation problems I ran the regression using these variables.

Key:

% change in Discount Rate = % Change in DR

Whether or not a change was made during the FOMC meeting = Meeting Change?

1= If there was a change in the discount rate
0= If there was no change in discount rate but a meeting

If the economy was in an expansion or contraction = Exp/Cont ?

1= If the economy is in a contraction
0= If the economy is in a recession

If it was after 1995 = Post 1995

1= If it is after 1995
0= If it is before 1995

My regression results from excel are as following:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.1123
R Square	0.0126
Adjusted R Square	-0.0400
Standard Error	0.8857
Observations	80.0000

ANOVA

	df	*SS*	*MS*	*F*	*Sig F*
Regression	4.0000	0.7516	0.1879	0.2395	0.9151
Residual	75.0000	58.8411	0.7845		
Total	79.0000	59.5927			

	Coeffi	*Strd Error*	*t Stat*	*P-value*	*L 95%*	*U95%*	*L 95.0%*	*U 95.0%*
Intercept	-0.1439	0.4533	-0.3174	0.7518	-1.0469	0.7592	-1.0469	0.7592
% Change DR	0.0005	0.0011	0.4313	0.6675	-0.0017	0.0026	-0.0017	0.0026
FOMC Met?	0.1249	0.2636	0.4737	0.6371	-0.4003	0.6501	-0.4003	0.6501
Exp/Cont	0.2838	0.3933	0.7214	0.4729	-0.4998	1.0673	-0.4998	1.0673
Post 1995?	-0.1116	0.2252	-0.4955	0.6217	-0.5602	0.3370	-0.5602	0.3370

* This is not correcting for autocorrelation and heteroskedasticity.

Regression Interpretation:

The equation that this regression analysis gives us is the following:

% Change in DJIA= Constant + % Change in DRB1 + MeetingD1 + Expan/ContrD2 + post 1995D3

When we substitute the coefficients found by running our regression we get the following:

% Change in DJIA= -.1439 + .0005B1 + .1249 D1 + .2838 D2 – 1116D3

According to the results with these variables at a 95% confidence level none of my explanatory variables are statistically significant. This shows that the change in the Dow Jones is not because of changes in the discount rate. This can also be said for the other explanatory variables. The t-statistics show that it does not matter if there is a meeting of the FOMC. Two things could be said about this, one, that a meeting of the FOMC alone although considered very import days to investors have no bearing on the stock market and two, even if they do change the discount it does not affect the stock market in such a way that it would allow for abnormal returns. Whether or not the economy was in a contraction or an expansion or if it is after 1995 has no bearing on the stock market either. It shows that the technology boom or the state of the economy while important is does not come into consideration when it comes to the discount rate and the stock market.

Summary and Conclusion

Basically what these regression results say is that a change in the discount rate does not affect the stock market the day that the FOMC makes their announcement. The R^2 of 0.0126 shows that there is not much of a relationship between the two. It shows that the discount rate is just a small part of

what drives the stock market and that there are must be many other variables that makes the Dow Jones move. It shows that abnormal returns cannot be made by using the change in the discount rate or simply by using the fact that there is an FOMC meeting. We can then make the assumption based on this model, holding everything else constant that the markets are efficient. They already reflect the economic conditions that the FOMC takes in consideration when determining to change the discount rate. That is why there is not a significant change in the DJIA on the day that the Fed announces their changes. One possible reason for this is that the markets have already adjusted to the information that was available and the change in the discount rate was not a surprise. This means that investors already had the information available to forecast what the Fed is going to do ahead of time and adjust their investing behavior.

Future Research

The question that is now raised is what does affect stock market movement if it is not the discount rate. If the goal of monetary policy is to drive the economy a certain direction the stock markets should obviously reflect that. Future studies can include other monetary variables like both the discount rate and the federal funds rate. Another study could be to make a major model including many macroeconomic variables like unemployment, GDP and inflation. Maybe with more variables we could get a more accurate picture of what drives the stock market. A study could be done to see how corporate America and the many recent scandals or shocks to the economy like September 11, 2001 could affect

the stock market. More accurate statistical methods could also be employed. Heteroskedasticity and autocorrelation could be account for and adjusted.

Another suggestion is to make a non linear model. Several studies have been done this way but they have always only included one or two variables. It would be interesting to find a model where the explanatory variables explain a large portion of the stock market movement. This could be groundbreaking as it would prove the EMH theory wrong.

In sum there are still many studies that could be done to see what moves the stock market. As long as there are people who think that they could out perform the stock market.