Preliminary Thesis Report

BI Norwegian Business School

ECB's monetary policy - A study on how the stock returns differ on announcement days versus regular days

Content

1.0 Introduction and research topic

To be able to predict stock prices precisely, is a field of high interest, and studies has been frequently conducted in order to solve this problem (Bernanke & Kuttner, 2005). While a lot of applicable information concerning the economy appear randomly over time, important macroeconomic news is released in the form of pre-scheduled announcements. Although these news are scheduled, investors do not know what the news will be. All they know is that there will be news. These dates of pre-scheduled announcements are dates of higher risk, and thus the risk-averse investor should require a premium in expected return (Savor & Wilson, 2013).

A recent study by Savor and Wilson (2013), regarding the same topic have established that the Federal Reserve (The FED) has a significant impact on the stock returns post important macroeconomic news. In fact, they identified that U.S stock returns from a sample from 1958 to 2009 is significantly higher on announcement days versus non-announcement days, more precisely 11.4 bps versus 1.1 bps. However, there have been conducted relatively little research regarding the ECB's monetary policy impact on stock performance post announcements of macroeconomic news in the European market (Savor & Wilson, 2013).

This paper will examine the relationship between macroeconomic announcements from the European central bank (ECB) and the return in the stock market, more precisely the indexes on the London Stock Exchange, Euronext Paris, Frankfurt Stock Exchange and Euronext. Our mission is to identify if there are differences between stock returns after and before monetary policy announcements of macroeconomic news, regarding factors such as interest rate, unemployment rate, consumer price index (CPI) and producer price index (PPI) (Savor & Wilson, 2013).

Moreover, we will study the announcement effect ECB's monetary policy has on Sharpe ratios, future interest rates, and stock returns and compare these ratios with non-announcement days. Since our field of interest is the European market where

the ECB is the news publisher, we will study how their monetary policy affects the chosen indexes.

The motivation for this paper is to increase the knowledge about the drivers in the stock market and to investigate a specific segment that deserves more attention. Today, our field of research does not have many published papers and no clear answer on how ECB's monetary policy affects the European stock market post announcement. Our goal is to identify a pattern between the risk of holding stocks prior to macroeconomic news announcement to post announcement and therefore be able to identify the risk premium on announcement days. Recent studies have concluded that there is no significant value of monetary policy announcement by other central banks, but the FED, which indeed has enormous impact on both domestic and global stock exchanges (Savor & Wilson, 2013). Hence, we believe that ECB's monetary policy announcements will not have a significant impact on the indexes in the four chosen stock exchanges, before versus after the scheduled announcements.

2.0 Background and literature

"*The primary objective of the European System of Central Banks [...] shall be to maintain price stability.*" (The Lisbon treaty, 2018). Financial stability is the state where a build-up of systemic risk is prevented. ECB has two main task concerning financial stability; to identify risk and to assess risks (ECB, 2018). ECB monitors cyclical and structural developments in the banking sector and other financial sectors of the euro area in order to identify risks. Systematic risk has the potential to influence the stability of the euro area, financial systems and ECB's resilience is assessed by applying quantitative tools (ECB, 2018).

In 2005, Bernanke and Kuttner conducted an empirical study of the relationship between monetary policy and the equity market. This relationship is still an important question for financial sector economists and academicians today. The stock market is proposed to be a crucial channel for monetary transmission mechanism, although it has been argued by some economists that the stock market is irrelevant beyond working as a measure of expected future corporate profits

(Bernanke & Kuttner, 2005). Furthermore, Bernanke and Kuttner (2005) found that a hypothetical unanticipated 0.25 bps cut in the federal funds rate target are associated with around 1% increase in broad stock indexes. Moreover, while an unanticipated rate cut leads to an instantaneous rise in equity prices, it is usually associated with a longer period of lower-than-normal excess returns (Bernanke & Kuttner, 2005).

However, the stock market is unlikely to be affected by monetary policy actions that already were expected by the market participants. Thus, estimating the effect on equity prices from monetary policy decisions is a complicated task (Bernanke & Kuttner, 2005). Furthermore, as mentioned above there are conflicting views on whether monetary policy has an influence on stock prices. Ioannidis and Kontonikas (2006) and Jensen, Mercer and Johnson, (1996) argues that monetary policy, in fact, influence the stock market, while on the other hand, Bordo and Jeanne (2002) and Fair (2005) argues that monetary policy has a minor or no influence on stock prices.

By the discounted cash flow model, stock prices are equal to the present value of expected future net cash flows (Ioannidis & Kontonikas 2006; Jensen, Mercer and Johnson, 1996). Hence, monetary policy should have a significant role in determining equity returns, by either influencing the market players expectation of future economic activity or by altering the discount rate applied by the market players. Thus, an expansive monetary policy is usually regarded as good news, since it is associated with low-interest rates. On the other hand, monetary policy tightening should be associated with lower stock returns, because higher discount rate for expected stream of cash flows, and lower expected economic activity (Ioannidis & Kontonikas, 2006; Jensen et al., 1996).

Patelis (1997) conducted a study in order to examine the forecasting power of monetary policy variables with the variables applied in the stock predictability literature. The study seeks to establish if either set of variables has a marginally significant forecasting power. The results from the study established that a decrease in the federal funds rate had a significant positive effect on predicting stock return and an increase in the federal funds rate had a significant negative

impact on predicting stock returns (Patelis, 1997). These results, which was based on a sample of monthly NYSE value-weighted excess stock returns from January 1964 to November 1994, hold particularly on anticipated excess returns rather than expected return and dividends.

Thorbecke (1997) conducted an extensive study where he employed a great variety of methodologies to scrutinize the relationship between stock prices and monetary policy in the US. The sample consisted of 22 industries and 10 size portfolios in the period 1953-1990. Included in the VAR system is the federal funds rate, inflation, output growth and monthly equity returns. The study concludes that monetary policy shocks (which is defined as: Unexpected changes in the fed funds target) have a significant impact on small capitalization stocks (Thorbecke, 1997). Moreover, a different study which examines the influence monetary policy has on stock returns over the period 1972-2002 in 13 OECD nations (Ioannidis & Kontonikas, 2006). Presented applying a regression model that both the short-term Treasury Bill rate changes and the discount rate changes heavily influenced the stock prices. Further, these findings provided significant evidence, over 80% of the nations included in the study, in periods of tight money, was associated with a contemporaneous reduction in stock market value, and future stock return.

After the financial crises there has been renewed interest in the relationship between monetary policy and price bubbles. Further, this revived an old debate about whether and how monetary policy should act to perceived deviations of asset prices from fundamentals. In this debate, there are two lines of thoughts. Firstly, the central bank should not use interest rates to manipulate the stock market, authors agreeing with this view (Bernanke & Gertler, 2000; Greenspan, 2004; Schwartz, 2003). The arguments in line with this viewpoint are that it is challenging to identify bubbles ex-ante. Further, if this was possible, interest rates cannot burst bubbles after the bubble is developed. Hence, all central banks can do is to limit the effects of the bubble. Furthermore, the same scholars point out that central banks must create an environment of sustainable growth where bubbles are less likely to happen by keeping the rate of inflation around 2%.

On the other hand, other scholars (Borio & White, 2004; Cecchetti, 2000; Roubini, 2006) have confidence in that the interest rate can be applied to hinder bubbles from emerging. The central bank is in fact responsible to keep financial stability, and stock prices are often pro-cyclical which in time affects the stability of the economy, and hence manipulating the stock market in order to avoid bubbles from emerging. A popular opinion for reducing strong movements in the stock market is the strategy: "Leaning against the wind" (Borio & White, 2004; Cecchetti, 2000; Roubini, 2006).

Gali and Gambetti (2014), carried out a study based on estimated vector auto regression with time-varying coefficients, applied to quarterly US data. The findings signify protracted situations where stock prices increase consistently in reply to an exogenous tightening of the monetary policy under the assumption where contemporaneous response of monetary policy to asset prices is absent (Gali & Gambetti, 2014).

An alternative strategy to answering this subject is to study how expansionary or contractionary monetary policies, inflation or deflation monetary policies, and how these factors influence the stock market.

It is established that stock prices and interest rates are negatively correlated (Banerjee & Adhikary, 2009). Interest rates are low to speed up the market, and the stock market return is positively affected during times of expansionary monetary policy. These findings are based on the dividend discount model, as lower interest rate enhance the value of equity (Banerjee & Adhikary, 2009). Therefore, we get a result where fixed income securities become less attractive than stocks. Thus, the cost of capital is lowered and the profit margin is improved. On the other hand, contractionary monetary policy has opposite mechanisms since interest rates are at a higher level (Banerjee & Adhikary, 2009).

Another variable that is of significant importance on the way stock prices behave after announcements of economic news is the state of the economy. In times of economic flourishment, the stock market quickly responds to announcements about real activity and prices (McQueen & Roley, 1993). Further, it has been proven that the state dependence in the stock market's reaction is related to

announcements about growth expectation and the equity premium. (Boyd, Hu & Jagannathan, 2005)

A great quantity of macroeconomic news is announced randomly over time, but certain crucial macroeconomic news about the economy is pre-scheduled announcements, whose dates are known long in advance (Savor & Wilson, 2013). The investors do not know what the news will be, but they know that there will be news. These dates of pre-scheduled announcements are dates of higher risk, and thus the risk-averse investor should require a premium in expected return (Savor & Wilson, 2013). Following this logic, stock returns should be predictably higher on announcement days. According to Savor and Wilson (2013) this logic holds, the average U.S stock market returns from 1958 to 2009 is significantly higher on announcement day versus non-announcement days, more precisely 11.4 bps versus 1.1 bps (Savor & Wilson, 2013). This propose that somewhat 60% of cumulative annual equity risk premium is realized on announcement days. Furthermore, the Sharpe ratio is 10 times higher and the risk-free rate is comparatively lower on announcement days (Savor & Wilson, 2013). Thus, investors are compensated for bearing macroeconomic announcement risk.

Policies and decisions applied by central banks have a great impact on the securities market. The Federal Open market committee (FOMC) interest rate decisions strongly affect equity prices (Bernanke & Kuttner, 2005). The Federal Reserve has a unique impact on global equity prices that stem from other factors than the importance and size of the U.S economy (Savor, Wilson & Brusa, 2016). Sharpe ratios and average stock market returns in the U.S, are around 20-40 times higher on pre-scheduled FOMC announcement days versus non-announcement days (Savor & Wilson, 2013). Savor and Wilson (2013) further identify that FOMC announcements in a sample from 1978-2016 have a large effect in almost every international stock market, and this effect is on average stronger in the different international markets compared to the U.S itself. The combined global average market excess return is 43.4 bps over a two-day FOMC window versus only 3.4 bps on non-announcement days (Savor et al., 2016) This difference is significant (and positive) in 29 (37) out of 38 countries. This effect has been gradually stronger in the more recent years. In the same sample, they find that

BOE, BOJ, and ECB virtually has no announcement effect either on the U.S market, but more surprisingly in their home markets. Investors from The United Kingdom, Japan, and Europe demand lower risk premium associated with their own -central bank decisions than they do by FOMC announcements (Savor et al., 2016). A possible explanation for these findings could be that the Fed have announced good news more often than BOE, BOJ, ECB or that these markets has substantial number of multinational corporations that is exposed to the U.S economy.

3.0 Methodology

In this thesis we will concede with a quantitative perspective to gather the needed data based on our research question. Williams (2011) argue that a typically quantitative approach requires a research question containing numerical data (Williams, 2011).

MacKinlay (1997) states that by using financial market data, an event study will measure the impact of a specific event. Thus, by considering the impact the ECB's monetary policy has on announcement days regarding stock returns, is an event study (MacKinlay, 1997).

At the moment our preferred method on evaluating the robustness of our research will be to apply different data samples i.e. testing our hypothesis over different subsamples of the whole sample. Thus, we will apply all our regressions and tests with different subsamples and test various estimation span.

In order to choose a model, we have applied already existing empirical literature. The most frequently applied factors are money supply and the interest rate. Thus, our model will consist of: Money supply, interest rate and inflation, as elements that ECB has as monetary policy instruments, and the market price, of one share, for the stock market.

In this paper we a going to test the following three hypotheses:
1   Sharpe ratio will be higher after scheduled announcements of macroeconomic news

2 Stock returns will be higher after scheduled announcements of
   macroeconomic news
3 Future interest rates will be higher after scheduled announcements of
   macroeconomic news

Historically, many scholars have studied the sensitivity of realized returns to pre-scheduled announcements of monetary policies. An example could be a negative inflation shock, which is an announcement of an inflation rate lower than market expectation, could induce a positive contemporaneous stock market return.

These papers define announcement day surprise as Zt+1, which is defined as the difference between the forecast and the announced value. Furthermore, a test asset return Rt+1 is decomposed into its residual and its conditional expectation (Savor & Wilson, 2013):

$$r_{t+1} = E_t[r_{t+1}] + \beta z_{t+1} + \varepsilon_{t+1}.$$

Flannery and Protopapadakis (2002) argue that in the simple one-factor model, researchers regress the market return(Rt) on a potential factor surprise (Zt).

$$r_t = E_{t-1}(r_t) + \beta z_t + u_t.$$

Flannery and Protopapadakis (2002) uses the same model as Savor and Wilson (2013) only with asset return in the time period t.

Together with Flannery and Protopapadakis (2002) and authors like Schwert (1981), Pearce and Roley (1985), Bomfim (2003) and Gurkaynak, Sack, and Swanson (2005) indeed investigate the responsiveness β of stock returns to different macroeconomic shocks. Flannery and Protopapadakis (2002) argue that there is a reliable relationship between the market portfolio and the factor if the coefficient β is statistically significant. Other scholars like Boyd, Hu, and Jagannathan (2005) explore how unemployment surprises affect security returns. They identified a negative stock market reply to news of increasing unemployment during economic contractions (negative beta), and a positive reply during expansions (positive beta). Andersen, Bollerslev, Diebold, and Vega

(2007) also finds that stock market response to macroeconomic news also depend on the state of the economy.

Considering the time frame of interest, we are prepared that this will be a demanding task, especially when we take into account the difficulties the economy in the Euro Zone have experienced, bearing in mind the financial crisis and other difficulties which have resulted in alternative monetary policy from ECB.

3.1 Data

In order to congregate the monetary policy decisions made by the ECB, we intent to use the ECB's own database. Furthermore, in order to examine the relationship between monetary policy announcements and stock returns, we need to collect historical data concerning stock prices and indexes. At the moment before submitting this paper, we have not decided which database(s) to apply in order to solve this task. Shortly after the submission of this paper we will decide on which database(s) to apply. There is certainly no shortage of databases that could provide historical stock quotes and indexes. Historically, this has been much harder to come by, but after the introduction of the internet this is no longer the case. Therefore, we are considering the databases Yahoo Finance, Bloomberg, and Orbis. The main advantage of using one or more of these databases, is that they provide plenty of criteria that can be employed in order to narrow the sample, so that the selected data would be appropriate. Since the European Union was established 1. November 1993, we would like to analyse the period from 1. January 1994 to the present.

Other sources of data, such as journals articles, books, newspaper articles etc. will be used as secondary sources. The contributions will be cited according to academic standards to guarantee that credit is awarded.

One limitation of our study will be the data, because we will collect all relevant data in a short time-period, which in turn can affect the reliability of our research. Another limitation is that other studies have partly studied our subject, and

concluded based on their sample, that ECB's monetary policy announcement have no significant impact on the stock market in Europe.

4.0 Tentative plan for completion of thesis

We have made a tentative timeline for the completion of this master thesis. The model below shows our action plan from the deadline of the preliminary thesis to the submission of the final thesis.

Task	January	February	March	April	May	June	July
Continue with literature review	███	███	███				
Collecting data		███	███	███			
Write the thesis		███	███	███	███	███	███
Improvements based on feedback						███	███

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