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Announcement days and the beta effect on the US stock market

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Abstract

In this paper the CAPM beta effect is researched when important macroeconomic news (PPI, unemployment rates or FOMC meetings) is released in to the market. A distinction is made between normal, announcement and FOMC days. Results show that stocks or portfolios with a high beta perform especially well on FOMC days while there is no sufficient evidence for announcement days. Implying that beta helps explain systematic risk. Furthermore, beta depicts a negative relation to returns on normal days referring to the low volatility effect. Following from the beta effect, the paper shows that it is beneficial to invest in high betas on special days while you are better off investing in low betas on normal trading days. In order to further expand existing literature, accounting anomalies as well as size, value and momentum factors are introduced and tested on each day. For the majority of trading days, daily returns are better explained by variables focused on the fundamentals of a company. Specifically, gross profitability, book to market ratio, historical volatility, accruals, market capitalization and past one year return exhibit a significant effect. With respect to announcement and FOMC days, not only beta but also the return on assets is a strong predictor for stock returns.

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1. Introduction

Macroeconomic announcements regarding inflation, interest rate changes, unemployment rate as well as FOMC (Federal Open Market Committee) have been crucial insights for investors as these events brought new information to the market where investors could act upon or potentially alter investment strategies. Monetary policies are based on the current market environment of their country. One recent example is the Covid-19 pandemic which started in March 2020. The fear of a global pandemic caused countries to go in lockdown. Ultimately leading to supply chain issues and a spike in unemployment. In the US, the unemployment rate increased from 3.5% in February 2020 to a staggering 14.7% in April. The Federal Reserve (FED) quickly adapted their policies by lowering their federal fund rates to near zero and implementing quantitative easing which caused financial markets to recover and unemployment to drop back to normal levels. Hence, monetary policies are based on the current market environment but at the same time are set to achieve the primary goals of the FED. The main objective of the FED is to reach full employment and keeping prices stable by setting a 2% inflation target rate. Even though the majority of the trading days within a year are considered to be normal days, the average excess return on announcement days is significantly larger compared to normal days. Previous literature has examined the difference in daily returns when information is released in the market. Savor & Wilson (2013) argue that more than 50% of the equity risk premium is captured during announcement days. They further expand their literature in 2014 by examining the effect of stock market betas on stock and portfolio returns during announcement days (release of PPI, unemployment rates and FOMC meetings) versus normal days. Savor & Wilson (2014) show that there is a positive and significant relation between average daily excess returns and stock market beta during an announcement day. Implying that high beta stocks are associated with a higher magnitude in returns during announcement days. This is in contrast with the results found for normal days, where stock market beta does not have a significant effect on daily excess returns. Hence, the capital asset pricing model (CAPM) predicts returns during announcement days while CAPM does not hold during normal days. Savor & Wilson (2014) argue that it is important for future research to shed light on this difference during different types of days. Explicitly, why does market beta predict excess return on announcement days while it has no explanatory power on normal days.

This research paper tries to explain why the beta effect is absent on normal days and further tests whether the beta effect has changed throughout the years. The main findings of Savor & Wilson (2014) are replicated, except for incorporating a more recent timeframe. The research takes place from 2002 up until 2022 and during this period two major recessions occurred. Namely, the financial crisis of 2008 and the Covid-19 pandemic in 2020. During both crises, strong policy changes were made by the Federal Reserve such as cutting interest rates and buying treasuries in order to stimulate the financial

market. Hence, important FOMC meetings took place in this period. Noteworthy, is that quantitative easing was introduced for the first time after the banking crisis and has become a popular policy. The downside risk of such policies is rising inflation and deviating from the 2% inflation target rate. In the interest of the paper, three different types of days are considered. Announcement days similar to the paper of Savor & Wilson (2014) which represent the release producer price index (PPI), unemployment rate and the Federal Open Market Committee (FOMC). Second, the FOMC meetings are viewed as a separate announcement day. Finally there are normal days where no announcement has been made which represents the majority of trading days. The first hypothesis that will be tested following from the paper of Savor & Wilson (2014) is that *the stock market beta has no significant impact on daily excess returns during different types of days.* The hypothesis is tested for individual stock returns as well as different portfolios created based on a stocks beta, volatility and a double sorted portfolio on size and book to market. Results show that beta does not have a significant effect on excess daily returns during announcement days, except of the value weighted volatility portfolios. This is in contrast with the findings of Savor & Wilson (2014) who did find a positive and significant relation for the different portfolios. Contrary, when solely focussing on FOMC meetings, excluding PPI and unemployment releases, the market factor beta does become significant for all portfolios. Not only for portfolios returns but the same results are shown for individual stock returns. Potential explanations for the disappearance of the beta effect on announcement days are that the release of PPI and unemployment rates has become irrelevant due to the fact that the market is forward looking. Therefore, no new insights are given to the market and expected rates are already priced in. Another reason was mentioned by Kuttner (2005) who argued that monetary policies have a direct effect on the US stock market and an indirect effect on inflation and unemployment rates. Regarding normal days, the beta effect does hold for both the volatility and the size and book to market portfolio, while it does not for the beta portfolio and individual stock returns. After the beta effect has been examined based on a Fama Macbeth regression, the process is repeated but this time using a pooled regression. Meaning a dummy variable for the announcement/FOMC day and an interaction effect between beta and the announcement day is included. Similar results are found in the pooled regressions. Furthermore, for individual stock returns, additional regressions are set up controlling for the Fama French three factor model plus momentum by creating betas for each of the control variables. The tables show that the value beta is a strong predictor on announcements days while only the stock market beta shows significant results on FOMC days. The next hypothesis that will be investigated follows from previous literature of Blitz van Vliet (2007) who argue that low volatility stocks earn high risk adjusted returns compared to high volatility shares. Even though correlation between beta and volatility of a stock can be high, the different methods of calculation help diminish correlation. Hence, making it an intriguing comparison. The paper investigates the second hypothesis, *low volatility*

portfolios do not outperform high volatility portfolios on different days. This is a contradictory hypothesis as Blitz & Van Vliet (2007) expect the difference to be positive while Savor & Wilson (2014) show that high beta stocks experience larger returns during announcement days. Specifically, going long in the low beta/volatility portfolio and short in the high beta/volatility portfolio. The results on the beta portfolio show a negative alpha for both FOMC days and announcement days. These significant results satisfy the argument of Savor & Wilson (2014). Hence, high beta portfolios perform better during these special types of days. In contrast to normal trading days where alpha turns out to be positive. Implying that the volatility effect is present as argued by Blitz & Van Vliet (2007). Next, the results for the long short volatility portfolio show negative alphas on all days.

Additionally to the hypotheses focussing solely on announcement/FOMC days, the research paper further sheds light to answering the questions on why beta is not a good indicator during normal days. From this point of view a new regression is made including the historical volatility per share in addition to the beta factor. Following from this regression, results indicate that beta is a strong predictor during FOMC days while the volatility factor is a considerate variable during normal days. Implying that stocks with a higher past volatility should be rewarded with higher daily excess returns. The next step of the paper is to expand the existing literature by creating additional regressions including different type of accounting anomalies as well as a size, value and past return factor to test whether these independent variables add predictive power to our regressions during different types of days. This is important as there may be other factors that better explain daily returns rather than the beta effect. The paper does find sufficient evidence that accounting anomalies such as accruals and gross profitability do significantly affect returns on normal days. Furthermore, while the size and value factor positively influence returns on normal days, the past year variable shows a negative relation to returns. For announcement and FOMC days, not only beta but also the return on assets of a company is a strong predictor for daily excess returns. Finally, a robustness check is applied in order to control for time. Pooled regressions are recreated but this time introducing a fixed effect of time expressed in days. The interaction effect between announcement day and beta becomes positively significant for all different portfolios.

After the introduction, the paper is divided in the following sections. Section 2 examines the existing literature and its findings regarding the topic of the research paper, announcement days and the beta effect on the US stock market. Section 3 shows which data will be used and the methodologies that are implemented. Section 4 depicts the results and provides answers to our main hypotheses. Section 5 introduces additional accounting anomalies to the regression and test their significance on different types of days. Next, in section 6 a robustness check is applied to control for the fixed effect of time.

Finally, section 7 will conclude the paper and gives room for discussion and recommendations for future research ideas.

2. Previous literature

Prior to explaining what data and methodology are used in the research paper, it is important to gain more insight from previous literature and their arguments related to the beta effect. Starting with the paper of Savor & Wilson (2014) which is closely related to this research. Savor & Wilson (2014) argue that the CAPM beta is a strong predictor for returns when announcements are made. Noteworthy, just like this research paper, an announcement day is considered to be a day when there is a release of PPI, unemployment rates or a FOMC meeting is scheduled. Their results show that there is a positive relationship between beta and returns. Explicitly, high beta stocks should earn greater returns when there is an announcement day. The contrary is true for normal trading days. However, no significant relation has been found on normal days. Their results even show that high beta portfolios experience negative returns on normal days. Hence, Savor & Wilson (2014) argue that a successful research should explain the positive relation of beta and return on announcement days and why there is no relation on normal days. Potential reasons for no effect during normal days could be a common noise factor or no new information is given to the market. A previous study of Savor & Wilson (2013) also found significant results on announcement days. Since new information is put into the market during announcement days, stock market returns tell us something about the future state and condition of the market. For example, when inflation stays below its expected rate, this would be an indication of a strong market implying stock market returns to go up. Hence, during announcement days there will be more systematic risk and in turn, should be rewarded with higher expected returns. This is meaningful as systematic risk refers back to the beta of the CAPM model which is used in this research paper. Savor & Wilson (2013) further argue that the systematic risk does not only influence the stock market but also the bond market. They found that bond returns are positively influenced by announcements, where returns increase monotonically. Explicitly, long maturity bonds are more affected in contrast to low maturity bonds. Next up, rather than looking at multiple announcement days, Bernanke & Kuttner (2005) focus solely on monetary policy changes and the effect on the stock market. They argue that policy changes have a direct effect on stock market returns while it has an indirect effect on inflation and employment. This is in contrast with the paper of Savor & Wilson (2014) who argue that inflation and unemployment news also have a significant effect on returns. Bernanke & Kuttner (2005) show that a decrease of the federal fund rate is associated with an increase in the stock market return and vice versa. Not only does the change in policy affect stock market returns, it differentiates between industries. Safe industries such as energy are not significantly affected by monetary policy changes while the tech industry is. Multiple explanations are mentioned by Bernanke & Kuttner (2005) for the

effect of monetary policy changes on stock returns. In case of a Fed fund rate decreases, the real interest rate (interest minus inflation) decreases leading to a lower discount rate in the future. A lower equity risk premium since debt (interest costs) becomes cheaper, making a stock less risky. Further, a rate decrease leads to higher future dividends as investors tend to switch from government to corporate bonds which offer higher dividend payments. Moreover, literature suggests that FOMC meetings have a significant effect on stock market return. Followed by the paper of Rosa (2013) who uses an event study in order to examine whether volatility increases when the FOMC minutes are released. The FOMC minutes provide more detailed information on the monetary policy and is released shortly after the FOMC meeting. Rosa (2013) argues that after the release of FOMC minutes, the volatility increases significantly across different asset classes such as treasuries, stocks and currencies. However, the paper further argues that the volatility effect caused by FOMC minutes has been diminishing since 2008. Implying that the general FOMC meetings pass down sufficient information to the market and became more transparent in the last decade. The paper of Nikkinen, Omran, Sahlström & Äijö (2006) confirm that U.S. macroeconomic announcements significantly affect volatility in stock markets. However, not only does it affect the U.S. stock market, large international markets such as the G7 countries, European countries as well as Asian markets experience spillover effects. They further argue that the release of CPI and employment rates are of main importance. Hanousek, Kocende & Kutan (2008) expand the literature by focusing on EU and US macroeconomic announcements and their effect on European emerging market returns such as Hungary, Poland and Czech Republic. Results show that EU news impacts all three markets while US macroeconomic news only influences the returns on the Hungary and Czech Republic market. The only reason therefore is due to the fact that there are more foreign investors in these countries. Hence, more trading takes place on US announcements. Next, the paper of Bomfim (2000) comes with some interesting results. Like Nikkinen, Omran, Sahlström & Äijö (2006), Savor & Wilson (2014) and Rosa (2013) he found an increase in market volatility when a FOMC meeting takes place. His results show that the average stock market return goes down when the federal fund rate goes up. This effect is stronger when the interest rate is increased above expectations. These results are similar to the findings of Bernanke & Kuttner (2005).

The research paper further examines whether low volatility/beta portfolios outperform high volatility/beta portfolio during announcement days which corresponds to the second hypothesis. Contrasting results can be found in previous literature. While Savor & Wilson (2014) argue that larger beta shares experience greater returns during special days, Blitz & Van Vliet (2007) show results which indicate that you are better of buying low volatility shares that would ultimately lead to higher risk adjusted returns. They further argue that when investing in lower volatility shares, this would improve the sharpe ratio of portfolios. Another interesting remark made by Blitz & Van Vliet (2007) is that low

volatility portfolios underperform high volatility during market booms. However, during recessions or market turmoil, low volatility portfolios outperform high volatility portfolios. Hence, when taking everything together, the outperformance during market turmoil offsets the losses during market booms. However, Blitz & Van Vliet (2007) mention that trading upon the low volatility effect can be difficult in practice. For example, institutions may be prohibited to apply leverage in order to exploit low volatility stocks. Another reason could be a decentralized investment approach. Indicating that many investors are likely to rather invest in high beta shares in order to try and outperform the market during market booms. Ultimately causing underpricing in low volatility shares. The third and final reason is behavioural biases toward risk seeking behaviour. Hence, the upward potential is more important than the downside risk.

Finally, for the research paper, it is crucial to examine additional accounting anomalies since Savor & Wilson (2014) did not find sufficient evidence for the beta effect on normal days. Hence, there might be other factors that better explain daily stock returns rather than the stock market beta for both announcement, FOMC and normal days. The paper of Stambaugh, Yu & Yuan (2011) examine 11 anomalies and their effect when investor sentiment is either low or high. Sentiment in the market determines the trend of all shares. Stambaugh, Yu, Yuan (2011) create long short portfolios based on each anomaly. Following from their results, they found three major contributions. First is that anomalies in the short leg are more overpriced during high market sentiment. Second, the long leg portfolios have similar returns regardless of market sentiment. Hence, there is little overpricing in the highest rank of anomalies. Third, for long short portfolios, returns are greater during periods of high sentiment. Due to the fact that overpricing is more likely due to short sale restrictions. Tan Zhang Zhou (2023) use the set of anomalies of Stambaugh, Yu & Yuan (2011) and other groups of anomalies and test them during FOMC meeting days. Tan, Zhang & Zhou (2023) argue that returns for different anomalies are unchanged whether it is an FOMC day or normal day. However, returns are larger during FOMC days because there is a stronger market drift present. They further contribute to the literature and show that trading behaviour for retail investors changes during FOMC meetings. Retail traders are uncertain on what might happen on the next day when a FOMC meetings takes place. Thereout follows that they do not know what type of information anomalies contain and ultimately scale down their trading on such anomalies.

3. Data & methodology

3.1 Data

In the next section, an overview is given for all the data that has been gathered for the research. Since this paper is an extension on the literature of Savor & Wilson (2014), similar data is used over a more

recent time period starting from January 2002 until December 2022. The starting point of 2002 is chosen in order to prevent taking the monetary policies of the dotcom bubble into account and its effect on the US stock market. Furthermore, two major recessions occurred within our time frame. The banking crisis of 2008 and the Covid-19 pandemic in 2020 which played a crucial role in the Federal Reserve's monetary policy. Hence, FOMC meetings were highly anticipated by investors as the policies could determine the trend of the market. Next, only US stock returns are taken into consideration. Daily stock returns and supplementary data can be found on the Center of Research in Security Prices (CRSP). It is important to have a well defined data set. That is why only the major exchanges are used which are the New York stock exchange (NYSE), American stock exchange (AMEX) and the Nasdaq. The data is further specified by excluding all types of shares except for ordinary common shares. Based on the stock returns, different portfolios are constructed based on a specific characteristic. Additionally, after creating regressions on different portfolios and individual stock returns which will be discussed in the methodology, regressions are controlled for the Fama French size, value and momentum factor as well as accounting anomalies presented in previous literature of Stambaugh, Yu & Yuan (2011). Next up, all the different type of announcement days and their release dates are gathered in order to examine the difference in returns between normal days and announcement days. Three types of information events will be considered announcement days. Namely, the release of producer price index, unemployment rates and Federal Open Market committee (FOMC) meetings. Both the release of unemployment rates and PPI can be found in the archives of the U.S. Bureau of Labor Statistics. Releases of PPI and unemployment rates come available once every month. Further, the scheduled FOMC meetings are extracted from the official site of the Federal Reserve (ST FRED). In Contrast to announcement days, the normal days are considered to be all the trading days that are not related to FOMC, inflation or unemployment releases. Noteworthy is that the FOMC meetings are also viewed separately.

3.2 Methodology

The next chapter focuses on the methodology of the paper. The first hypothesis that is tested in the paper is that *the stock market beta does not have a significant effect on stock and portfolio returns during different types of days.* the hypothesis will be tested for three unique portfolios as well as individual stock returns. The first portfolios consists of ten beta sorted portfolios measured by the excess return of stocks relative to the excess market return. The second is slightly different, ten portfolios are created based on their historical volatility, this idea was first illustrated in previous literature of Blitz & van Vliet (2007). Hence, the volatility portfolios are based on the standard deviation of individual stocks with a rolling window of 36 months using daily stock returns. The final portfolios that are constructed consist of a double sort on size and the book to market ratio, with both groups expressed in quintiles. Ultimately, creating 25 different portfolios. Furthermore, all portfolios are

rebalanced at the beginning of every month. Next, because we do not exclude any small caps or penny stocks it is interesting to differentiate between equal weighted and value weighted portfolios. By doing this, it provides an additional robustness check to investigate whether the beta effect is significant when accounting for size within portfolios. In order to check whether the first hypothesis is true we need to create an extra variable that indicates whether a certain day is considered to be an announcement day or a normal day. Hence, a dummy variable is created that has the value of one when there is a release of inflation (PPI), unemployment rate or a scheduled FOMC meeting on that day and zero otherwise. In recent years, monetary policies became more popular and new policies are implemented in order to combat inflation and unemployment as the goal of the Federal Reserve is to reach full employment and keep inflation steady at 2%. During the research paper, a comparison is made between announcement (PPI, unemployment, FOMC meetings) days and FOMC meetings as a separate dummy variable. After preparing the portfolios and creating an announcement day dummy variable it is possible to set up a regression. Regarding the first hypothesis and testing if beta has a significant effect on stock and portfolio returns during announcement or FOMC days, a Fama Macbeth regression is set up using the following equation:

(1) $Ri_{(t+1)} - rf_{(t+1)} = y0_t + y1\beta i_t$

Where Ri stands for the return for respective portfolio i and rf equals the risk free rate expressed as the one month treasury bill. Hence, the difference equals the excess return of portfolio i at time t which is expressed in days. On the right hand side, y0 depicts the intercept of the regression and y1 represents the coefficient for its respective beta. Equation (1) will be tested for all the portfolios during announcement days, normal days and FOMC days. Following from the Fama Macbeth two-way linear regressions, the same regressions is recreated but this time a pooled regression is used introducing the announcement day dummy variable as well as an interaction effect between beta and the dummy variable. The pooled regression is:

(2) $Ri_{(t+1)} - rf_{(t+1)} = y0_t + y1\beta i_t + y2Aday_{(t+1)} + y3\beta i_t Aday_{(t+1)}$

The left hand side is the same as in equation 1, representing the daily excess return of a portfolio on the next day. Opposed to the first equation, two new variables are introduced. Aday is the dummy variable relating to the announcement day which has the value of one when the next day is considered to be the release date of inflation (PPI), unemployment rate or an FOMC meeting. Since the pooled regressions are recreated but only considering FOMC meetings as a dummy, the variable Aday changes to FOMC. Finally there is an interaction effect between the dummy variable Aday and the stock market beta to help explain the beta effect during announcement days. For the pooled regression, the standard errors are clustered by time in order to account for autocorrelation and heteroskedasticity. The results

of the beta effect on different portfolio returns during different types of announcement days is depicted in table 1 and 3 while the pooled regressions are shown in table 2 and 4.

After answering the first hypothesis for each respective portfolio, the regressions are recreated but now in the interest of individual stock excess returns. Table 5 represents the regressions with respect to announcement days (PPI, unemployment and FOMC meetings) while table 6 examines the beta effect when only including the FOMC meetings as an announcement day. Panel A and B in both table 5 and 6 show the effect of the stock market beta on stock returns. In panel C, the regression is expanded by introducing the betas of the Fama French three factor model. Next to the stock market beta, the size (SMB) and value (HML) factor beta are taken into consideration as well as the momentum (UMD) factor beta as it will improve explaining the daily excess return during different types of days. This further helps to verify whether the stock market beta of the CAPM model remains a significant factor and to examine if certain characteristics of stocks can be exploited and traded on during different types of days. Panel D uses the same variables but now in a pooled regression to check if the interaction effect is still significant. In the next part, a comparison is made between the average daily returns on normal versus announcement days for each type of portfolio. This helps to explain which kind of portfolios are more or less affected during special days. Or which portfolios tend to perform well during normal days. Table 7 shows the average daily return for all the 25 size book to market portfolios. While table 8 and 9 represent the daily average return for the ten beta sorted and volatility sorted portfolios respectively. For simplicity, the returns are calculated for the value weighted portfolios. Hence, the size of the shares within portfolios is taken into consideration. If the average returns are larger on announcement days in contrast to normal days, this could indicate that the release of PPI, unemployment rates or scheduled FOMC meetings bring new information to the market where investors act upon. Furthermore, in the appendix table 10 can be found which shows the average returns of the Fama French three factor model.

After the average returns have been examined for each type of day, the paper further develops to answer the second hypothesis which states that *low volatility portfolios do not outperform high volatility portfolios during different days.* The hypothesis will be tested for both portfolios sorted and beta and historical volatility. Hence, a new portfolio is created by going long in the low volatility/beta decile and short in the high volatility/beta decile which is shown in table 11. The hypothesis is examined to test whether the results of Savor & Wilson (2014) still hold. They argued that high betas show significantly larger returns during announcement days in contrast to low beta stocks. This makes economic sense because the investor should get rewarded for investing in a riskier stock. Hence, the risk return trade off which argues that higher risk stock show higher return. A contradicting argument comes from Blitz & van Vliet (2007) who mention that low volatility stocks exhibit higher risk adjusted

returns than their high volatility competitors. Considering we have two recession in our relative small time period of 20 years, it can be interesting the invest in the low volatility shares during market turmoil.

The next step of the paper is to expand the existing literature of Savor & Wilson (2014) by introducing additional accounting anomalies, as well as factors controlling for volatility, size, value and momentum in order to examine if there are alternative variables that explain daily stock returns on different types of days. A new Fama Macbeth regression is created, introducing a historical volatility factor to the beta (CAPM) factor on excess stock returns, as represented in table 12. Since Savor & Wilson (2014) did not find a significant effect of beta during normal days, this paper contributes to the literature in the hope that historical volatility does help explain returns on normal days. It is possible to compare both variables as the correlation is 0.09. Furthermore, as additional check the variance inflation factor (VIF) is used which measures the multicollinearity between the independent variables. The VIF has a value of 1.01. Hence, historical volatility and beta are not correlated with each other.

Subsequently, an additional test is to introduce accounting anomalies to the model. Previous literature of Stambaugh, Yu & Yuan (2011) shows that anomalies can be traded on when market sentiment is high. Explicitly, buying the highest rank of the anomaly and shorting the worst ones exploiting the mispricing effect. Important is that sentiment determines the trend of the market and the market often experiences high market sentiment when a FOMC meeting is due. Hence, all securities tend to move in the same direction. Table 13 presents the daily excess return of individual stocks on the stock market beta and three accounting anomalies. Namely, return on assets (roa), gross profitability (GProf) and accruals. Based on these anomalies the following regression is set up:

(3) $Ri_{(t+1)} - rf_{(t+1)} = y0_t + y1\beta i_t + y2roa(i)_t + y3Gprof(i)_t + y4accrual(i)_t$

Similar to the previous equations, the left hand side represents the daily excess stock return for stock i on the next day. The right hand side shows the intercept, beta effect and the three anomalies for each respective stock at time t. Noteworthy is that the accounting anomalies are calculated at the beginning of each month. Further, accounting for extra factors helps to determine whether beta remains a significant variable that predicts returns during announcement and FOMC days. Furthermore, the regression also helps to indicate whether certain anomalies tend to predict stock returns during normal days which the beta effect could not do. Finally, table 14 is an extension on table 13 which also takes the Fama French size and value factor into consideration as well as the past the one year return variable. This leads to the fourth equation:

(4) $Ri_{(t+1)} - rf_{(t+1)} = y0_t + y1\beta i_t + y2MCi_t + y3BMi_t + y4Past\ year\ (i)_t y4roa(i)_t + y5Gprof(i)_t + y6accrual(i)_t$

Equation 4 is similar to equation 3 but now there are additional control variables. First, the market cap factor (MC) is calculated for each respective stock at the beginning of each month. Second, the book to market ratio (BM) variable becomes available every quarter. Finally, the past year factor represents the return of a share in the last twelve months, recalculated every month. The regression tests whether beta and other variables have significant power on daily returns during different types of days. Specifically, does beta have explanatory power on announcement and FOMC days and do other anomalies help explain returns on normal trading days.

The final step of the research paper is to create a robustness check for the pooled regressions. Implying that the robustness check is used to investigate what will happen with the interaction effect between announcement days and beta if the regressions are controlled for time. Explicitly, is the interaction effect significant after absorbing days. Table 15 shows the pooled regressions with a fixed effect of time and can be found in the appendix. The regressions are constructed for individual stocks as well as different types of portfolios, both equally and value weighted.

4. Results

4.1 Beta effect on announcement days

In the next section, multiple tables are reported and examined. In this research it is of main importance to focus on the beta effect with the aim to determine if beta does affect portfolio returns during announcement days. As mentioned earlier, the results are created for normal trading days, announcement days which are the release dates of inflation (PPI), unemployment rates and FOMC meetings. In addition to the announcement days, FOMC meetings are also looked at in isolation. Starting with table 1 which reports Fama Macbeth regressions for the beta effect on daily excess returns for different portfolios during announcement days and normal trading days where the coefficients are expressed in percentages. The first thing that jumps out for announcement days is that, for most portfolios, the beta coefficient is insignificant except for the value weighted volatility portfolios shown in panel B. This would imply that an increase in beta of one would increase the daily excess return by 0.152% or 15.2 bps (basis points) on announcement days. The intercept equals -0.026% meaning that volatility portfolio experiences negative returns on announcement days. When looking at the normal days for volatility portfolios represented in panel A and B, the results show that the intercept as well as beta are significant on normal days. When controlling the portfolios for size, referring to the value weighted portfolio, the beta coefficient is three times larger than its equal weighted portfolio. The beta coefficient is 0.114% or 11.4 bps for value weighted volatility portfolios on normal days versus 0.038% or 3.8 bps for the equal weighted portfolio. However, the intercept for equal weighted volatility portfolio is positive (0.019%) in contrast to the value weighted portfolios which is negative (-0.018%).

Continuing with the beta sorted portfolios which can be found in panel C and D, the results are quite interesting. For both equal and value weighted portfolios, the beta is insignificant on announcement days as well as on normal days. While it is in line with the literature of Savor & Wilson (2014) who argue that beta is insignificant on normal days, their results show that beta is significant on announcement days. For panel C on announcement days, the intercept is 0.048% and significant while the beta coefficient equals 0.037% but is insignificant. Even though the beta is not significant it remains positive. However, when looking at normal days, the sign of beta changes both in panel C and D. These results indicate that it is beneficial to invest in higher beta portfolios during announcement days as this would result in higher daily returns while it is disadvantageous on normal days. Hence, investors would be better of investing in low beta assets on normal trading days. Finally, looking at panel E and F which represent the double sorted portfolios on size and book to market. The results show that beta is negative and significant on normal days. For the equal weighted size B/M (book to market) portfolio, the intercept is 0.083% or 8.3 bps while the beta equals -0.04%. The coefficients are much larger in magnitude for the value weighted portfolios. Panel F on normal days shows an intercept of 0.25% and a beta of -0.110%, again both coefficients are significant. When comparing value weighted size B/M portfolios to the equal weighted portfolio on announcement days, the intercept remains large (0.194% versus 0.038%) but the beta becomes negative (-0.021% versus 0.042%). This is the only time the beta coefficient becomes negative for announcement days. Based on the results shown for the value weighted portfolios in panel F, high beta portfolios perform worse on announcement days while they are advantageous for the equal weighted size B/M portfolios. Following from table 1, it is possible to conclude that beta does not have a significant effect on daily returns. This is in contrast with the findings of Savor & Wilson (2014) who did find sufficient evidence for the beta effect. Some potential explanations for the disappearance of the beta effect on announcement days are that the release of PPI and unemployment rates is not relevant for the market anymore. The stock market is forward looking and is already pricing in the expected inflation and unemployment rates. If the actual rates do not differ from their expectations, no new information is given to the market where investors act upon. Only when the actual rates deviate from the expected rates there maybe come new insights in the market. Another explanation comes from the paper of Kuttner (2005), who argued that monetary policies taken by the FED during FOMC meetings have a direct effect on the stock market and give forward guidance to achieve inflation and employment goals. Hence, monetary policies have an indirect effect on inflation and unemployment.

Table 1: Daily excess portfolio returns during announcement and normal days

Fama Macbeth regression			
Type of day	Intercept	Beta	R^2 avg.

Panel A: equal weighted volatility deciles			
Announcement day	0.00459	0.08928	.444
	(0.36)	(1.47)	
Normal day	0.01930***	0.03757*	.4231
	(3.76)	(1.70)	
Panel B: value weighted volatility deciles			
Announcement day	-0.02596	0.15223**	.3924
	(-1.08)	(2.56)	
Normal day	-0.01779*	0.11378***	.3778
	(-1.88)	(5.19)	
Panel C: equal weighted beta deciles			
Announcement day	0.04796***	0.03719	.6524
	(3.49)	(0.67)	
Normal day	0.06392***	-0.00919	.6395
	(10.57)	(-0.45)	
Panel D: value weighted beta deciles			
Announcement day	0.08056***	0.01543	.5415
	(2.87)	(0.26)	
Normal day	0.08419***	-0.00588	.5303
	(7.37)	(-0.27)	
Panel E: equal weighted Size B/M 25 portfolios			
Announcement day	0.03788	0.04201	.3291
	(1.54)	(0.71)	
Normal day	0.08263***	-0.04000*	.3099
	(7.44)	(-1.86)	
Panel F: value weighted Size B/M 25 portfolios			
Announcement day	0.19377***	-0.02087	.301
	(6.80)	(-0.35)	
Normal day	0.25086***	-0.10980***	.2801
	(16.30)	(-4.79)	

*Note: The table above shows three different portfolios and for each portfolio, both the equally weighted as well as the value weighted returns are estimated. Panel A and B represent the volatility portfolios, panel C and D are the beta sorted portfolios and panel E and F represent the size and book to market portfolios. Announcement days are considered to be days when PPI, unemployment rates are released or a FOMC meeting. Next, the market factor beta is estimated using a rolling window of one year using daily returns. Furthermore, the t-statistics are shown in parentheses. The stars (*, ** and ***) show the significance of the coefficients at the 10%, 5% and 1% level respectively.*

Next up, table 2 is an extension of table 1 but rather than using a Fama Macbeth regression, a pooled regression is used with a dummy variable which has the value of one when there is an announcement day and an interaction term (Aday # Beta) between beta and announcement days being the most important factor. Furthermore, the regressions are then clustered by time, expressed in days to account for correlation. Beginning at the volatility portfolios, for the equal weighted portfolios (Panel A), the intercept equals 0.095% on normal days and will increase with 0.019% or 1.9 bps on announcement days. Further, the beta coefficients is -0.041% but becomes positive on announcement days with a value of 0.010% or 1 bps. Comparing it to the value weighted volatility portfolios (panel B), when accounting for size, it gives large differences in results. The intercept on normal days is much smaller (0.035%) and will be even lower during announcement days (-0.175%). In contrast to beta, which is positive with a coefficient of 0.068% or 6.8 bps on normal days. However, the coefficient is almost 3 times as large during announcement days represented in the interaction term which equals 0.178%. Important to mention is that all coefficients are insignificant. Advancing to the beta portfolios shown in panel C and D for both equal and value weighted portfolios, the intercept on normal days is significant and almost the same (0.087% vs 0.085%). When there is an announcement day, daily returns drop with 0.039% (significant at 10% level) for equal weighted portfolios and drop 0.004% for value weighted portfolios. Further, when looking at beta in panel C, the beta coefficient on normal days equals -0.027% but for the interaction terms it turns positive to 0.064%. The results in panel D are much smaller, the beta effect is -0.005% on normal days and 0.016% for the interaction term. Hence, the equal weighted beta portfolios are more affected by beta. Finally, panel E and F represent the size and book to market portfolios. Where the value weighted portfolios (panel F) have more powerful coefficients. For the equal weighted portfolios (panel E), the normal day intercept is 0.099% which is significant and decreases with 0.039% on announcement days. The beta coefficient is negative and insignificant (-0.050%) on normal days and positive but remains insignificant on announcement days (0.071%). For the value weighted portfolios, the intercept is significant and comes in at 0.335% or 33.5 bps but decreases with 0.059% if it is an announcement day. With respect to beta, it is significant and negative on normal days (-0.178%) while the interaction term becomes positive but insignificant with a coefficient of 0.086%. Hence, the results in this research paper are not in line with the paper of Savor & Wilson (2014) as they found the interaction effect to be significant. The results do show positive coefficients for the interaction term meaning there is a positive relation between beta and returns on announcement days. One potential explanation is that the pooled regressions are subject to the fixed effect of time. Later in the paper, the regressions are recreated, but the fixed effect of time expressed in days is absorbed to determine whether the interaction term will become positive. Another reason for an insignificant interaction term could be due to lower market sentiment when inflation or unemployment data is released. Hence, no new information is provided to the market on the release

dates. But what would happen if we exclude the release of PPI and unemployment rates as an announcement day. Explicitly, focusing only on scheduled FOMC meetings as an announcement day. The following section recreates table 1 and 2 but this time the emphasis lays on FOMC days.

Table 2: Pooled regressions for announcement days

Pooled regression					
Type of day	Intercept	Beta	Aday	Aday # Beta	R^2
Panel A: equal weighted volatility portfolios					
Announcement day	0.09456	-0.04090	0.01931	0.01035	.0000874
	(1.06)	(-0.48)	(0.14)	(0.07)	
Panel B: value weighted volatility portfolios					
Announcement day	0.03533	0.06750	-0.17501	0.17759	.0003656
	(0.48)	(1.28)	(-1.12)	(1.50)	
Panel C: equal weighted beta portfolios					
Announcement day	0.08721***	-0.02708	-0.03867*	0.06446	.000136
	(8.81)	(-1.56)	(-1.92)	(1.64)	
Panel D: value weighted beta portfolios					
Announcement day	0.08487***	-0.00541	-0.00317	0.01600	.0000127
	(3.56)	(-0.21)	(-0.36)	(0.35)	
Panel E: equal weighted Size B/M 25 portfolios					
Announcement day	0.09940***	-0.04980	-0.03913	0.07050	.000156
	(3.43)	(-1.70)	(-0.66)	(1.08)	
Panel F: value weighted Size B/M 25 portfolios					
Announcement day	0.33467***	-0.17763***	-0.05854	0.08574	.001048
	(5.48)	(-3.44)	(-1.00)	(1.35)	

Note: The table shows pooled regressions for three different kinds of portfolios which are the volatility portfolio, beta sorted portfolio and finally the 25 portfolios based on size and book to market. Furthermore, both the equal weighted as well as the value weighted returns per portfolio are estimated. Next, there is a dummy variable (Aday) which has the value of one when an announcement (release of PPI, unemployment rate or an FOMC meeting) has been made. An interaction effect is included in the regression between the market factor beta and the announcement day dummy variable. The market factor beta is estimated using a rolling window of one year using daily returns. Furthermore, the t-statistics are shown in parentheses. The stars (, ** and ***) represent the significance of the coefficients at the 10%, 5% and 1% level respectively.*

4.2 Beta effect on FOMC days

In the previous section, the results have shown that the beta on announcement days did not have a significant effect on portfolio returns with the exception of the value weighted volatility portfolio. Now,

Table 3 reports the same Fama Macbeth regression but this this time the focus is on FOMC days. Hence, the release of PPI and unemployment rates are excluded and are viewed as normal trading days. Starting with the normal trading days, the coefficients for both the intercept as well as beta for each type of portfolio are very similar to the ones depicted in table 1. The betas are positive and significant for both equal and value weighted volatility portfolios while the betas are significant but negative for the equal and value weighted size and book to market portfolios. Even though the days when employment numbers or inflation are released are now considered to be normal days, this does not change the coefficients. Potential reasons could be that these special days are only a limited amount of days and thus have no large effect on coefficients as the majority of days are still normal. Another argument is that the stock market is forward looking and already factors in the expectations of the future PPI or unemployment rate releases. Meaning that no new insights are given to the market on the release date itself. Furthermore, with respect to the FOMC days, all betas becomes significant and larger in magnitude. The only exception is the value weighted size book to market portfolios (panel F) which is positive but insignificant. When looking at the volatility portfolios, panel A shows a very low and insignificant intercept of only 0.003% or 0.3 bps. However, the beta comes in at 0.28% or 28 bps and is significant. For the value weighted volatility portfolios (panel B) the intercept becomes -0.049%. Hence, becoming negative but remains insignificant. In contrast to the beta coefficient of 0.394% which is larger in magnitude than in panel A. Meaning, if beta goes up by one on FOMC days, the value weighted volatility portfolio daily excess return would increase with 39.4 bps. Next up are the beta portfolios represented in panel C and D, these results are in line with the paper of Savor & Wilson (2014). For panel C, the beta coefficient is insignificant and negative for normal days but becomes positive and significant with a coefficient of 0.273% or 27.3 bps for FOMC days. The intercept on FOMC days is 0.034%. Comparing to the vale weighted beta portfolios (panel D), the intercept on FOMC days is almost twice as large (0.065%) but remains insignificant. The beta coefficient is almost the same being 0.263%. Finally, when looking at the size and book to market portfolios (panel E and F), the results on normal days and the respective coefficients are almost the same as in table 1. For both panel E and F, the intercept is positive and significant while the beta coefficients are negative. However, when looking at FOMC days, for the equal weighted size and book to market portfolios, the intercept is negative (-0.017%) and insignificant while the beta becomes significant, positive and larger in magnitude with a coefficient of 0.289%. The value weighted size book to market portfolios (panel F) give different results. Here, the intercept is 0.164% which is significant and positive and almost 10 times as large compared to panel E while the beta coefficient is insignificant but remains positive (0.201%). Based on the results found in table 3, it is possible to conclude that beta does have a positive and significant effect on FOMC days with the value weighted volatility portfolio having the largest beta coefficient. Furthermore, the beta coefficients of table 3 are greater in magnitude in comparison to

table 1 on announcement days. Hence, it is beneficial to invest in high beta portfolios on FOMC days. Supplementary to the existing literature of Savor & Wilson (2014), the results in this research paper show that the beta effect tends to disappear during announcement days (PPI, unemployment rate, FOMC meeting) but is strongly visible during FOMC meetings viewed separately. Indicating that the release of PPI and unemployment rates does not bring new information to the market and therefore market sentiment does not increase on these days. Hence, FOMC meetings determine the trend of the market and provide insights into the policies taken and their impact on inflation and employment. Further, it is remarkable that both the volatility as well as the size book to market portfolio experience a significant beta effect during normal days. This is in contrast with the paper of Savor & Wilson (2014) who do not find any evidence on the beta effect on normal days. One could argue that it makes economic sense for the volatility portfolios to experience a beta effect on normal days since portfolios are sorted based on their historical volatility. Therefore, high volatility portfolios should experience greater daily returns, referring to a higher beta effect. In contrast to the size and book to market portfolios which shows a negative beta coefficient. A potential explanation could be that small caps and growth stocks experience higher betas in general and are rewarded on announcement and FOMC days while exhibiting a negative relationship on normal days. These results are in line with the theory of Savor & Wilson (2014) but now the beta effect has gained significance on normal days.

Table 3: Daily excess portfolio returns on FOMC and normal days

Fama Macbeth regression			
Type of day	Intercept	Beta	R^2
Panel A: equal weighted volatility portfolios			
FOMC day	0.00318	0.28273**	.4167
	(0.16)	(2.50)	
Normal day	0.01797***	0.03593*	.426
	(3.67)	(1.70)	
Panel B: value weighted volatility portfolios			
FOMC day	-0.04902	0.39401***	.4127
	(-1.29)	(3.40)	
Normal day	-0.01778**	0.10928***	.3785
	(-1.97)	(5.23)	
Panel C: equal weighted beta portfolios			
FOMC day	0.03430	0.27341**	.6166
	(1.19)	(2.30)	
Normal day	0.06288***	-0.01278	.6419
	(11.09)	(-0.66)	

Panel D: value weighted beta portfolios			
FOMC day	0.06475	0.26287**	.5529
	(1.05)	(2.05)	
Normal day	0.08438***	-0.01218	.531
	(7.85)	(-0.58)	
Panel E: equal weighted Size B/M 25 portfolios			
FOMC day	-0.01748	0.28875**	.2937
	(-0.32)	(2.33)	
Normal day	0.08076***	-0.04094**	.3128
	(7.78)	(-2.00)	
Panel F: value weighted Size B/M 25 portfolios			
FOMC day	0.16363**	0.20053	.2647
	(2.39)	(1.56)	
Normal day	0.24652***	-0.10888***	.2833
	(17.32)	(-5.02)	

Note: The table above shows three different portfolios and for each portfolio, both the equal weighted as well as the value weighted returns are estimated. Panel A and B represent the volatility portfolios, panel C and D are the beta sorted portfolios and panel E and F represent the size and book to market portfolios. Furthermore, only the FOMC meetings are considered to be an announcement day. Next, the market factor beta is estimated using a rolling window of one year using daily returns. The t-statistics are shown in parentheses. Further, the starts (, ** and ***) next to the coefficients shows the significance at the 10%, 5% and 1% level respectively.*

Following from the results in table 3, pooled regressions are created in order to examine if the beta effect is different on normal days versus FOMC days. Table 4 reports the pooled regressions for different portfolios. However, this time the dummy variable equals one if on the next day a scheduled FOMC meeting takes place. Further, beta is mentioned both on normal days and FOMC days represented in the interaction term. The first results that jump out are the beta portfolios shown in panel C and D, where the beta coefficient is negative and insignificant on normal days (-0.027% and -0.01%). The opposite effect occurs on FOMC days. Namely, the interaction term for equal and value weighted beta portfolios is 0.231% and 0.204% respective. Indicating that beta does have a significant effect during FOMC days. Looking at the volatility portfolios in panel A, all coefficients are insignificant where the dummy variable is quite large at 0.413%. Meaning the daily excess return would increase with 41.3 bps if there is a FOMC day. However, the interaction term becomes negative implying that if beta goes up by one, the daily excess return drops by 22.5 bps. The beta on normal days is negative and small (-0.033%). Comparing to panel B, where beta is significant and positive (0.091%) on normal days but changes sign in the interaction term. Ultimately, having a beta coefficient of -0.063%. Finally, for the size and book to market portfolios shown in panel E and F, there is significant difference in the intercept.

Resulting in an intercept of 0.327% for the value weighted size and book to market portfolio which is three times larger than the intercept (0.095%) of the equal weighted portfolio. Further, beta is negative on normal days (-0.173%) while being significant for the value weighted portfolios (panel F). Turning to the interaction term, the equal and value weighted portfolios show a coefficient of 0.199% and 0.183% respective. After examining table 4, it is possible to reach to a conclusion that for beta portfolios on FOMC days, the beta effect in the interaction term does help to explain daily excess return. Indicating that high beta portfolios experience larger daily returns. These results are in line with the findings of Savor & Wilson (2014). However, for the volatility and size book to market portfolios there is no evidence for a beta effect during FOMC days. Later on in the research paper, a robustness check is implemented by absorbing the fixed effect of time in order to test if the interaction effect does becomes significant for the different portfolios.

Table 4: Pooled regressions for FOMC days

Pooled regression					
Type of day	Intercept	Beta	FOMC	FOMC # Beta	R^2
Panel A: equal weighted volatility portfolios					
FOMC day	0.08376	-0.03251	0.41258	-0.22538	.0007136
	(0.96)	(-0.39)	(1.42)	(-0.80)	
Panel B: value weighted volatility portfolios					
FOMC day	0.00134	0.09121*	0.38989	-0.06280	.001122
	(0.02)	(1.99)	(1.15)	(-0.26)	
Panel C: equal weighted beta portfolios					
FOMC day	0.08280***	-0.02662	-0.01118	0.23055**	.0008905
	(7.48)	(-1.55)	(-0.47)	(2.64)	
Panel D: value weighted beta portfolios					
FOMC day	0.08382***	-0.01000	0.01922	0.20372*	.0008581
	(3.40)	(-0.39)	(0.82)	(2.01)	
Panel E: equal weighted Size B/M 25 portfolios					
FOMC day	0.09477***	-0.04781	-0.00003	0.19931	.0006654
	(3.28)	(-1.63)	(-0.00)	(1.55)	
Panel F: value weighted Size B/M 25 portfolios					
FOMC day	0.32686***	-0.17300***	0.01799	0.18254	.001404
	(5.51)	(-3.45)	(0.15)	(1.38)	

Note: The table shows pooled regressions for three different kinds of portfolios which are the volatility portfolio, beta sorted portfolio and finally the 25 portfolios based on size and book to market. Furthermore, both the equal weighted as well as the value weighted returns per portfolio are estimated. Next, there is a dummy variable (FOMC day) which has the value of one when a FOMC meeting is scheduled. Furthermore, an interaction effect is included

between the market factor beta and the announcement day dummy variable. The market factor beta is estimated using a rolling window of one year using daily returns. Furthermore, the t-statistics are shown in parentheses. The stars (, ** and ***) show the significance of the coefficients at the 10%, 5% and 1% respectively.*

4.3 Beta effect on individual stock returns

In the previous section, the results showed that beta does have a significant effect during FOMC days viewed when viewed separately for different types of portfolios. However, when looking at the announcement days, there is no sufficient evidence for a beta effect. In the next part, a Fama Macbeth regression is made. Rather than using different portfolios, the beta effect is tested on individual stock returns. Table 5 reports the beta results on announcement and normal days. In panel A, only the beta is taken into consideration while panel B represents a pooled regression taking into account a dummy variable and interaction term. Starting of with panel A on announcement days, beta is positive at 0.055% but insignificant. This is in contrast on normal days where the beta coefficient becomes -0.023%. Hence, being negative as well as insignificant. These results show that it is disadvantageous to have high beta shares on normal days but beneficial on announcement days as this would imply higher daily excess returns. The sign of the coefficients is in line with the paper of Savor & Wilson (2014). Unfortunately, the beta is still insignificant on announcement days. Considering a pooled regression in panel B, the intercept equals 0.075% on normal days but would decrease with 0.030% if there is an announcement day. Further, the beta is again negative (-0.025%) on normal days but changes sign and is larger in magnitude on announcement days (0.063%). All coefficients are insignificant except for the intercept. Next, instead of focusing on beta as the sole explanatory variable, the betas are taken for the Fama French three factor model plus the momentum factor. Hence, besides the market beta, the size (SMB), value (HML) and momentum (UMD) factor betas are calculated for each stock. Controlling for additional factors helps determine whether the market beta still has explanatory power or if its significance diminishes when more variables are introduced in the regression. Based on the results shown in panel C, during normal days not one factor is significant except for the intercept. While stock market beta, size and momentum beta are all negatively related, the value factor is positive. In contrast to announcement days, stock market beta turns positive (0.035%) as well as the size factor beta which becomes two times larger in magnitude (0.009%). Further, the value factor beta becomes significant and remains positive with a coefficient of 0.055%. At last but not least, the momentum beta remains negative but with a magnitude 10 times larger in comparison to the coefficient on normal days. Finally, the stock market beta is insignificant both on normal as well as announcement days. Continuing to the pooled regressions in panel D, the stock market beta does becomes significant but remains negative on normal days. Other significant variables are the value and momentum factor that keep the same sign as in panel C. Next, on announcement days the intercept would be 0.028% lower while the interaction

term of beta becomes positive although insignificant. Based on the results reported in table 5 it is possible to conclude that the stock market beta does not add explanatory power in explaining individual stock returns on announcement days. However, the value factor beta does positively explain daily excess returns as shown in panel C.

Table 5: Daily excess return for individual stocks on announcement days

Type of day	Intercept	Beta					
Panel A: Beta only							
Announcement day	0.03065	0.05532					
	(1.27)	(1.19)					
Normal day	0.07516***	-0.02311					
	(8.15)	(-1.34)					
	Intercept	Beta				Aday	Aday # Beta
Panel B: Beta only							
	0.07601***	-0.02517				-0.02970	0.06336
	(6.41)	(-1.63)				(-0.89)	(1.47)
	Intercept	Beta	SMB beta	HML beta	UMD beta		
Panel C: Factor betas as control variables							
Announcement day	0.03025	0.03547	0.00866	0.05533**	-0.05029		
	(1.33)	(0.90)	(0.54)	(2.36)	(-1.62)		
Normal day	0.07042***	-0.02146	-0.00441	0.00692	-0.00952		
	(8.39)	(-1.41)	(-0.68)	(0.79)	(-0.80)		
	Intercept	Beta	SMB beta	HML beta	UMD beta	Aday	Aday # Beta
Panel D: Factor betas as control variables							
	0.07247***	-0.02601*	-0.00280	0.01235*	-0.01600*	-0.02762	0.07056
	(7.41)	(-1.84)	(-0.36)	(1.95)	(-1.74)	(-0.98)	(1.60)

Note: The table above shows the daily excess return for individual stocks. Both Fama Macbeth as well as pooled regressions are created. For the pooled regressions there is a dummy variable which has the value of one when an announcement (release of PPI, unemployment rate of FOMC meeting) has been made. Further, an interaction term is created between the beta and announcement day dummy to examine the beta effect on special days. Panel A and B only takes the stock market beta into account. Further, Panel C and D include additional factor betas in the regression. The betas are created for the Fama French size (SMB) and value (HML) factor as well as the momentum (UMD) factor beta. The t-statistics are in parentheses below the coefficients. Next, the stars (, ** and ***) show the significance of the coefficients at the 10%, 5% and 1% level respectively.*

So far, the previous tables have shown that the beta effect is absent for most portfolios as well as individual stocks during announcement days. However, when considering FOMC days, the beta effect becomes strongly positive and significant. Table 6 is just the same as table 5 but with respect to FOMC days viewed separately. Deriving out of panel A, the intercept equals 0.036% for daily excess stock returns while the beta coefficient is 0.234% or 23.4 bps which is significant at the 5% level. Further, the coefficient becomes four times larger in magnitude compared to its respective coefficient during announcement days. This implies that on FOMC days, new information comes available in the stock market where traders act upon. Hence, higher beta shares are more affected and give larger returns on these days. Similar results are obtained when looking at the pooled regression in panel B. The intercept of 0.071% is positive and significant and would increase with an additional 0.035% if a FOMC meetings occurs. When comparing beta on normal versus FOMC days, higher beta stocks perform worse on normal days with an coefficient of -0.023%. In contrast, the interaction effect which is associated with a 0.168% increase in stock returns when beta goes up by one, being significant at a 5% level. After controlling for the factor betas that are depicted in panel C, the stock market beta remains significant on FOMC days. When taking the other factor betas into account, both the size and value beta are positive but insignificant, each having a coefficient of 0.041%. These results are quite interesting when comparing them to panel C in table 5. The size factor beta becomes larger for FOMC days but both are insignificant while the value factor beta becomes insignificant but holds close to the same weight. Finally, there is no difference in the momentum factor beta, for both announcement and FOMC days, the coefficient is negative and insignificant. Subsequently, panel D in table 6 gives more insights on the stock market beta. The major difference when comparing the results to panel D in table 5 are the dummy and interaction effect. The dummy variable becomes positive, meaning that the daily excess stock return increases with 0.018% on FOMC days, this was -0.028% for announcement days. Further, the interaction term verifies that beta does have positive explanatory power on the regression. Explicitly, stock returns increase with 0.215% (significant at 5%) if beta goes up by one during FOMC days. This is a major difference in comparison to announcement days where the interaction coefficient was 0.071% and insignificant.

Table 6: Daily excess return for individual stocks, using FOMC meetings

Type of day	Intercept	Beta					
Panel A: Beta only							
FOMC day	0.03621	0.23378 **					
	(1.02)	(2.28)					
Normal day	0.07081 ***	-0.02173					
	(8.03)	(-1.33)					
	Intercept	Beta				FOMC	FOMC # Beta
Panel B: Beta only							
	0.07120 ***	-0.02283				0.03519	0.16835 **
	(6.28)	(-1.56)				(0.68)	(1.99)
	Intercept	Beta	SMB beta	HML beta	UMD beta		
Panel C: Factor betas as control							
FOMC day	0.03024	0.21119 **	0.04083	0.04124	-0.05067		
	(0.82)	(2.42)	(1.13)	(0.84)	(-0.79)		
Normal day	0.06665 ***	-0.02201	-0.00427	0.01192	-0.01333		
	(8.28)	(-1.53)	(-0.70)	(1.43)	(-1.18)		
	Intercept	Beta	SMB beta	HML beta	UMD beta	FOMC	FOMC # Beta
Panel D: Factor betas as control							
	0.06846 ***	-0.02426 *	-0.00280	0.01235 *	-0.01600 *	0.01816	0.21471 **
	(7.42)	(-1.82)	(-0.36)	(1.95)	(-1.74)	(0.41)	(2.43)

Note: The table above shows the daily excess return for individual stocks. Both Fama Macbeth as well as pooled regressions are created. For the pooled regressions there is a dummy variable which has the value of one when a FOMC meeting occurs. Further, an interaction term is introduced between the beta effect and the dummy variable to examine the beta effect during FOMC days. Panel A and B only take the stock market beta into account. Further, Panel C and D include additional factor betas based on the Fama French 3 factor model. Besides the stock market

beta, the size (SMB), value (HML) as well as momentum (UMD) factor betas are introduced to the regressions. Furthermore, The t-statistics are in parentheses below the coefficients. Finally, the stars (, ** and ***) show the significance of the coefficients at the 10%, 5% and 1% level respectively.*

With the help of the found results it is possible to answer our first hypothesis. Recall, the hypothesis states that *the stock market beta does not have a significant effect on daily excess stock and portfolio returns during different types of days.* First, since a distinction is made between announcement days (release PPI, unemployment rate, FOMC meetings), FOMC days separately and normal trading days, the hypothesis is answered for each event day separately. Starting with normal trading days, the beta effect is missing when looking at individual stock returns. Indicating that the beta coefficient is not significant. Another interesting result is that the coefficient is negative. So for the majority of trading days the investor would be better off by investing in low beta assets in order to maximize returns. This is in line with the theory of Blitz & Van Vliet (2007) who argued that low beta stocks experience higher risk adjusted returns. Noteworthy, for the pooled regressions controlling for additional factor betas, the beta effect on normal days does become significant but remains negative, this is possibly due to clustering days to adjust for the standard errors and possible correlation. Moving on to the different portfolios, there is insufficient evidence for the CAPM beta effect on beta sorted portfolios to reject the null hypothesis. This is in line with the main results of Savor & Wilson (2014) who argue that the beta effect is not significant or even negative on normal trading days. However, when examining other portfolios such as the volatility and double sorted portfolios on size and book to market, the results suggest that beta does help explain returns on normal days. With respect to the volatility portfolios, we find a positive relation between excess return and beta, referring to the risk return trade off where more volatile shares should be rewarded with greater returns. On the other hand, the size and book to market portfolios experience a negative and significant effect of beta on their portfolio returns. In general, small caps and growth shares often have larger betas which in turn decrease their returns on normal days. Next, answering the hypothesis for the beta effect on announcement days. The results found in this paper are contradictory with existing literature. Savor & Wilson (2014) show that both individual stocks as well as beta sorted portfolios and 25 Fama French portfolios are subjected to the beta effect during announcement days. However, in this research paper there is no evidence that the beta effect is significant on daily excess stock returns during announcement days. The coefficient remains positive, meaning that high beta stocks would earn higher excess returns during these days. Looking at the created portfolios, with respect to the volatility, beta, and size book to market portfolios, the beta effect seems to be absent on announcement days for all portfolios. Potential explanations on why the beta effect disappeared on announcement days are that the release of PPI and unemployment rates has become irrelevant. Meaning that the market is forward looking and is already pricing in the

expected rates. Second, as Kuttner (2005) argued, FOMC meetings have an indirect effect on inflation and employment rates since policies are implemented to achieve the goals of the FED which are a target inflation rate of 2% and reaching full employment. Furthermore, not only the Fama Macbeth regressions are insignificant, so are the pooled regressions. The coefficients are positive but do not add explanatory power. The only exception is the value weighted volatility portfolio which has a positive and significant coefficient. One reason could be due to the creation of the portfolio and controlling for size.

Finally, the paper now differentiates from the literature by considering the FOMC days separately. While there is no evidence that the CAPM beta affects the stock or portfolio returns on announcement days, it does add explanatory power on FOMC days. For the individual excess stock returns, the beta coefficient is largely positive and significant even after controlling for the Fama French factor betas. Further, when looking at the pooled regressions the same results show up, indicating that the interaction term between beta and the dummy variable of FOMC days is significantly positive. Turning to the different types of portfolios, similar results appear. With respect to the Fama Macbeth regressions, all portfolios experience a positive and significant beta effect with coefficients being larger than 0.20%. There is one exception which is the beta effect for the value weighted size and book to market portfolios where the beta is positive but insignificant. However, when considering the pooled regressions, the interaction term is not significant for the volatility and size book to market portfolios. The interaction term is even negative for the volatility portfolios, implying that excess returns would go down on these days. This is in contrast with the results found in the Fama Macbeth regression. For the portfolios sorted on size and book to market, the interaction effect remains positive but is insignificant. Finally, for the beta sorted portfolios, the interaction term in the pooled regression remains positive and significant. Based on these results, one could argue that the beta effect is relevant for days when a scheduled FOMC meeting takes place as new information becomes available to the market such as potential interest rate cuts or hikes and the general state of the economy where investors act upon. Hence, the stock market beta helps explain returns on FOMC days. Other days such as the release of inflation numbers or news related to unemployment rates do not bring new insights in the market and can be rather viewed as normal trading days. Hence, the beta effect is absent on announcement days. Markets are forward looking and are potentially already price in the expectations of the PPI or unemployment rate prior to being released. If the actual rate is equal to the expected rate, no new information becomes public.

4.4 Average returns on normal and announcement days

Previous results in the paper have shown that beta does not have a significant effect during announcements days. However, this should not mean that the daily excess return of portfolios could still be higher on announcement days in contrast to normal trading days. Other papers argue that the returns are reversed on announcement days. For example, growth stocks tend to perform really well during announcement days while value stocks which in general have a high book to market ratio perform better on normal days. In order to examine whether this argument is true, tables are created which report the average daily excess return for different types of days. Table 7 shows the excess return on 25 different portfolios sorted on size and book to market. Hence, it is possible to determine whether small or large caps perform well or growth versus value shares tend to perform well on normal days. The first feature that jumps out is that the small cap portfolios experience larger returns on both normal and announcement days compared to the large size (5) portfolios. Noticeable is that the returns decrease monotonically as the size of shares within the portfolio gets larger. Next, it is remarkable to see that for the smaller sized portfolios, the low book to market (growth) shares exhibit higher average excess returns in comparison to portfolios that have high book to market (value) shares, this effect occurs on both types of days. However, when looking at the largest size quintiles, this effect reverses. Indicating that especially on announcement days, the value portfolios tends to outperform the growth portfolios while keeping the size fixed. For normal days, the average daily excess return is larger for the growth portfolios except for the largest size quintile. Furthermore, table 8 represents the daily average excess return for the beta sorted portfolios. Theory suggests that the high beta portfolios should earn higher returns during announcement days, which is in line with the results shown by Savor & Wilson (2014). During announcement days in table 8, the highest beta portfolio (decile 10) earns an average excess return of 0.170% while that of the lowest beta portfolios (decile 1) equals 0.130%. implying that indeed high beta portfolio earn higher returns during announcement days. In contrast to normal trading days, the returns are reversed. A low beta portfolio (decile 1) is rewarded with an daily average excess return of 0.130% while the highest beta portfolio only earns 0.099% excess return. These results refer back to the low volatility effect. Implying that shares with low volatility earn higher risk adjusted returns. However, in practice this is difficult to exploit. Blitz & van Vliet (2007) argue that the low volatility effect cannot be exploited due to leverage constraints, behavioural biases by investors and investor preferences to investing in high beta shares. Continuing with table 9, which represents the average excess return for volatility portfolios. These portfolios are constructed based on the methodology of Blitz & Van Vliet (2007) who use a rolling window of 36 months with daily stock returns. While we did find a low volatility effect for the beta sorted portfolios, the effect seems to disappear for the volatility portfolios. For both normal days as well as announcement days the average excess return

increases for higher volatility portfolios. These results are in line with the risk return trade off. Indicating that the investors should be rewarded with higher returns for bearing the additional risk of investing in more volatile stocks. Furthermore, Table 9 shows that the daily average excess returns are higher on announcement days in contrast to normal trading days. For example, in the highest volatility portfolio (decile 10), the excess return equals 0.391% on announcement days and 0.298% on normal days. The absolute difference between announcement and normal days is 0.093% or 9.3 bps which is quite large. Comparing it to the absolute difference of 0.008% (0.054% - 0.046%) for the lowest volatility portfolios which is more than 10 times smaller compared to the highest decile. Hence, investing in higher volatility portfolios would result in larger average returns. In the appendix, table 10 is given which represents the average returns for the three Fama French and momentum factor. The market and size factor remain positive on both types of days. On the other hand, the momentum and value factor switch signs on announcement days. Explicitly, the value factor becomes positive while momentum turns negative.

Table 7: Average excess return by type of day, 25 value weighted size book to market portfolios (table 3 S&W)

Type of day		Growth (1)	2	3	4	Value (5)
N-day	Small (1)	0.47562***	0.32699***	0.29352***	0.28705***	0.31330***
		(6.78)	(14.01)	(11.31)	(12.94)	(19.18)
A-day		0.44483***	0.23929***	0.24793***	0.23743***	0.29114***
		(4.64)	(4.21)	(5.35)	(3.92)	(7.11)
N-day	2	0.24122***	0.18843***	0.16001***	0.13669***	0.19050***
		(9.22)	(8.39)	(7.46)	(7.52)	(8.53)
A-day		0.28998***	0.18861***	0.17747***	0.16175***	0.24086***
		(3.69)	(3.23)	(3.35)	(3.37)	(3.82)
N-day	3	0.16682***	0.12810***	0.11658***	0.10550***	0.14933***
		(6.30)	(5.24)	(4.75)	(4.36)	(5.30)
A-day		0.17054**	0.16160**	0.16876***	0.19722***	0.23618***
		(2.48)	(2.45)	(2.59)	(2.92)	(3.06)
N-day	4	0.12320***	0.08632***	0.08439***	0.08227***	0.10814***
		(5.10)	(3.85)	(3.82)	(3.56)	(3.95)
A-day		0.14304**	0.12311**	0.12953**	0.14558**	0.21497***
		(2.21)	(2.02)	(2.13)	(2.30)	(2.82)
N-day	Large (5)	0.06582***	0.05543***	0.05333***	0.05332**	0.07657***
		(3.64)	(3.12)	(2.82)	(2.53)	(2.79)
A-day		0.04751	0.08126	0.08730*	0.08107	0.10430
		(0.96)	(1.63)	(1.69)	(1.42)	(1.42)

Note: The table above shows the average excess return for 25 size book to market portfolios for different types of days. The returns are based on value weighted portfolios. The t-statistics are shown in parentheses. Further, the stars (, ** and ***) show the significance at the 10%, 5% and 1% level respectively.*

Table 8: Average excess return by type of day, value weighted beta sorted portfolios

Type of day	Low (1)	2	3	4	5	6	7	8	9	High (10)
N-day	0.12999***	0.07832***	0.06126***	0.05715***	0.05931***	0.06392***	0.06173***	0.06786***	0.07429**	0.09915***
	(11.31)	(7.04)	(4.88)	(3.93)	(3.55)	(3.39)	(2.87)	(2.75)	(2.58)	(2.62)
A-day	0.13001***	0.05837**	0.05542*	0.06747*	0.07722*	0.07155	0.07772	0.12105*	0.09100	0.17014*
	(5.01)	(2.12)	(1.68)	(1.66)	(1.68)	(1.39)	(1.33)	(1.82)	(1.19)	(1.66)

Note: The table shows the average excess return for ten beta sorted portfolios. The returns are expressed as value weighted returns for different types of days (announcement days versus normal days). Announcement days are considered to be days when news regarding PPI, unemployment rates is released or when there is a FOMC meeting. T-statistics are shown in parentheses. Furthermore, the stars (, ** and ***) depict the significance of the returns at the 10%, 5% and 1% level respectively.*

Table 9: Average excess return by type of day, value weighted volatility sorted portfolios

Type of day	Low (1)	2	3	4	5	6	7	8	9	High (10)
N-day	0.04641***	0.05960***	0.07044***	0.06857***	0.08136***	0.08985***	0.12603***	0.15094***	0.16573***	0.29846***
	(3.23)	(3.19)	(3.39)	(3.04)	(3.24)	(3.20)	(4.18)	(4.75)	(4.98)	(8.37)
A-day	0.05351	0.06910	0.08680	0.10322*	0.13922**	0.16071**	0.16326**	0.18970**	0.20326**	0.39117***
	(1.32)	(1.33)	(1.52)	(1.71)	(2.06)	(2.11)	(2.00)	(2.36)	(2.37)	(4.31)

Note: The table shows the average excess return of ten volatility sorted portfolios where returns are expressed based on value weighted portfolio returns. Furthermore, a distinction has been made between announcement (release of PPI, unemployment rate or FOMC meetings) days and normal days. T-statistics are shown in parentheses. Furthermore, the stars (, ** and ***) represent the significance of the returns at the 10%, 5% and 1% level respectively.*

4.5 Low beta/volatility portfolios versus high beta/volatility portfolios

in the previous sections, the main goal was to test whether the CAPM beta has a significant effect on stock and portfolio returns on normal, announcement and FOMC days. With sufficient evidence the paper concludes that beta is especially significant on FOMC days but not always on normal or announcement days. After considering the daily average excess return of portfolios, the second hypothesis can be created which goes as follows *low beta/volatility portfolios do not outperform high beta/volatility portfolios on announcement, FOMC or normal days.* To examine the hypothesis a long short portfolios is created. Hence, going long in the lowest beta/volatility decile while going short in the highest beta/volatility decile. Table 11 represents the daily excess return of long short portfolios on all three types of days. Further, both the equal and value weighted portfolios are created in order to control for size and examined if this makes a significant difference. Starting with panel A, the most prominent feature is the return on FOMC days equalling -0.556% or -55.6 bps and being significant on a 5% level. Indicating that high beta portfolios perform especially well during these days. When comparing to the announcement days (Aday) return of -0.079%, the return diminishes after adding the release of inflation and unemployment rates as special days. Two possible explanations follow for the smaller return. One explanation is that the low beta portfolios perform relatively well in contrast to high betas on days when inflation or unemployment rates are released. The second explanation is that expected inflation and unemployment rates are already priced in to the portfolios prior to the release, meaning that on the days of release no significant news is provided to the market. Hence, the release days of inflation and unemployment rates are similar to normal days. Now, with respect to the normal trading days, the excess return turns positive. Implying that on normal days the low beta portfolios outperform their high beta counterparties. Multiple reason are mentioned in the paper of Savor & Wilson (2014) on why this could be possible. One explanation is that beta experiences a negative relation with returns during normal days. Hence, higher beta shares have on average more negative returns on normal days. Do note that this effect is reversed when there is an announcement day which can be found back in the results of table 11. Another explanation refers back to the volatility effect implying that low beta portfolios exhibit a higher risk adjusted return. Consequently, panel B shows the value weighted long short portfolio. While the alphas keep the same sign, they do become smaller in magnitude after controlling for size. For FOMC days, the alpha is -0.500% which is 5.6 bps smaller in contrast to panel A. The alpha for normal trading days equals 0.036% and is 1.6 bps smaller in comparison to the equal weighted portfolio. Subsequent, panel C and D represent the long short portfolios based on the historical volatility factor. Thus going long in low volatility and short in high volatility portfolios. With regards to panel C, while the alpha is negative for normal and announcement days equalling -0.070% and -0.013% respective, the alpha turns positive (0.002%) on FOMC days

meaning that the low volatility portfolio outperforms the high volatility portfolios. This is in contrast with the literature as it suggests that high volatility shares should earn larger return on announcement days. This effect is shown in the results of panel A and B. However, since the alpha is very small on FOMC days, the positive sign could be due to measurement errors. On the contrary, when examining panel D, all alphas turn negative after accounting for size of the shares within the portfolio. For announcement days, the alpha is significant and equals -0.344%. This alpha is more than 25 times larger in magnitude compared the results in panel C. During FOMC days, the alpha even increases in magnitude to a significant -0.491%. Based on these results the FOMC day is the most important type of day and therefore, returns are largest in magnitude. Finally, for normal trading days, while the excess return is smallest with -0.260%, it remains negative. For this reason the low volatility effect does not hold on normal days. While Blitz & Van Vliet (2007) do find evidence for a positive excess return by buying the low volatility decile and selling high volatility decile, the results in panel D rather show negative excess returns. Hence, investors are rewarded for bearing additional risk by investing in more volatility shares.

Table 11: daily excess return of a long short portfolio for beta and volatility factor.

Type of day	Intercept
Panel A: equal weighted Long Short beta	
Aday	-0.07940
	(-0.75)
FOMC	-0.55604**
	(-2.39)
Nday	0.05170
	(1.36)
Panel B: Value weighted long short beta	
Aday	-0.02420
	(-0.23)
FOMC	-0.49555**
	(-2.19)
Nday	0.03599
	(0.97)
Panel C: Equal weighted long short volatility	
Aday	-0.01346
	(-0.30)
FOMC	0.00167
	(0.02)

Nday	-0.07033***
	(-3.90)
Panel D: Value weighted long short volatility	
Aday	-0.34407***
	(-4.64)
FOMC	-0.49120***
	(-3.01)
Nday	-0.26012***
	(-9.16)

Footnote: the intercept of the table above show the daily excess return of a long short portfolio on different types of days, both for the beta sorted portfolio as well as volatility sorted portfolios. The different types of days represent announcement days (Aday) which are days when there is a release of PPI, unemployment rates or a scheduled FOMC meeting. FOMC only consists of days when there is a FOMC meeting. Nday represents the normal trading days where no special event occur. Furthermore, both the equal and value weighted portfolios are created. Finally, the portfolios mentioned above are going long in low beta/volatility shares and short in high beta/volatility shares. Furthermore, t-statistics are shown in parentheses. The starts (,**, ***) depict the significance at the 10%, 5% and 1% level respectively.*

5. Accounting for additional anomalies

In the previous part of the paper, the beta effect has been examined for all different types of days. The results have shown that the beta effect disappeared on announcement days but remains strongly visible on FOMC days. In the following part, the research paper further expands the existing literature of Savor & Wilson (2014) by not only considering the beta effect on different days but rather focusing on additional accounting anomalies as well as other factors that could help explain the daily excess return of individual stocks on normal, announcement or FOMC days. Therefore, new tables are created which include accounting anomalies such as gross profitability, return on assets and accruals. Recall, Tan, Zhang & Zhou (2023) argued that accounting anomalies experience larger returns during FOMC days in contrast to normal days. Hence, there may be alternative factors to beta where investors could act upon during special days. Furthermore, a historical volatility factor as well as factors controlling for size, value and past yearly returns are introduced in the regression. In order to test if the anomalies experience a significant effect on daily excess stock returns, a Fama Macbeth regression is applied.

5.1 The beta effect and the historical volatility factor

Up to this moment the historical volatility is only used to create volatility sorted portfolios. Nevertheless, Blitz & Van Vliet (2007) argued that the volatility effect is still present even after including the Fama French three factor model. For the next table, the historical volatility factor is included as independent variable to check whether it has any explanatory power on daily excess stock returns.

While beta and volatility are considered to be closely related, the methodology is very different. When calculating the correlation between the CAPM beta and historical volatility of the stock we get a correlation of 0.09 which is low. An additional check is implemented to control for multicollinearity. Using the variance inflation factor (VIF) gives us a value of 1.01 indicating that there is no correlation between the independent variables. Hence, for the research it is interesting to examine if there is an alternative volatility factor that better explains returns on normal or announcement days rather than the CAPM beta. Below, table 12 is shown which represents the daily excess return for individual stocks. Commencing with panel A which only includes the historical volatility factor, the coefficient equals 0.174% but is insignificant on announcement days. Noteworthy is that the volatility factor is calculated based on the standard deviation of daily returns with a rolling window of 36 months. Hence, the volatility factor is a relative measure since it is expressed in returns. Moving back to the announcement day volatility factor, investing in higher volatility shares would result in higher excess returns. Conversely, on FOMC days the intercept is 0.264% and is significant while the volatility factor equals -1.079% which is very large but insignificant. This implies that the more volatile shares would perform worse on FOMC days. In spite of that, higher volatility shares tend to perform very well on normal trading days with a coefficient of 0.799% which is significant on a 1% level and an intercept of only 0.019%. Building upon these results, it is possible to conclude that the volatility factor helps explain returns on normal days while it does not on other special days. Specifically, investing in high volatility shares would reap higher returns on normal days while it gives negative returns on FOMC days. Turning over to panel B, both CAPM beta and the volatility factor are used as explanatory variables. Assessing the variables on announcement days, both the volatility as well as the beta factor are insignificant but positive with a coefficient of 0.120% and 0.054% respective. Examining FOMC days, the volatility coefficient turns negative at -1.255% but remains insignificant. Meaning that high volatility stocks would experience large negative returns on FOMC days. This is in contrast to the beta factor which becomes significant at the 5% level with a coefficient of 0.233%. These results look contradictory at first sight since high beta shares often experience larger price changes implying more volatility. However, since the correlation between both variables is low, a high beta stock should not have a high historical volatility. One explanation for the difference in coefficients might be that the historical volatility factor is based on the standard deviation of daily stock returns using a rolling window of 36 months while the beta factor is calculated based on a rolling window of 12 months using daily returns. Meaning that shares could have become less volatile in the last year and vice, versa. Ultimately, with respect to normal trading days the effect seems to be reversed. In other words, now the volatility factor does become significant and positive with a coefficient of 0.870% while the beta factor now turns negative with a coefficient of only -0.025%. The beta coefficient further is insignificant. In light of these outcomes, it is possible to say that the volatility factor helps to explain daily excess return on normal

days and indicates that investing in more volatile shares would reap additional returns. Firms with a high historical volatility might be associated with growth companies or small caps which are often rewarded with greater daily returns as the paper has shown in table 7. Furthermore, the beta factor does exceptionally well in explaining stock returns during FOMC days, implying that high beta stocks are rewarded with larger returns. Finally, both factors are insignificant on announcement days. Even though they are positive, they do not have any explanatory power to the model. As mentioned earlier, this is potentially due to a forward looking market where expected inflation and unemployment rates are already priced in as well as FOMC meetings and its policies having an indirect effect on inflation and employment rates.

Table 12: Excess daily stock returns including volatility factors

Type of day	Intercept	Volatility	Beta	R^2
Panel A: Volatility				
Aday	0.07211	0.17446		.005554
	(1.41)	(0.32)		
Normal day	0.01963	0.79875***		.006745
	(1.07)	(3.36)		
FOMC	0.26445***	-1.07894		.005664
	(2.74)	(-0.95)		
Panel B: Volatility + Beta				
Aday	0.02095	0.12028	0.05442	.02472
	(0.80)	(0.22)	(1.17)	
Normal day	0.03908***	0.86968***	-0.02515	.0261
	(4.17)	(3.76)	(-1.47)	
FOMC	0.06362	-1.25486	0.23338**	.02547
	(1.48)	(-1.10)	(2.28)	

Footnote: the table above shows the individual daily excess stock returns as dependent variable for different types of days. Announcement days (Aday) are considered to be releases of PPI, unemployment rates and FOMC meetings. FOMC is also seen as a separate announcement day. Beta represents the stock market beta based on a rolling window of one year using daily returns. Next, the volatility factor equals the historical volatility of each respective stock based on the standard deviation with a rolling window of 36 months using daily returns. Furthermore, the t-statistics are shown in parentheses. The stars (, ** and ***) represent the significance of the coefficients at the 10%, 5% and 1% level.*

5.2 Introducing accounting anomalies

The paper has shown that the beta and volatility factor do well in explaining excess returns during different types of days. However, there may be even more anomalies that explain daily returns. For the

succeeding part, the research paper is expanding the existing literature by introducing accounting anomalies to the model as they tend to give information about the state of a company. Using additional variables contributes to our main research topic that there may be even better factors to invest in rather than beta on different types of days. Stambaugh, Yu & Yuan (2011) argued that creating long short portfolios on a certain anomaly results in greater returns when market sentiment is high. Noteworthy, when a FOMC meeting is scheduled, market sentiment increases significantly. Hence, investing in healthy companies could be beneficial when certain announcements are made. Followed by table 13, three new anomalies are introduced. Namely, return on assets , gross profitability and accruals. One important aspect for these anomalies is that they are relative measures , meaning that the factors are divided by their total assets. Thus, the coefficients give an indication in which direction the returns are affected. Analysing panel A of table 13, the beta effect remains similar to previous tables. Thus, being positive on announcement days but negative on normal days, both being insignificant. When considering the accounting anomalies, the return on assets (roa) factor is significant on announcement days with a coefficient of 0.056%. This would imply that companies with a strong net income relative to their total assets experience larger returns on announcement days. Indicating that healthy companies are safe assets to invest in when macroeconomic announcements are made. In contrast to normal trading days, the effect seems to disappear or even become negative. Next, the gross profitability (Gprof) term is negative (-0.007%) and insignificant on announcement days. However, for normal trading days the factor switches signs and becomes significantly positive (0.023%) at a 1% level. These are some noteworthy discoveries as this would suggest that companies with strong revenues after deducting direct costs perform better throughout the year in contrast to companies with low revenues. Nonetheless, the factor does not determine returns on announcement days. Further, the accrual factor is negative for both types of days. On announcement days, the coefficient is really small equalling -0.010%. This could be due to the fact the factor is insignificant, thus having no effect on announcement days. On the other hand, the coefficient becomes larger in magnitude and significant for normal trading days, the coefficient is -0.025%. Considering these results, one could argue that the more accruals a company has, the more uncertainty there is for paying or receiving future payments. Hence, having a negative effect on stock returns. Now let's investigate if these anomalies help explain returns on FOMC days which are shown in panel B. Starting of with the beta effect. Even after implementing additional anomalies the beta effect remains positive and significant on FOMC days. This is in line with the results found in the previous tables where beta is viewed separately. Next, while the roa's coefficient does become larger (0.093%), it is not significant anymore in contrast to the announcement days. One explanation could be the lack of observations. In spite of that, a firm with strong return on assets is rewarded with larger returns on FOMC days. The same story goes for the Gprof factor, the coefficient now becomes positive and is larger in magnitude in comparison to

announcement days (0.048% vs -0.007%). Implying there is a positive relation between revenue and stock returns, as can be seen in normal days as well. However, since the coefficient is not significant, it does not help explain returns on FOMC days. Nevertheless, when there is uncertainty about the future state of the economy, it might be beneficial to invest in profitable and healthy firms. Finally, the accrual factor remains insignificant but turns positive with a coefficient of 0.023%, the coefficient was negative during announcement days. Accordingly, accruals is not a good factor that forecasts returns on special days. Though it does especially well on normal days, showing a negative relation between accruals and excess stock returns. Taking everything together, the table indicates that gross profitability and accruals are strong independent variables that help determine returns for stocks on normal days. While beta does so for FOMC days and return on assets helps explain returns on announcement days.

Table 13: Daily excess stock return, controlling for accounting anomalies

Type of day	Intercept	Beta	roa	Gprof	accrual	R^2
Panel A: individual stocks on Adays						
Aday	0.03456	0.05510	0.05626*	-0.00739	-0.00995	.02604
	(1.43)	(1.19)	(1.70)	(-0.37)	(-0.33)	
Normal day	0.06550***	-0.02171	-0.00154	0.02311***	-0.02498**	.02709
	(7.09)	(-1.27)	(-0.11)	(2.99)	(-2.20)	
Panel B: individual stocks if FOMC						
FOMC	0.01758	0.24023**	0.09337	0.04798	0.02271	.0263
	(0.48)	(2.37)	(1.27)	(1.10)	(0.35)	
Normal day	0.06317***	-0.02071	0.00263	0.01840**	-0.02466**	.02698
	(7.15)	(-1.27)	(0.20)	(2.52)	(-2.30)	

Footnote: The table shows the daily excess return for individual stocks. Panel A focuses on multiple announcement days (Aday) which are the release of PPI, unemployment rate and FOMC meetings. Panel B solely focuses on FOMC meetings as an announcement day. Beta represent the stock market beta. Further, multiple accounting anomalies are taken into account which are return on assets (Roa), gross profitability (Gprof) and accruals. The t-statistics are shown in parentheses. Furthermore, the stars (, ** and ***) represent the significance of the coefficients at the 10%, 5% and 1% level respectively.*

In the subsequent section, table 13 is expanded with more independent variables. Since it is not possible to apply the Fama French three factor models or momentum due to the fact that these factors are used for time series regressions. This is in contrast with the research paper which uses panel data. In order to have similar factors that represent the size and value factor, MC gives the market capitalization of a share in billions while BM is the book to market ratio of a company. Furthermore the past year variable is used as an alternative for the momentum factor. Table 14 is shown below, where panel A focuses on announcement days and panel B looks at FOMC days specifically. Commencing with

panel A, the first aspect that jumps out is that the roa variable remains positive but now becomes insignificant for announcement days while it was significant in the previous table. Indicating that the other new variables become more important to predict stock returns. Furthermore, the Gross profitability and accrual factor remain insignificant. Interestingly, the new variables BM (book to market ratio) and past year are significant and help explain excess stock returns on announcement days. Where the BM factor has a positive relation with a coefficient of 0.023%, meaning if book to market ratio goes up by one, daily excess returns would increase with 2.3 bps. For the past year factor the relation is negative. Hence, high book to market stocks perform better on announcement days while shares that had a positive past yearly return are likely to suffer from negative returns. When taking a look at the size factor MC, the coefficient of -0.0003% is insignificant but suggests a negative relation between size and stock returns. Based on the coefficient, larger firms experience worse returns on announcement days. Moving forward to normal days, Gprof and accrual show the same results as in table 13. However, the coefficients do become greater in magnitude after introducing additional variables to the regression. Next, the past year and BM variable both remain significant on both days, with the book to market ratio becomes slightly smaller in magnitude while the past year variable gets larger in magnitude. Regarding MC, the factor becomes significant on normal trading days with a coefficient of -0.0001%. Signalling that large cap stocks are in a disadvantage and investors would be better of investing in small caps on normal as well as announcement days. Furthermore, the beta effect remains the same. Explicitly, positive on announcement days, negative on normal days and both being insignificant as shown earlier. Continuing with the regressions on FOMC days represented in table 14 panel B, the beta effect becomes positive and significant with a coefficient of 0.228% which has almost the same weight as in table 13. Next, while the Gprof and accrual factors remain insignificant on FOMC days, the roa variable becomes significant at the 5% level with a coefficient of 0.219% which is three times greater than the one observed on announcement days. This is quite an intriguing finding as in table 13, roa was significant on announcement days but it is not in table 14. On the other hand, it was insignificant in table 13 while it is significant in table 14 after introducing more explanatory variables during FOMC days. Based on the results, it is possible to conclude that roa has a strong positive relation to returns on special days. Hence, investing in healthy firms with strong earnings would reap additional returns. Satisfying the argument of Tan, Zhang & Zhou (2023) who found returns to be greater during FOMC meetings. Shifting to the size (MC) and value (BM) variable, both show an insignificant and negative effect on returns. Indicating that size and book to market show no sufficient evidence in explaining excess returns on FOMC days. This is in contrast with the BM factor which had a significant and positive coefficient on announcement days. One reason could be that announcement days have more observations with the inflation and unemployment rate days looking similar to normal days which causes the coefficient to be positive and significant. At last but not least, the past year variable carries

on to be significant and negative with a coefficient slightly larger in magnitude during FOMC days in comparison to announcement days. Hence, results show a reversal effect for shares that performed well in the last year. Meaning that stocks with a positive past one year return are likely to suffer from negative returns in the future. Based on the results shown in table 14, It can be concluded that not only beta but also roa (return on assets) has a positive and significant effect on FOMC days. Hence, it is beneficial to invest in high beta and financially healthy companies with strong earnings when FOMC meetings are scheduled. This effect is in line with the paper of Kuttner (2005) who argued that the stock market is directly impacted on these days. Further, this also explains the lack of sufficient evidence for beta and roa on announcement days as monetary policies already give information about the expected inflation and unemployment rate. Meaning, the release dates of inflation and unemployment data are irrelevant. Noteworthy is that both factors remain positive but are insignificant for announcement days. On the other hand, while beta is not a strong predictor for daily stock returns on normal days, there are plenty of other factors that help explain returns on the majority of trading days. Explicitly, gross profitability and accruals do especially well with gross profitability having a positive relationship and accruals exhibiting a negative effect on stock returns. Next, the other factors controlling for size, value and past returns are also strong predictors on normal trading days. Whereas both size and past year return experience a negative relationship, the value factor shows a positive relation on stock returns.

Table 14: Daily excess stock return, controlling for size, book to market and accounting anomalies

Type of day	Intercept	Beta	MC	BM	Past year	Roa	Gprof	Accrual	R^2
Panel A: Adays									
Aday	0.01381	0.04934	-0.00026	0.02262 **	-0.01823 ***	0.06113	0.00908	-0.02579	.03398
	(0.53)	(1.05)	(-1.36)	(2.11)	(-3.27)	(1.40)	(0.40)	(-0.71)	
Normal day	0.04573 ***	-0.02057	-0.00012 *	0.01895 ***	-0.0198 ***	-0.0097	0.03995 ***	-0.03198 **	.03577
	(4.64)	(-1.17)	(-1.79)	(4.31)	(-7.46)	(-0.54)	(4.61)	(-2.31)	
Panel B: FOMC day									
FOMC days	0.04022	0.22846 **	-0.00006	-0.01080	-0.02556 **	0.21922 **	0.01778	0.00118	.03389
	(0.97)	(2.20)	(-0.13)	(-0.49)	(-2.32)	(2.42)	(0.35)	(0.01)	
Normal days	0.04186 ***	-0.02004	-0.00014 **	0.02041 ***	-0.01940 ***	-0.00835	0.03678 ***	-0.03230 **	.0356
	(4.44)	(-1.20)	(-2.19)	(4.92)	(-7.82)	(-0.49)	(4.48)	(-2.48)	

Footnote: The table shows the daily excess return for individual stocks. Panel A focuses on multiple announcement days (Aday) which represent the release of PPI, unemployment rate and FOMC meetings. Panel B solely focuses on FOMC meetings as an announcement day. Beta represent the stock market beta. Further, MC represents the market cap of a company expressed in billions while BM shows the book to market ratio of a firm. The Past year anomaly represents the return of a share in the last one year. Next, multiple accounting anomalies are taken into account which are return on assets (Roa), gross profitability (Gprof) and accruals. T-statistics are shown in parentheses. Furthermore, the stars (, ** and ***) represent the significance of the coefficients at the 10%, 5% and 1% level respectively.*

6. Robustness check, day fixed effect

In the subsequent segment the paper conducts a robustness check for the pooled regressions. explicitly, pooled regressions are created but this time the fixed effect of time, which is expressed in days, is absorbed. Even though the dummy variable of FOMC or announcements days is omitted, the interaction effect remains visible. This factor is of main importance since the regression tests whether the relation between beta and the dummy variable is positive and significant. In the appendix, table 15 represents the pooled regressions for both individual stocks and different portfolios. With respect to the portfolios, the equal and value weighted portfolios are taken into account. After the fixed effect of time, the foremost highlight of the table is that all interaction terms become significant and positive. Hence, there is a positive relation between announcement or FOMC days and beta. With respect to the individual stocks in panel A and B, the interaction effect on FOMC days equals 0.216% which is almost three times as large in contrast to the interaction effect of 0.071% on announcement days. Meaning it is beneficial to invest in high beta stocks during special days. Moving on to the portfolios, for the beta sorted portfolios, the interaction effect is significantly larger in magnitude for FOMC days relative to announcement days. Subsequently, for volatility sorted portfolios, the interaction term on announcement days is quite similar to the one of the beta sorted portfolios. However, focussing on the interaction term on FOMC days, the coefficient drops in magnitude and is only twice as large than the announcement days interaction effect. Finally, for the double sorted portfolios on size and book to market ratios, the interaction effect is considerably bigger during FOMC days compared to announcement days. When beta is examined separately on normal trading days, the coefficients remain negative for both individual stocks and all portfolios. Indicating that high beta would negatively impact daily excess returns during normal days. The only exception can be found in the value weighted volatility portfolios represented in panel K and L. In this scenario, high beta volatility portfolios experience larger excess returns. This could be a measurement error since the equal weighted volatility portfolios do suffer from a negative beta coefficients. But since the same effect occurs in the previous tables 2 and 4, the difference in sign is likely related to weight of the shares within the portfolio.

7. Conclusion

Previous literature of Savor & Wilson (2014) has shown that the CAPM beta has a positive effect on stocks and portfolio returns during announcement days. This research paper does not find such evidence in the period examined. To be more precise, the beta effect is absent for individual stocks, volatility, beta and size and book to market sorted portfolios during announcement days. On the other hand, there is sufficient evidence that the beta effect has a strong positive relation on daily excess returns during FOMC days, where beta is significant for all different portfolios and individual stocks. A potential explanation for these results could be that the expected inflation and unemployment rates are already priced in. Therefore, they do not give new market insights when the actual rates are released and can rather be viewed as normal trading days. Another reason comes from the paper of Kuttner (2005) who argued that monetary policies taken by the FED on FOMC days indirectly affects inflation and unemployment rates in the future. On the contrary, for normal trading days, the beta effect is similar to the paper of Savor & Wilson (2014) who argue that beta is insignificant but experiences a negative relation. The same holds in this paper where beta, size and book to market portfolios as well as individual stocks are negatively affected. The research paper does find new evidence for the volatility and size and book to market portfolios. Namely, results show that beta is significant on normal days. Remarkably even influencing volatility portfolios positively. Implying that bearing additional risk is rewarded with larger returns. Hence, the first hypothesis whether beta does not influence daily excess returns cannot be rejected for announcement days while it does have significant impact on FOMC days. The paper further sheds light to the hypothesis whether the low beta/volatility portfolio outperforms the high beta/volatility portfolio on different types of days. With respect to the beta portfolios, high betas are exposed to larger returns on both announcement and FOMC days. Hence, the long short portfolio shows negative returns. These results are in line with Savor & Wilson (2014) who argue that returns are larger in magnitude for high beta shares. Regarding normal days, the long short beta portfolios is positive, meaning that low beta outperforms high beta portfolios. This phenomenon is also called the volatility effect as shown by Blitz & Van Vliet (2007), who argue that low volatility shares experience higher risk adjusted returns. For the long short volatility portfolios, returns are negative for all types of days. The research paper further expands the existing literature by examining additional anomalies on each type of day. Results have shown that the following variables explain returns on normal days: historical volatility, gross profitability and book to market all experience a significant positive relation with returns, while accruals, past one year return and market cap exhibit a negative relation to returns. These results suggest that the fundamentals of a company better explain daily returns on normal days rather than focusing on a share's volatility relative to the market, referring to the beta effect. With respect to announcement days, the book to market ratio positively influences

stock returns. In contrast, the past one year return consistently shows a negative impact on both FOMC and announcement days. Ultimately, the return on assets which is close to but not always significant, positively enhances returns on both FOMC and announcement days with a relatively large magnitude. Its significance points to the importance of investing in healthy companies with a strong roa which in return drives stock returns. Therefore, not only beta but also accounting anomalies such as return on assets is a strong predictor for daily stock returns on both FOMC and announcement days. For future research, it is suggested to take a deeper look into the release of unemployment and inflation release dates as the paper did not find any evidence for a beta effect in the last two decades when taking them together. Explicitly, examining the inflation and unemployment rates release dates separately to determine if beta does influence excess returns. Furthermore, another interesting topic to explore is whether beta remains effective in explaining returns when the actual rates deviate from the expected rates as the market is forward looking. If this effect occurs, the market is presented with new information which is not yet priced in where investors quickly act upon. Making it an interesting subject for future research.

8. References

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9. Appendix

Table 10: Average return by type of day, Fama French 3 factors and momentum factor

Type of day	MKTRF	SMB	HML	UMD
N-day	0.03341*	0.00183	-0.00168	0.01248
	(1.83)	(0.21)	(-0.15)	(0.81)
A-day	0.04448	0.03508	0.04227	-0.01914
	(0.89)	(1.42)	(1.41)	(-0.50)

Note: The average excess return for the Fama French three factors are estimated for announcement (release of PPI, unemployment rate or FOMC meetings) days and normal days. T-statistics are shown in parentheses. Furthermore, the stars (, ** and ***) represent the significance at the 10%, 5% and 1% level respectively.*

Table 15: Robustness check, pooled regression of stocks and portfolio while absorbing the fixed effect of days

	Intercept	Beta	Aday # Beta	R^2
Panel A: Individual stocks Aday				
	0.07427***	-0.02817***	0.07146***	.08571
	(34.57)	(-13.66)	(9.85)	
	Intercept	Beta	FOMC # Beta	R^2
Panel B: Individual stocks FOMC				
	0.07425***	-0.02636***	0.21616***	.08573
	(34.55)	(-12.41)	(18.85)	
	Intercept	Beta	Aday # Beta	R^2
Panel E: equal weighted beta portfolio, Aday				
	0.07970***	-0.02498*	0.07047***	.727
	(6.07)	(-2.01)	(12.54)	
	Intercept	Beta	FOMC # Beta	R^2
Panel F: equal weighted beta portfolio, FOMC				
	0.07968***	-0.02663*	0.31860***	.7273
	(6.07)	(-2.12)	(21.95)	
	Intercept	Beta	Aday # Beta	R^2
Panel G: value weighted beta portfolio, Aday				
	0.08286**	-0.00573	0.03197**	.6687

	(3.07)	(-0.25)	(2.31)	
	Intercept	Beta	FOMC # Beta	R^2
Panel H: value weighted beta portfolio, FOMC				
	0.08284**	-0.01117	0.28987***	.669
	(3.06)	(-0.48)	(8.65)	
	Intercept	Beta	Aday # Beta	R^2
Panel I: equal weighted volatility portfolio, Aday				
	0.12621*	-0.08058	0.08478*	.8684
	(1.98)	(-1.28)	(2.11)	
	Intercept	Beta	FOMC # Beta	R^2
Panel J: equal weighted volatility portfolio, FOMC				
	0.12630*	-0.07623	0.18417**	.8684
	(1.99)	(-1.25)	(2.43)	
	Intercept	Beta	Aday # Beta	R^2
Panel K: value weighted volatility portfolio, Aday				
	-0.03663*	0.11740***	0.09890***	.8095
	(-1.93)	(5.82)	(4.48)	
	Intercept	Beta	FOMC # Beta	R^2
Panel L: value weighted volatility portfolio, FOMC				
	-0.03658*	0.12308***	0.19894***	.8095
	(-1.92)	(6.01)	(3.98)	
	Intercept	Beta	Aday # Beta	R^2
Panel M: equal weighted size B/M portfolio, Aday				
	0.10835***	-0.06916***	0.11325***	.7623
	(8.14)	(-5.92)	(6.94)	
	Intercept	Beta	FOMC # Beta	R^2
Panel N: equal weighted size B/M portfolio, FOMC				
	0.10827***	-0.06801***	0.39634***	.7625
	(8.13)	(-5.65)	(11.34)	
	Intercept	Beta	Aday # Beta	R^2
Panel O: value weighted size B/M portfolio, Aday				

	0.34243***	-0.19732***	0.11968***	.5423
	(6.51)	(-4.32)	(5.40)	
	Intercept	Beta	FOMC # Beta	R^2
Panel P: value weighted size B/M portfolio, FOMC				
	0.34241***	-0.19451***	0.36752***	.5424
	(6.51)	(-4.49)	(7.75)	

Footnote: The following pooled regressions are created as a robustness check by absorbing the fixed effect of time (days). Therefore, the dummy variable whether it is an announcement days (Aday) or FOMC day is omitted. Hence, the dummy is not shown in the table. Furthermore, regressions are created for individual stocks and different types of portfolios, both for equal and value weighted portfolios. The dependent variable expresses the daily excess return. The independent variables are beta which represents the stock market beta and an interaction effect between beta and the dummy variable which has the value of one when it is an announcement or FOMC day. T-statistics are shown in parentheses. Furthermore, the stars (, ** and ***) show the significance of coefficients at the 10%, 5% and 1% level respectively.*