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Macroeconomic Indicators and Systematic Risk - Is there a difference between Emerging and Developed Markets?

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Abstract:

This explorative study is about the influencing effects of US macroeconomic announcements on changes in systematic risk with the focus on the difference between emerging and developed markets. Seven different US macroeconomic indicators have been examined and used to estimate betas as a proxy for the systematic risk around the announcement dates. In the period from 1996 until 2017, betas have been estimated over a three-month pre- and post window, resulting in 27 announcements per US macroeconomic indicator. The study also tries to provide insights of the consequences for portfolio managers, based on patterns of changes in betas and their relationship with changes in Sharpe ratios. The study results reveal that betas change consistently over the sample period, however, to a small magnitude. Also, the changes in mean Sharpe ratios around these announcement dates have not been found as statistical significant. However, the study results indicate that there is a positive relationship between changes in Sharpe ratios and changes in betas for developed countries as the Pearson correlation coefficient illustrates.

Keywords: Beta, Macroeconomic Announcements, Sharpe Ratio, Systematic Risk

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1. Introduction

Within finance, risk and return always have been a major subject of study. Many practitioners make use of different kind of back testing procedures to find patterns in stock prices and risks, to build profitable investment strategies upon them. Hence risk and return are an inseparable combination. This fundamental leads to the tradeoff that higher return comes at the expense of higher risk. According to the finance literature, risk is segregated into two components: 'systematic' and 'unsystematic risk' (Robichek & Cohn, 1974). While idiosyncratic risk can be diversified away, systematic risk cannot. Furthermore, the literature reveals that the beta coefficient is the most commonly used coefficient to represent systematic risk of a stock with respect to its benchmark or the market portfolio. Beta is estimated by taking the covariance of a stock and its market portfolio over the variance of the market portfolio. Consequently, high beta stocks (> 1) have a higher risk than the market but also might have higher returns. Even though, beta has been studied quite intensively over the past decades, there is still only a little evidence to what degree betas response to changes in the economic environment. The work from Robichek & Cohn (1974) and Andersen, Bollerslev, Diebold & Wu (2005) had revealed that systematic risk is indeed influenced by macroeconomic variables and that it is time varying. Robichek & Cohn (1974) could provide significant findings for the two macroeconomic variables of GDP and inflation. However, the authors could only provide insights on these two macroeconomic indicators. Therefore, this study tries to build on their findings and to provide new insights, whether the actual announcements of such macroeconomic variables have any effects on betas. Furthermore, the literature does not reveal if there is a difference between emerging and developed economies with respect to the effect of macroeconomic news on betas. Out of this, this study tries to contribute to this gap in the literature by answering the following research question: *'To what extent does changes in systematic risk differ between developed and emerging markets due to the announcements of US macroeconomic indicators'?* The

motivation, why it seems to be reasonable to examine the effect of macroeconomic announcements on systematic risk, is based on the fact that stock market prices are supposed to reflect companies' fundamentals. Since these fundamentals depend on the expected present value of future dividend payouts and in turn those dividend payouts must reflect the real economic environment, mainly measured by industrial production and gross domestic product GDP (Shapiro ,1988), the assumption that macroeconomic events also drive betas seem to be acceptable. In total, this study examines the announcements of Unemployment rates, Trade Balance, Consumer Price Index, Interest rates, Business Inventories, Nonfarm Payrolls, and the University of Michigan Consumer Sentiment Index. The reason for the selection for most of these macroeconomic indicators is based on the findings from Flannery & Protopapadakis (2002), who have identified CPI, PPI, Monetary Aggregates, Employment Report, Balance of Trade, and Housing Starts as strong candidates for risk factors. Their reasoning for considering these factors as risky is based on the assumption that announcements regarding these factors are either affecting returns or increasing the market's conditional volatility. The study's aim is based on the same fundament. Preliminary results of this paper indicate that betas are indeed changing in response to macroeconomic announcements, while changes in Sharpe ratios of emerging and developed market portfolios seem not to be affected by these announcements.

Within the first part of this study, the existing literature regarding systematic risk and macroeconomic indicators will be reviewed. The second part will explain the methodology and data used to analyze the effect of macroeconomic announcements on systematic risk and how this study tries to relate it to implications for portfolio managers. Finally, within the third and last part of the study, the results and conclusions will be drawn.

2. Literature

Before describing the analysis, prior findings within the finance and economic literature regarding determinants of betas and the importance of macroeconomic indicators will be emphasized.

The analysis of announcements within the world of finance almost knows no limits. With the most famous and popular 'Event Study' methodology, introduced by Fama et al. (1969), the analysis of events and in particular the analysis of announcements on equities, fixed income but also on merger & acquisition activities among others, have been further and further developed. The importance of announcements on financial markets has also been confirmed by practitioners, when Goldberg & Leonard (2003) were analyzing the effects on economic news on international bond markets on behalf of the Federal Reserve Bank in New York. According to the authors, economic announcements are an important source of information, affecting global yields. In particular, the authors found that the largest yield moves have been associated with announcements on Unemployment rates, real GDP growth, and Consumer Sentiment. As one can clearly observe, the importance of economic announcements is undisputable. However, before presenting the analysis regarding announcements on macroeconomic indicators, it is crucial to determine which announcements might have the strongest effects on betas. In order to do this, prior literature findings regarding betas and therefore systematic risk will be reviewed to see how betas are behaving within financial and economic analyses.

2.1 Systematic Risk and its Determinants

One of the most common concepts within the finance literature was the emergence of the Capital Asset Pricing Model (CAPM). The CAPM, developed by William Sharpe, Jack Treynor, John Lintner and Jan Mossin in the early 1960s relates the price of an asset to the risk-free rate, prevailing in a country and to the market premium.

In the case of the CAPM, the beta coefficient is estimated by dividing the covariance between the asset and the market index by the variance of the market, representing the systematic risk. With the emergence of the CAPM as an extension to Markowitz portfolio theory from 1952, the foundation was laid for incorporating the systematic risk for price discoveries for equities and portfolio analyses.

2.1.1 Systematic Risk and the Micro Environment

Most of the finance literature regarding systematic risk has been conducted on a micro level. The literature has revealed that operating efficiency, measured by asset turnover ratios, has a negative relationship to the systematic risk of companies. According to Logue & Merville (1972), a higher operating efficiency leads to higher profits of companies and thus have a lower probability of default, which in turn reduces the systematic risk for shareholders. These findings have been confirmed by Gu & Kim (1998), who examined the effect of asset turnover ratios on systematic risk for 35 casino firms in the United States throughout the 90s. The authors have revealed that rather than expanding the casino's operations, higher operational efficiencies (higher asset turnover ratios) resulted in lower systematic risk.

Furthermore, a company's liquidity seems to play an important role for systematic risk as well. According to Logue & Merville (1972) there is a negative relationship between liquidity and systematic risk. The authors explain this relationship with the fact that high liquidity indicates low level of short – term liabilities, which lower systematic risk. These findings have been confirmed by Moyer & Chatfield (1983) later within the literature.

However, also contrary findings regarding the relationship between systematic risk and liquidity have been published. According to Jensen (1984), systematic risk is also increased (decreased) with a higher (lower) level of liquidity. The author is explaining this phenomenon with the agency theory, as high liquidity rises the firm's agency cost of free cash flow and hence

its systematic risk. Similar findings have been revealed earlier by Beaver & Manegold (1975), who found a negative relationship between firm's current ratios and systematic risk. However, a greater proportion of the literature's findings indicate a positive relationship between liquidity and systematic risk (Pettit & Westerfield, 1972, Rosenberg & McKibben, 1973 and Borde ,1998). According to these authors, there is a positive relationship between liquidity ratios and systematic risk.

Next, profitability has been found to have a negative relationship with systematic risk. According to Logue & Merville (1972), higher profitability of a firm reduces the probability of default and hence reduces the systematic risk for shareholders. These findings are confirmed by Scherrer & Mathison (1996), who analyzed the systematic risk for REITs, by revealing that the stability of the operational cash flow indicates that the property is being managed profitable, which in turn reduces the systematic risk.

Furthermore, there are also many studies about the effect of leverage on firm's systematic risk. After the introduction of the Modigliani and Miller (MM) propositions in the 1950s, several studies have been conducted to analyze a firm's systematic risk related to its capital structure. According to Hamada (1972), systematic risk is increased whenever a firm is increasing its leverage while maintaining a fixed level of equity. With the mean – standard deviation of the CAPM, the covariance of an asset's return with the return of the market portfolio is greater for a stock with a higher debt – equity ratio than for a firm with a lower debt – equity ratio. Assuming the MM propositions are correct, roughly 21% to 24% of a firm's systematic risk can be explained by adding leverage to the firm's capital structure. These findings have been complemented later within the finance literature, when Mandelker & Rhee (1984) were analyzing the degree of operating leverage (DOL) and the degree of financial leverage (DFL) on a firm's systematic risk. The authors revealed that the DOL and DFL are magnifying the variation in beta of a company. In other words, systematic risk is not only increased by financial

leverage but also by operational leverage. Similar findings regarding the positive relationship between leverage and systematic risk have been published later within the literature. According to Moyer & Chatfield (1983), Amit & Livnat (1988), and Kim, Gu & Mattila (2002), there is a positive relationship between systematic risk and a firm's leverage. The authors describe their findings with the fact that a higher debt leverage exposes their shareholders to a higher systematic risk. Even though, the literature agrees upon a positive relationship between a firm's greater reliance on leverage and higher systematic risk for shareholders, this relationship has been found as not linear (Melicher, 1974).

2.1.2 Systematic Risk and Mergers & Acquisitions

Another area of the analyses of systematic risk within the finance literature is the effect of merger and acquisition activities on changes in systematic risk. According to Chatterjee & Lubatkin (1990), systematic risk of bidding firms within a M&A process can reduce their systematic variability in the returns of their securities by acquiring or merging with target companies which complement through their non – competing products. Furthermore, the literature revealed that systematic risk can be reduced, when growing through merger and acquisitions activities when lower portions of debt financing are used (Kim, Gu & Mattila, 2002).

2.1.3 Systematic Risk and the Macro Environment

As already mentioned empirical findings regarding systematic risk and the economic environment are mainly focused on the micro level. Mainly the relationship between beta and liquidity, leverage, operational efficiency, profitability, dividend payout, firm size and growth have been analyzed. However, to what extent systematic risk is influenced by macroeconomic indicators is less elaborated. There is still some evidence that the economic environment is determining a company's beta and therefore its systematic risk. Robichek & Cohn (1974), who

were testing the principal hypothesis, indicate that the systematic riskiness of the common shares of companies are related to the economic conditions. The authors revealed that a small but statistically significant number of companies' systematic risk varied due to GDP and inflation, by comparing estimated betas in times with high economic growth and inflation versus low economic growth and inflation. Even if Robichek & Cohn (1974) could not give any explanations why the systematic risk changed due to macroeconomic events, the authors justified their assumption that even if the systematic risk is not changing because of macroeconomic indicators, it is difficult to expect that it would remain the same.

2.2 Macroeconomic Indicators

The elaboration of the literature's most frequently cited macroeconomic indicators is used as the basis for the selection of the study's U.S. macroeconomic announcements. Since there is no exact comparable study within the literature regarding the analysis of macroeconomic announcements on betas, a starting point had to be set when selecting macroeconomic indicators. The literature has been screened mainly on macroeconomic indicators that are most influential on financial markets and especially on equity and bond markets. The literature's landscape regarding macroeconomic announcements focuses on two distinct categories: the influence and creation of abnormal returns and the influence on volatilities around announcement dates. Since the main input of systematic risk or beta is the covariance and variance of the stock and its market return, it seems to be reasonable to focus and follow the most frequent cited macroeconomic determinants of equity prices and volatilities. In addition, information regarding bond markets seem to be acceptable as well, due to the basic relationship between interest rates and bond and equity markets, respectively.

According to the literature, the most influential and frequently examined and cited macroeconomic indicators for financial markets are: Interest rates, Unemployment rates,

Inflation, Exchange rates, Imports, Exports, and Trade Balance. However, to what extent these indicators are influencing financial markets depend on several factors such as economic development of a country, whether it is a long term or short term analysis and so forth. This study will review prior findings about Interest rates, Trade Balance, Business Inventories, Consumer Price Index, Unemployment rates, Nonfarm Payrolls, and findings regarding the University of Michigan Consumer Sentiment Index. Even though, the last two indicators are less examined within the finance literature, this study will include them to also add new insights about those two indicators.

Before reviewing prior results of the literature, possible asymmetrical findings of macroeconomic variables on stock returns could be explained twofold, with asset prices reacting to volatility feedback (Campbell & Hentschel, 1992) and because asset prices tend to react to behavioral aspects of risk assessment such as the prospect theory (Patel et al., 1991).

2.2.1 Interest Rates

To begin with one of the most influential indicators, Interest rates, financial markets and equity markets seem to respond to changes in Interest rates quite intensively. In the early economics' literature, Blume, Kraft & Kraft (1977) found out, while testing the effect of movements in money supply on stock returns, that interest rates lead to no movements of stock prices. Their explanation for their finding is based on the efficient market hypothesis, which implies that all prices already reflect all available information of the market. Later, Chen et al. (1986) revealed, whenever long term interest rates decrease which ultimately leads to subsequently lower real returns, investors will try to protect themselves against this by focusing more on equities which returns are correlated with long term bond returns. Consequently, following these findings, one should expect an inverse relationship between interest rates and stock market prices. Similar findings have been obtained by Sweeney & Warga (1986), who have proven whenever Interest

rates rise, due to inflation, the real present value of utility stocks is reduced. Hence, there is a negative correlation between stock returns and Interest rates. These findings have been confirmed by Giovannini & Jorion (1987), who have proven that nominal interest rates are negatively correlated to stock market returns. In addition, more recent literature findings have revealed the same relationship. The authors Baele, Bekaert & Inghelbrecht (2010) were investigating the effect of macroeconomic factors on the performance of bond prices with the result that an increase in Interest rates led to an increase in bond returns. This leads to a negative effect on stock prices and returns, since investors tend to move their capital from stocks to bonds when the Interest rates are increasing. Consequently, increasing interest rates are associated with lower stock returns. Moreover, Kasman, Vardar & Tunç (2011) revealed that Interest rate volatility and exchange rate volatility are also an important determinant of equity volatility.

2.2.2 Trade Balance

For the macroeconomic indicator Trade Balance most literature findings are related to FX markets or the volatility of equity markets. Compared to other classical macroeconomic announcements like Interest rates, Trade Balance is also less observable by economic agents. The reason for this is, that Trade Balance is only available on a monthly basis with a lag and often subject to revisions (Aggarwal & Schirm, 1998). Regarding the effect of Trade Balance on equity markets, Flannery & Protopapadakis (2002) observed that the balance of trade is affecting the markets portfolio returns, when examining the stock market's conditional volatility (> 15%). Consequently, there seems to be an effect of Trade Balance on stock volatility which in turn might affect also the systematic risk of stock markets in respect to the US. Furthermore, the literature revealed that Trade Balance is an important economic indicator for FX markets. According to Deravi, Gregorowicz & Hegji (1988), Trade Balance have been

found significantly influencing FX markets for six major currencies, British Pound, Canadian Dollar, French Franc, West German Mark, Japanese Yen, and Swiss Franc. Similar findings have been found by Hogan, Melvin & Roberts (1991). According to the authors, there is a positive relationship between Trade Balance and the US dollar exchange rate. In particular, unexpected large trade deficits had a negative influence on the US dollar spot and future rate. Even though Trade Balance figures seem to be more important for the demand and supply for domestic currencies, this paper will examine its announcement effect on equity returns to provide additional insights on this economic variable.

2.2.3 Business Inventories

Business Inventory measures the level of dollar held inventories available to sell from retailers, wholesalers and manufactures across the United States and can be related to economic growth, which is a driver for global stock markets. Even though, the announcement of Business Inventories is less elaborated, it seems to be an important announcement due to its relationship to economic growth. According to Christiansen & Ranaldo (2007), Business Inventory levels seem to strengthen the bond – stock return correlation, when examining intraday patterns of realized bond-stock correlation. Since the bond and stock correlation is influenced by Business Inventories, it seems to be acceptable to assume that this might also affect covariances and variances and hence systematic risk of equity markets. Furthermore, Christie–David, Chaudhry & Koch (2000) have revealed, that the announcement of Business Inventories has a considerable effect on commodities' volatility. The authors observed a lower variance of silver prices during announcement days than on non - announcement days. Therefore, it seems to be reasonable to assume that Business Inventory levels might also affect the volatility of equities and hence systematic risk. However, the literature also provided evidence that business inventories have no meaningful effects on future markets. According to Erenburg, Kurov &

Lasser (2006), Business Inventories resulted in insignificant effects when analyzing the returns of the regular and E-mini S&P 500 future markets. Since future prices converge to the spot price nearing maturity, future contracts can be used as a proxy for the underlying asset and therefore one could also expect to obtain no meaningful results regarding the analysis of macroeconomic announcements and stock prices.

Despite the contentious findings within the literature regarding the effects of Business Inventories on financial markets, this paper will take the announcements of Business Inventory levels into account to also provide new insights regarding its effects on systematic risk.

2.2.4 Consumer Price Index

The Consumer Price Index, measuring the weighted average of prices of a basket of consumer goods and services can be used to assess changes in prices and therefore can be used as a proxy for inflation. Within the finance and economic literature, the prior findings seem to have a consistent view on the relationship between consumer prices and stock returns. In addition, these results also seem not to have changed over time. According to Fama & Schwert (1977), Sweeney & Warga (1986) and Jain (1988), the announcement of Consumer Price Index surprises has a negative significant effect on stock prices. Moreover, prior findings indicate that the common stock returns are negatively related to inflation rates, when analyzing hedging abilities of different asset classes. More recent studies such as the study from Adams, McQueen & Wood (2004) revealed that announcements of CPI surprises have a strong negative relationship with stock returns. In particular, the authors found that a CPI surprise of 1% induced a stock return response of -1.289% on an intraday basis. With these findings, the effect of consumer prices on stock returns seem not only to be significant on long term periods but also on very short term periods. Moreover, Miao, Ramchander & Zumwalt (2013) found that the announcement of negative Consumer Price Index figures lead to price jumps and hence to

an increase in volatility within the intraday prices of the S&P 500 futures. These findings have been confirmed by Gurgul & Wójtowicz (2015), who revealed that the announcements of CPI above consensus are bad news and therefore imply negative abnormal returns. However, by just analyzing the direct relationship between consumer prices and stock returns seem not to be enough. When incorporating the current state of the economy into the analysis, results might change. According to Knif, Kolari & Pynnönen (2008), when analyzing the effect of CPI announcements, it is crucial to account for the state of the economy. In particular, the authors revealed that a 1% positive CPI announcement within a rising economy is associated with a roughly 10% decline in stock returns within a two-week event window. Finally, consumer prices have also been examined regarding their effect on bond yields. According to Blose (2010), announcements of the Consumer Price Index are affecting bond yields which can be explained by the Fisher hypothesis. Furthermore, the author obtained evidence that CPI announcements have no influence on commodity prices, namely gold prices.

2.2.5 Unemployment Rates

Unlike inflation, the effect of Unemployment rates on stock markets seem to differ within the literature, which could be due to the effect that Unemployment rates are a lagged indicator of a countries economic status. Nevertheless, it seems to be an important macroeconomic indicator since Nikkinen et al. (2006) revealed that employment figures, such as reports on the employment situation, employment cost index, producer and consumer price indices, and NAPM figures are important for market wide measures of the economy, which affect the financial market. However, the effect of Unemployment rates on financial markets seem to have changed over time. According to McQueen & Roley (1993), an unanticipated decline in Unemployment rates is associated with decline in stock prices of around 2.2%, when the authors were analyzing Unemployment rates in the 1980s. However, more recent studies indicate that

the effect of Unemployment rates on financial markets have changed, also with the consideration of the state of the economy. According to Boyd & Jagannathan (2005), the announcement of Unemployment rates has different consequences for stock returns depending on the state of the economy. Their findings indicate, in the case of an economic recession, good news about a country's employment situation lead to higher stock prices. Consequently, good employment news lead to reduced stock prices in times of economic expansion. Nevertheless, the literature has also revealed that Unemployment rates have no influencing effects on financial markets at all. Following the findings of Birz & Lott (2011), who did not find any explanatory power of employment news on the day of release on the S&P 500 during 1991 until 2004. Consequently, the effect of Unemployment rates on financial markets seem to differ quite frequently within the finance and economic literature.

2.2.6 Nonfarm Payrolls

Nonfarm Payrolls are measuring the employment situation by highlighting the number of additional jobs added from the previous months within any job field, except for unincorporated self-employment, employment by private households, military and intelligence agencies. The Nonfarm Payrolls account for approximately 80% of the workforce which is producing the largest share of the United Sates' GDP, which makes it an important influencing indicator for financial markets. Also within the finance literature, Nonfarm Payrolls have been identified as one of the most informative macroeconomic indicators, that have been found to significantly affect the S&P 500 (Andersen et al., 2007). According to Hu & Li (1998), there is a negative relationship between Nonfarm Payrolls and stock returns as positive shocks for Nonfarm Payrolls lead to decreased prices in the S&P 500 and Russell 1000. Similar findings have been revealed by Boyd & Jagannathan (2005), who indicated that stock markets tend to rise whenever there are bad employment and labor news published to the market. Moreover,

Nonfarm Payrolls seem also to be important on short term periods. When Miao, Ramchander & Zumwalt (2013) were analyzing the price jumps upon macroeconomic announcements on an intraday basis, the authors revealed that Nonfarm Payrolls and Consumer Confidence are most significantly related to those jumps and hence drive volatility. Finally, Nonfarm Payrolls are not only important for equity and bond capital markets but also for FX markets. According to Faust et al. (2007), an announcement with a positive surprise in Nonfarm Payrolls is associated with an appreciation of the dollar against DM/euro on an intraday basis.

2.2.7 University of Michigan Consumer Sentiment Index

The Michigan Consumer Sentiment Index (MCI), measuring the US consumer's expectations about the future state of the economy by telephone surveys, is a widely used macroeconomic indicator. The consumer survey started in 1947 on a quarterly basis when it changed to a monthly frequency in 1978. Every month, the survey is sent to 500 households asking the following questions: (1) 'Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?' (2) 'Do you think that a year from now, you (and your family living there) will be better off financially, or worse off, or about the same as now?' (3) 'Now turning to business conditions in the country as a whole – do you think that during the next 12 months, we will have good times financially or bad times or what?' (4) 'Looking ahead, which would you say is more likely – that in the country as a whole we will have continuous good times during the next five years or so or that we will have periods of widespread unemployment or depression, or what?' and (5) 'Do you think now is a good or bad time for people to buy major household items?' (Lemmon & Portniaguina, 2006). Based on the replies, the relative score for each question is calculated as a percentage of favorable replies minus the percent of unfavorable replies, plus 100, rounded to the nearest whole number (Lemmon & Portniaguina, 2006). As the outcome of the survey provides insights into the

behavioral side of an economy, it seems to be reasonable to assume that there is an effect of MCI on financial markets. According to the literature, there is a negative relationship between the rational and behavioral hypothesis and asset prices, indicating a negative relationship between consumer confidence and asset prices (Lemmon & Portniaguina, 2006). These findings have been confirmed years later, when Stambaugh, Yu & Yuan (2012) analyzed long - short strategies and revealed that such strategies result in the highest profits after periods of high sentiment. Moreover, Consumer Sentiment has valuable information content. Specifically, when a lower than previous month Consumer Sentiment index is announced, the equity market experiences a significant negative announcement day effect. In other words, negative Consumer Sentiment announcements are associated with lower equity returns. However, surprisingly the authors have also revealed that a higher than previous month Consumer Sentiment has no significant effect on equity returns at all (Akhtar et al., 2011). Finally, consumer sentiment has also been found to be important for intraday trading strategies. According to Miao, Ramchander, & Zumwalt (2013), who were analyzing the price jumps upon macroeconomic announcement on an intraday basis, found out that Nonfarm Payrolls and Consumer Confidence are the most significantly related to those price jumps.

3. Methodology & Data

3.1 Methodology

As the previous literature review indicates, macroeconomic announcements indeed have influential effects on equities. In order to test the effect of US macroeconomic announcements on changes in systematic risk, this study applies a time series panel data analysis, to see whether betas change with US macroeconomic announcements over time. Even though, the literature does not suggest any specific testing procedure for the analysis of systematic risk, applying a panel data analysis seems to be reasonable since it is a widely accepted method within social

science and econometrics. In order to incorporate the effect of US macroeconomic announcements within the panel data analysis (Equation 1), dummy variables will be introduced, which are considered to be 'unity' in the case of the pre & post announcement window and in the case of the post announcement window. In addition, the unconditional beta will be estimated, which will be the result of the regression from the returns of the S&P 500 and the emerging and developed stock market indices, respectively. With the inclusion of the unconditional beta, the changes in beta after an US macroeconomic announcement can be obtained by simply adding up the estimated unconditional coefficient and the coefficients of the interaction effects between the pre & post and the post dummy variables. In the end, the post dummy variable will indicate how and to what magnitude betas will have changed, based on the different types of macroeconomic announcements and whether those changes are statistically significant. In particular, this paper is estimating the stock market betas over a period of three months.

$$Return_{(Stock\ market\ index\ )} = \propto + Dummy_{(Dummy\ Pre\&Post)} + Dummy_{(Post)} + Return_{(S\&p\ 500\ T-1)} + Return_{(S\&P\ 500)} + Return_{(S\&P\ 500\ T+1)} + Dummy_{(Dummy\ Pre\&Post)} * Return_{(S\&P\ 500)} + Dummy_{(Post)} * Return_{(S\&P\ 500)} + \epsilon$$

Equation 1 - Panel Data Regression

The reason for this is based on literature. According to Jegadeesh & Titman (1993), who were analyzing strength trading strategies, suggest that those trading strategies, which aim to sell stocks that performed poorly in the past and to buy those which performed well, work best based on the price movements of equities over the past 3 – 12 months. This paper will estimate the systematic risk over a period of three month for two reasons. First, it seems to be an acceptable time range according to the literature and second, the literature also confirms its acceptance and relevance for trading strategies, which will be the second part of the analysis of

this paper, when trying to relate changes in betas to changes in portfolio performances. Furthermore, the reason for the selection of the S&P 500 as the market portfolio for the estimation of the beta coefficients is based on several assumptions: First, as this paper studies US macroeconomic indicators, which might have the largest effect on the US market, the choice of the S&P 500 seems to be reasonable. Second, the S&P 500 is a market cap weighted low cost index and offers a great diversification, which is desirable for a global investor (Berger, 2017). However, one might still argue that the S&P 500 might not reflect the true market portfolio, as only US equities are included. Nevertheless, even other global indices like the MSCI World Index also run some limitations as they don't offer exposure to emerging markets or do not include SMEs. Finally, despite the S&P 500 only reflects the US economy, many of the companies included within the index have subsidiaries, operations or even headquarters outside the US, which in turn exposures these companies to foreign risks which should be reflected within the prices of the S&P 500. Therefore, this paper will proceed its analysis with the inclusion of the S&P 500 as the market portfolio.

The second part of the analysis of this paper is to verify whether US macroeconomic announcements, which are assumed to change betas, are also important for changes in portfolio Sharpe ratios of emerging market and developed market portfolios, respectively. With this additional insight, implications for portfolio managers are tried to be included within this study. In order to examine the effect of US macroeconomic announcements on portfolios, this paper creates three equally weighted portfolios consisting of either emerging market equities, developed market equities or of pooled (emerging and developed) market equities. In particular, the developed market portfolio consists of investments within the DAX Index (Germany), FTSE 100 (UK), Straits Times Index (Singapore), and the Nikkei 225 Index (Japan), while the emerging market portfolio consists of positions within the IBOVESPA Index (Brazil), IPSA Index (Chile), RTSI$ Index (Russia), JCI Index (Indonesia), and the SHSZ300 Index (China).

Finally, the pooled portfolio consists of all above mentioned emerging and developed market indices. Furthermore, the portfolios are held over the same period as the dummy variables described within the previous methodology, in order to achieve fair comparison. Consequently, the portfolio positions cover the total six months period around the announcement dates. Moreover, in order to examine the performance of these portfolios, Sharpe ratios for the three months pre window and the three months post window are estimated separately by taking the average 90 days (pre or post) return of the portfolio and divide it by its standard deviation. In the end, the differences in Sharpe ratios (difference between the pre Sharpe ratio and post Sharpe ratio) will be calculated and analyzed in their statistical significance, using a confidence interval bootstrap method, suggested by the literature (Equation 2).

$$Sharpe\ ratio_{(Pre\ announcement)} \left(\frac{Return_{(Porfolio)}}{Standard\ Deviation_{(Portfolio)}} \right) \approx Sharpe\ ratio_{(Post\ announcement)} \left(\frac{Return_{(Porfolio)}}{Standard\ Deviation_{(Portfolio)}} \right)$$

Equation 2 - Estimation of the differences in Sharpe ratios

After prior findings within the literature by Jobson & Korkie (1981) and Memmel (2003), the empirical evidence by Ledoit & Wolf (2008) suggests the best method to test the performance of Sharpe ratios is to construct time series bootstrap confidence intervals for the differences of Sharpe ratios. The authors suggested that the significance of these Sharpe ratios should be based on whether the confidence interval contains zero. Finally, in order to run the analyses of these bootstrapped confidence intervals, this paper chooses a resample size of 10.000. As there are only 27 analyzed announcements per macroeconomic indicator, this would only result in a sample of pre and post Sharpe ratios of 27. This sample size seems to be really small and therefore by bootstrapping these 27 differences a ten thousand times, this shortcoming can be circumvented. After resampling these 27 differences in Sharpe ratios, the individual means of

these 27.000 samples are used to estimate the confidence intervals. Despite the histogram (Appendix, Figure 5) indicates a normal distribution of the mean differences in Sharpe ratios, this study assumes no particular distribution and hence runs a one sample non – parametric bootstrap test. In this case, this would imply that if the confidence interval contains zero, the true mean of differences in Sharpe ratios can take the value of zero and therefore there is no statistically significant difference in the Sharpe ratios.

Finally, unlike the Sharpe ratio suggests, the Sharpe ratios within these analyses are estimated without taking into the account the prevailing risk-free rates. The reason for this is that especially within recent times there had been negative interest rates, which would bias the outcome of the Sharpe ratios.

3.2 Data

All the data for the analysis of this study have been obtained from Bloomberg Terminal. Specifically, all available US macroeconomic announcements from 10/31/1996 – 06/01/2017 have been obtained. During this period, there were 22.513 macroeconomic announcements in the United States. However, for the purpose of this study only 7 different announcement types (macroeconomic indicators) have been considered based on the most frequently and less elaborated macroeconomic indicators within the finance literature. Furthermore, all betas have been estimated on a three months pre - and post – announcement window. Within this study, nine different countries (excluding US as the S&P500 represents the market portfolio) have been analyzed. For every country, the country's major stock index had been used as a proxy for the domestic financial market to estimate the betas in respect to the S&P 500. In the case of the developed countries Germany, United Kingdom, Singapore, and Japan, the DAX Index, FTSE 100, Straits Times Index, and the Nikkei 225 Index have been consulted. On the other hand, the emerging markets Brazil, Chile, Russia, Indonesia, and China are represented by the

IBOVESPA Index, IPSA Index, RTSI$ Index, JCI Index, and the SHSZ300 Index. Moreover, the daily natural logarithm of the returns (one period log return) of the stock indices has been calculated, in order to estimate the betas of those stock indices in respect to the US.

Furthermore, the unconditional beta is estimated by applying the concept of 'Dimson Beta', which has been introduced by Dimson (1979). This concept suggests to make use of an aggregated coefficient method to correctly estimate betas, due to trading biases. The concept suggests to tackle these trading biases by using leads and lags to correct for infrequent trading. Especially when analyzing financial data across many countries with different time zones, this concept seems to be useful for the purpose of this study. In particular, the unconditional beta is estimated by summing up the one day lagged, the coincident, and the one day lead beta coefficient. With this method, the estimated unconditional betas (market betas) are adjusted to one, which should be the case as the beta coefficient indicates to what extent an asset moves, with or against the market. The results for these selected methodologies and data will now be presented within the following section.

4. Results

4.1 Results Pooled Markets

4.1.1 Interest Rates

For the analysis of the macroeconomic announcements of US Interest Rates, an unconditional beta of 0.725434 with a SE of 0.03472 has been obtained for the pooled sample (Table 10, Appendix), which is highly significant using an alpha level of 1%. The beta of the dummy variable for the pre- and post announcement period (three months before and three months after) has been estimated with -0.000271 with a SE of 0.00025, while the dummy variable for the post period (three months after) has been found significant on 5% significance level, with a beta coefficient of -0.000345 and a SE of 0.000146. However, the interaction effect between the

S&P 500 returns and the pre- and post dummy variable has been found as statistically insignificant with a beta of 0.028089 and a SE of 0.024757. On the other hand, the interaction effect between the S&P 500 returns and the dummy variable for the post window has been found to be highly significant on a 1% significance level with a beta coefficient of 0.069099 and a SE of 0.012068. Hence, in the case of the pooled sample, an increase in stock betas of around 0.07 in the following three months of an announcement of US interest rate has been observed.

4.1.2 Trade Balance

In the case of the analysis of the macroeconomic announcements of Trade Balance, an unconditional beta of 0.863874 with a SE of 0.028949 has been obtained (Table 10, Appendix), which is highly significant using an alpha level of 1%. The dummy variable, indicating the pre- and post announcement window, has an estimated coefficient of 0.000670 with an SE of 0.000248 which is highly significant on a 1% significance level. Furthermore, the dummy variable for the post announcement window is statistically significant on a 5% significance level with a beta coefficient of -0.000296 with a SE of 0.000147. The interaction effect between the S&P 500 and the dummy pre- and post variable has been found as highly statistically significant, testing on a 1% alpha level. The resulting beta coefficient is estimated to be -0.119341 with a SE of 0.019447. Furthermore, the post announcement interaction effect has revealed a beta coefficient of 0.064204 with a SE of 0.012327, which is found to be highly statistically significant on a 1% significance level. In this case, over the total sample period of over 20 years, a stock beta increase of 0.06 within the following three months of an announcement of Trade Balance has been observed.

4.1.3 Business Inventories

Moreover, for the case of the announcements of Business Inventories, an unconditional beta of 0.816585 with a SE of 0.031224 (Table 10, Appendix) has been examined to be highly significant on a 1% significance level. The pre- and post dummy variable around the announcement date has been found as statistically insignificant with a coefficient of -0.000323 and a SE of 0.000252. On the other hand, the post dummy variable has been obtained with a coefficient of 0.0000416 with a SE of 0.000146. For the interaction effects, the pre- and post interaction effect with the S&P 500 has been revealed as statistically insignificant, estimated with a beta of -0.020008 with a SE of 0.021310, while the interaction effect between the S&P 500 and the post announcement dummy variable has been revealed as statistically significant with a beta of -0.024210 and a SE of 0.01216. In this case, when analyzing the effect of the announcements of Business Inventories on international stock betas, it turns out that every announcement of Business Inventories leads to a decrease in stock betas of -0.02 within three months after an announcement has been made.

4.1.4 Consumer Price Index

For the announcements of Consumer Price Index, a statistical significant unconditional beta of 0.884844 with a SE of 0.03006 (Table 10, Appendix) has been found to be highly statistically significant on an alpha level of 1%. The pre- and post dummy variable is estimated as statistical insignificant with a coefficient of 0.000125 with a SE of 0.000248. Similar results have been obtained for the post announcement dummy variable with a statistical insignificant beta of -0.000213 and a SE of 0.000146. The analysis of the interaction effect between the dummy variables and the return of the S&P 500, however, have resulted in statistical significant beta coefficients. In particular, the interaction effect between the pre- and post dummy variable and the S&P 500 has been revealed as highly statistically significant with a beta of -0.139677 with

a SE of 0.020451 using a 1% alpha level. Furthermore, the post announcement beta is also highly statistically significant with a coefficient of 0.059143 and a SE of 0.012237 using a 1% significance level. Consequently, the statistical analysis revealed that after the announcement of US Consumer Price Index, international stock market betas tend to increase by around 0.06 within the following three months after the announcement has been made.

4.1.5 Unemployment Rates

When analyzing the effects of the announcements of US Unemployment Rates on international stock market betas, the unconditional beta has been found as statistical significant (on a 1% rejection level) and is estimated to be 0.726482 with a SE of 0.029536 (Table 11, Appendix). The pre- and post dummy variable has been estimated as statistically insignificant with a coefficient of 0.000233 with a SE of 0.000226. On the other hand, the post dummy variable has been found to be statistically significant on a 1% significance level, with a coefficient of -0.000438 and a SE of 0.000143. The interaction effect between the pre- and post dummy variables and the returns of the S&P 500 have resulted in statistical significance. The pre- and post dummy variable has an estimated coefficient of 0.039937 with a SE of 0.019886, which is significant on a 5% alpha level. On the other hand, the interaction effect between the post announcement dummy variable and the S&P 500 returns have led to highly statistical significant findings using a 1% significance level with a coefficient of 0.050581 and a corresponding SE of 0.012203. In this case, the analysis has revealed that an announcement of US Unemployment rates is associated with an increase in stock beta of 0.05 within the following three months of the announcement.

4.1.6 University of Michigan Consumer Sentiment Index

For the announcements of the US Consumer Sentiment Index, a highly statistical significant unconditional beta of 0.820471 with a SE of 0.02696 (Table 11, Appendix) on a 1% alpha level has been estimated. The pre - and post dummy variable beta is estimated to be 0.001095 with a SE of 0.000212, which is highly statistical significant on a 1% level. Also, the post dummy variable has been found to be significant on a 5% significance level with an estimated coefficient of -0.000327 and a SE of 0.000151. However, when analyzing the interaction effects between the dummy variables and the returns of the S&P 500, the interaction effect between the S&P 500 and the pre- and post dummy variable has been found as statistically insignificant with an estimated beta of -0.014216 and a SE of 0.017796. On the other hand, the interaction effect between the S&P 500 and the post announcement dummy variable has resulted in an estimated beta of -0.043918 with a SE of 0.012544, which is highly statistically significant on a 1% significance level. In other words, on average an announcement of the US Consumer Sentiment Index is associated with a decrease in stock market betas of -0.04 within the following three months after the announcement has been made.

4.1.7 Nonfarm Payrolls

Finally, the estimation of the stock betas for the pooled sample in respect to the announcements of US Nonfarm Payrolls led to an estimated unconditional beta of 0.884284 with a SE of 0.028092 (Table 11, Appendix), which is highly statistically significant at a 1% significance level. The pre- and post dummy variable is observed to have a coefficient of 0.000779 with a SE of 0.000248, which is statistically significant using a 1% significance level. The post dummy variable, however, has not been found to be statistically significant with a coefficient of -0.000182 and a SE of 0.000146. However, the interaction effect between the S&P 500 and the pre- and post dummy has resulted in a highly statistically significant beta coefficient of -

0.128250 with a SE of 0.018704 on a 1% significance level. The interaction effect of the post announcement dummy variable and the S&P 500 has resulted in a coefficient of 0.039374 with a SE of 0.012413, which is also highly statistically significant on a 1% significance level. The results of the analysis revealed that the international stock market betas tend to increase by 0.04 within three months after an announcement of Nonfarm Payrolls has been made.

4.2 Results Emerging Markets

4.2.1 Interest Rates

For the emerging market sample, the announcements of US Interest rates revealed a highly statistically significant unconditional beta of 0.669818 with a SE of 0.053543 (Table 6, Appendix) on a 1% significance level. The pre - and post dummy variable has been found as statistically insignificant with a coefficient of -0.000308 with a SE of 0.000385. Furthermore, the dummy variable for the post three month announcement window, however, has been found as statistically significant on a 5% significance level with a coefficient of -0.000579 and a SE of 0.000226. When analyzing the interaction effects between the dummy variables and the returns of the S&P 500, only the post announcement interaction effect has been found to be statistically significant on a 1% significance level. In this case, the pre and post announcement interaction effect has revealed a beta estimate of 0.042006 with a SE of 0.038165 and the post announcement interaction effect has an estimated beta coefficient of 0.062522 with a SE of 0.018649. This implies, emerging market betas are associated with an increase of around 0.06 within three months after an announcement of US Interest Rates.

4.2.2 Trade Balance

Furthermore, the announcements of US Trade Balance have revealed an unconditional beta of 0.816549 with a SE of 0.044651 (Table 6, Appendix), which is highly statistically significant

at a 1% significance level. The pre- and post announcement dummy variable as well as the post announcement dummy variable have been found to be statistically significant with coefficients of 0.000787 (SE = 0.000383) and -0.000502 (SE = 0.000226). Furthermore, the interaction effects between the S&P 500 and the dummy variables, have been found to be highly statistically significant on a 1% significance level. While the interaction effect of the pre- and post dummy variable resulted in a coefficient of -0.122561 with a SE of 0.029975, the interaction effect of the post dummy variable resulted in a coefficient of 0.074694 with a SE of 0.019044. Consequently, the analysis of the announcement of US Trade Balance revealed that announcements of US Trade Balance are associated with an increase in emerging market stock betas of around 0.07 within three months after an announcement has been made.

4.2.3 Business Inventories

In the case of the announcements of Business Inventories, the unconditional beta is highly statistically significant on a 1% significance level with a coefficient of 0.794406 and a SE of 0.048144 (Table 6, Appendix). The pre- and post dummy variables are not statistically significant as well as the interaction effect between the returns of the S&P 500 and the pre- and post dummy variables. In the case of the pre- and post dummy variable, a coefficient of -0.000450 with a SE of 0.000388 has been obtained, while a coefficient of 0.0000817 with a SE of 0.000226 has been obtained for the post dummy variable. Furthermore, the interaction effect between the pre- and post dummy variable and the S&P 500 has also been found to be statistically insignificant with a coefficient of -0.033814 and a SE of 0.032846. However, the interaction effect between the S&P 500 and the post dummy variable is found to be highly statistically significant at a 1% significance level. This interaction effect is estimated to have a beta coefficient of -0.048779 with a SE of 0.018783. In this case the beta coefficients are

expected to decrease by 0.05 within three months after an announcement of Business Inventory has been made.

4.2.4 Consumer Price Index

Next, for the announcements of the Consumer Price Index the unconditional beta has been estimated as highly statistically significant on a 1% significance level with a coefficient of 0.808118 and a SE of 0.046373 (Table 6, Appendix). Both dummy variables have not been found as statistically significant with the beta coefficients of 0.000170 (with a SE of 0.000383) and -0.000324 (with a SE of 0.000226). However, both interaction effects of the pre- and post dummy variable and post dummy variable have been estimated as highly statistically significant on a 1% significance level, respectively. In this case, the pre- and post announcement interaction coefficient is estimated to be -0.112448 with a SE of 0.031528, while the post announcement interaction coefficient is estimated with a beta of 0.073483 with a SE of 0.018907. This implies that the beta coefficients tend to increase by around 0.07 in the following three months after the announcement of Consumer Price Index has been made.

4.2.5 Unemployment Rates

Moreover, the announcement of US Unemployment rates has revealed an unconditional beta of 0.660436 with a SE of 0.045515 (Table 7, Appendix), which is found to be highly statistically significant on a 1% significance level. For the emerging market sample, the pre- and post dummy variable has been estimated with the coefficient of 0.000563 with a SE of 0.000348, which is not statistically significant, while the post dummy variable is highly statistically significant, on a 1% significance level, with an estimated coefficient of -0.000645 and a SE of 0.000221. The interaction effect between the pre- and post dummy variable and the S&P 500 has been found to be marginally significant using a 10% rejection level with an estimated beta

coefficient of 0.054246 and a SE of 0.030622. Finally, the interaction effect between the post dummy variable and the S&P500 is also found to be statistically significant on a 1% alpha level with a coefficient of 0.066452 and a SE of 0.018852. In this case, the post announcement beta for US Unemployment rates is expected to increase by around 0.07 within three months after the announcement has been made.

4.2.6 University of Michigan Consumer Sentiment Index

For the announcements of the Consumer Sentiment Index the unconditional beta is estimated to be highly statistically significant at a 1% significance level with a coefficient of 1.336111 and a SE of 0.045515 (Table 7, Appendix). While the post dummy variable is not found to be statistically significant with a coefficient of -0.000208 with a SE of 0.000495, the pre- and post dummy variable is estimated as statistically significant on a 5% significance level with a coefficient of 0.001459 with a SE of 0.000664. The interaction effects between the returns of the S&P 500 and both dummy variables are statistically significant at a 1% and 5% significance level. In this case, the coefficient of the interaction effect of the pre- and post dummy variable is estimated to be -0.277259 with a SE of 0.055735, while the coefficient of the post dummy variable is estimated to be -0.106323 with a SE of 0.041193. This result implies that within three months after the announcement of US Consumer Sentiment Index, the beta coefficients tend to decrease by around 0.1.

4.2.7 Nonfarm Payrolls

In the case of the announcements of Nonfarm Payrolls the unconditional beta is estimated to be highly statistically significant on a 1% significance level with a coefficient of 0.841097 with a SE of 0.043366 (Table 7, Appendix). While the post dummy variable is not found to be statistically significant with a coefficient of -0.000227 and a SE of 0.000226, the pre- and post

dummy variable is found to be highly statistically significant on 1% significance level with a coefficient of 0.001083 with a SE of 0.000383. Both the interaction effects between the S&P 500 returns and the dummy variables are found to be highly statistically significant on a 1% alpha level. In this case, the interaction effect of the pre- and post dummy variable has been estimated with a coefficient of -0.142795 with a SE of 0.028855. On the other hand, the interaction effect between the post dummy variable and the S&P 500 has been estimated with a coefficient of 0.062944 with a SE of 0.019171. The results indicate that the systematic risk of emerging countries tend to increase by around 0.06 within three months after an announcement of US Nonfarm Payrolls has been made.

4.3 Results Developed Markets

4.3.1 Interest Rates

When obtaining the results for the developed sample for the announcements of US interest rates, an unconditional beta of 0.792971 with a SE of 0.040535 has been estimated (Table 8, Appendix), which is highly statistically significant on a 1% significance level. Both dummy variables have not been found as statistically significant with estimated coefficients of -0.000224 (with a SE of 0.000293) and -0.0000592 (with a SE of 0.000171). Furthermore, only the interaction effect between the S&P 500 returns and the post dummy variable has been found as statistically significant with a beta coefficient of 0.077101 and 0.014053. The interaction effect between the pre- and post dummy variable and the S&P 500 has been found as statistically insignificant with a coefficient of 0.011547 and a SE of 0.028917. However, since the interaction effect between the S&P 500 and the post dummy variables has been found as statistically significant, this result indicates that within three months after an announcement of US interest rates, developed market betas tend to increase by around 0.07.

4.3.2 Trade Balance

For the announcements of Trade Balance, the unconditional beta of 0.921657 with a SE of 0.033792 (Table 8, Appendix) has been found as highly statistically significant on a 1% significance level. Again, both dummy variables have not been found as statistically significant with obtained coefficients of 0.000530 (with a SE of 0.000290) and -0.0000444 (with a SE of 0.000171). However, the interaction effects between the dummy variables and the returns of the S&P 500 have been found as highly statistically significant on a 1% significance level. In detail, the coefficient of the interaction effect between the pre- and post dummy variable and the returns of the S&P 500 is estimated to be -0.115510 with a SE of 0.022721. On the other hand, the interaction effect between the S&P 500 and the post dummy variable has been estimated with a coefficient of 0.051692 with a SE of 0.014361. In this case, developed market betas tend to increase by around 0.05 within three months after an announcement of US Trade Balance has been made.

4.3.3 Business Inventories

In the case of the announcements of Business Inventory, the unconditional beta has been found as highly statistically significant on a 1% significance level with a coefficient of 0.843191 and a SE of 0.036469 (Table 8, Appendix). However, all other variables including the dummy variables as well as the interaction effects between the dummy variables and the returns of the S&P 500 have not been found as statistically significant. In this case, the coefficients of -0.000165 (with a SE of 0.000295) and -0.0000079 (with a SE of 0.000171) have been estimated for both dummy variables. Moreover, the interaction effects have been estimated to be -0.002451 with a SE of 0.024898 and 0.005607 with a SE of 0.014171. However, as both the dummy variables as well as the interaction effects are not statistically significant, the

announcements of US Business Inventory levels seem not to have any influential effects on developed market betas.

4.3.4 Consumer Price Index

Furthermore, the announcements of Consumer Price levels revealed an unconditional beta of 0.978828 with a SE of 0.035071 (Table 8, Appendix), which has been found as highly statistically significant on a 1% significance level. Both dummy variables, the pre- and post, and the post dummy variable have not been found as statistically significant with coefficients of 0.0000720 (with a SE of 0.000290) and -0.0000772 (with a SE of 0.000171). However, the interaction effects between the dummy variables and the returns of the S&P 500 have been found as highly statistically significant using a 1% significance level. For the interaction effect between the pre- and post dummy variable and the return of the S&P 500, a beta coefficient of -0.173265 with a SE of 0.023879 has been estimated. On the other hand, the interaction effect between the post dummy variable and the returns of the S&P 500 has been estimated to have a beta coefficient of 0.041887 and a SE of 0.014251. In this case, developed market betas have been observed to increase by around 0.04 within three months after an announcement of US Consumer Price Index has been made.

4.3.5 Unemployment Rates

In the case of the announcements of US Unemployment rates, the unconditional beta has been found as highly statistically significant on a 1% significance level with a coefficient of 0.807452 and a SE 0.034523 (Table 9, Appendix). While both dummy variables have not been found as statistically significant with the coefficients of -0.000172 with a SE 0.000264 and -0.000183 with a SE 0.000167, the interaction effect between the S&P 500 and the post dummy variable has been examined as statistically significant on a 5% significance level. In this case, the

coefficient has been estimated with 0.031345 and a SE of 0.014219. However, the interaction effect between the pre- and post dummy variable and the S&P 500 returns has not been found to be statistically significant with an estimated coefficient of 0.022069 with a SE of 0.023263. This would imply that developed market betas tend to increase by around 0.03 within three months after an announcement of Unemployment rates has been made.

4.3.6 University of Michigan Consumer Sentiment Index

For the announcements of Consumer Sentiment, the unconditional beta has been found as highly statistically significant on a 1% alpha level with a coefficient of 0.786791 and a SE of 0.031674 (Table 9, Appendix). Again, the pre- and post dummy variable has been found as statistically insignificant with an estimated coefficient of 0.000397 with a SE of 0.000250. However, the post dummy variable has been estimated with a coefficient of -0.000298 with a SE of 0.000175, which is statistically significant on a 10% significance level. Furthermore, only the interaction effect between the pre- and post dummy variable and the S&P 500 has been found to be statistically significant on a 1% significance level with an estimated beta coefficient of 0.076895 with a SE of 0.020954. On the other hand, the interaction effect between the post dummy variable and the returns of the S&P 500 has been found to be statistically insignificant with an estimated beta of -0.017698 with a SE of 0.014588. The results imply that there are no statistical influential effects on developed market betas by announcements of the US University of Michigan Consumer Sentiment Index levels.

4.3.7 Nonfarm Payrolls

Finally, the announcements of US Nonfarm Payrolls have revealed an unconditional beta of 0.936744 with a SE of 0.032757 (Table 9, Appendix), which has been revealed as highly statically significant on a 1% alpha level. Both dummy variables have been found as statically

insignificant, with estimated coefficients of 0.000405 with a SE of 0.000290 and -0.000125 with a SE of 0.000171. On the other hand, the interaction effect between the pre- and post dummy variable and the returns of the S&P 500 has been estimated with a coefficient of -0.110117 and SE of 0.021829, which is highly statistically significant on a 1% significance level. However, the interaction effect between the post dummy variable and the returns of the S&P500 has been estimated to have a beta of 0.010767 with a SE of 0.014467, which is not statistically significant. Since the interaction effect between the returns on the S&P 500 and post dummy variable is not statistically significant, there seem to be no statistical influential effects on developed market betas from announcements of US Nonfarm Payrolls.

4.4 Results Bootstrap Confidence Intervals

With this explorative study, also insights for implications for portfolio managers should be provided. This section and within 4.5 and 4.6, consequences for portfolio managers are tried to be included, based on the results of the bootstrap confidence intervals, observed patterns of the changes in systematic risk, and the relationship between changes in betas and changes in systematic risk.

4.4.1 Results Bootstrap Confidence Intervals Pooled Markets Portfolio

Table 1 – Estimation of Bootstrap CI for Mean Differences in Sharpe Ratios for Pooled Market Portfolios

	Upper Confidence Value (0.95) for Sharpe Ratio	Lower Confidence Value (0.05) for Sharpe Ratio	Confidence Interval Width	Mean of Differences Bootstrapped Sharpe Ratios	Standard Deviation of Bootstrapped Sharpe Ratios
Announcement					
Nonfarm Payrolls	0.07518617	-0.05765687	0.13284304	0.009007095	0.04023233
University of Michigan Consumer Sentiment Index	0.01642564	-0.11751556	0.1339412	-0.05083421	0.04082531
Unemployment Rates	0.0394623	-0.1047694	0.1442317	-0.034256	0.04394346
Consumer Price Index	0.05864215	-0.07837362	0.13701577	-0.01009937	0.04168282
Business Inventories	0.04819102	-0.08668392	0.13487494	-0.01873839	0.04112172
Trade Balance	0.08826987	-0.05575583	0.1440257	0.01552022	0.04396213
FOMC Rate Decision	0.03782264	-0.13468658	0.17250922	-0.0488327	0.05324032
Notes:	Confidence Intervals have been estimated on a 95% confidence level. *, is indicating a statistical significance.				

The results for the Bootstrap confidence intervals, to estimate the true mean of differences of the Sharpe ratios for the pooled portfolio, have not been found as statistically significant (Table 1). In all cases, the 95% confidence interval for the mean of the changes in Sharpe ratios contains zero. This implies, that for portfolios consisting of emerging and developed market equities, in which one had invested for six months around the announcement dates, had not been statistically influenced by US macroeconomic announcements. In the case for the announcement of Nonfarm Payrolls, the mean of the differences in Sharpe ratios (between pre- and post announcement) is equal to 0.009007095 (with SD of 0.04023233). However, the 95% confidence interval suggests that the true mean of the differences in Sharpe ratios lies between the lower level of -0.05765687 and the upper level of 0.07518617. This would imply that whenever, there is an announcement of US Nonfarm Payrolls, Sharpe ratios of portfolios consisting of emerging and developed equities tend to increase. However, as already mentioned the confidence interval contains possibility for the mean of differences in Sharpe ratios to be

zero, which makes this finding not statistically significant. For the University of Michigan Consumer Sentiment Index, the mean difference in Sharpe ratios is estimated to be -0.05083421 (with SD of 0.04082531), indicating that an announcement of the Consumer Sentiment Index leads to a decrease in Sharpe ratios of portfolios consisting of emerging and developed market equities. However, again the 95% confidence interval contains zero, which implies that these findings are not statistically significant. The true mean of differences in Sharpe ratios for the announcement of US Consumer Sentiment levels lies between the lower level of -0.11751556 and the upper level of 0.01642564. The analysis of the Unemployment rates has revealed a mean of differences in the portfolio's Sharpe ratios of -0.034256 (with a SD of 0.04394346), which leads to the assumption that announcements of US Unemployment rates lead to lower Sharpe ratios. However, these findings are not statistically significant. The true mean of differences in Sharpe ratios for US Unemployment rates lies between -0.1047694 and 0.0394623. Furthermore, for the announcements of US Consumer prices, the mean of differences in Sharpe ratios is estimated to be -0.01009937 (with a SD of 0.04168282), indicating that an announcement of US Consumer Prices leads to a decrease in Sharpe ratios for pooled portfolios. However, the true mean of differences in Sharpe ratios is estimated to lie between 0.05864215 and -0.07837362 with 95% confidence. Again, the confidence interval contains zero, which makes this result statistically insignificant. Moreover, the mean of differences in Sharpe ratios for US Business Inventory levels has been estimated to be -0.01873839 (with a SD of 0.04112172). This result implies that announcements of Business Inventories levels are associated with lower Sharpe ratios within three months after the announcement has been made. Nevertheless, the 95% confidence interval has been revealed as not statistically significant, with a confidence interval range of -0.08668392 (lower level) to 0.04819102 (upper level). The announcements of US Trade Balance have revealed a mean of differences in Sharpe ratios of 0.01552022 (with a SD of 0.04396213). Unlike in the previous

cases, this result indicates an increase in the mean of differences in Sharpe ratios within three months after an US Trade Balance announcement have been made. However, the 95% confidence interval has been estimated with a range of -0.05575583 (lower level) and 0.08826987 (upper level), which makes this result not statistically significant. Finally, the announcement of US Interest rates resulted in a mean of differences in Sharpe ratios for the pooled portfolio of -0.0488327 (with a SD of 0.05324032). This finding leads to the assumption that after an announcement of US interest rates, the mean of differences in Sharpe ratios is expected to decrease. However, since the 95% confidence interval ranges from -0.13468658 (lower level) to 0.03782264 (upper level), the true mean of differences in Sharpe ratios can take the value of zero, which implies these findings are not statistically significant.

4.4.2 Results Bootstrap Confidence Intervals Emerging Markets Portfolio

Overall, the results for the mean of difference in Sharpe ratios for the emerging markets portfolio have not been found as statistically significant (Table 2). The overall estimated means of differences in Sharpe ratios have been found to be negative compared to the pooled portfolio sample. This result indicates, that a portfolio's Sharpe ratio, consisting of only emerging market equities, seems to be always negatively affected by US macroeconomic announcements.

Table 2 - Estimation of Bootstrap CI for Mean Differences in Sharpe Ratios for Emerging Market Portfolios

	Upper Confidence Value (0.95) for Sharpe Ratio	Lower Confidence Value (0.05) for Sharpe Ratio	Confidence Interval Width	Mean of Differences Bootstrapped Sharpe Ratios	Standard Deviation of Bootstrapped Sharpe Ratios
Announcement					
Nonfarm Payrolls	0.04899634	-0.07463367	0.12363001	-0.01372243	0.03774846
University of Michigan Consumer Sentiment Index	0.02752488	-0.1201717	0.14769658	-0.04790624	0.04438958
Unemployment Rates	0.00498662	-0.14249771	0.14748432	-0.07061415	0.04469087
Consumer Price Index	0.02967828	-0.09682322	0.1265015	-0.0353189	0.03831173
Business Inventories	0.06707555	-0.06878554	0.13586109	-0.001079007	0.04167075
Trade Balance	0.0393506	-0.09576975	0.13512035	-0.02843865	0.04104799
FOMC Rate Decision	0.01978723	-0.16855617	0.1883434	-0.07472701	0.0570864
Notes:	Confidence Intervals have been estimated on a 95% confidence level. *, is indicating a statistical significance.				

For the announcement of US Nonfarm Payrolls, the mean of differences in Sharpe ratios for the emerging market portfolio has been estimated with -0.01372243 (with a SD of 0.03774846). This finding leads to the assumption that the announcements of US Nonfarm Payrolls are associated with a decrease in the mean of differences in Sharpe ratios. Nonetheless, the 95% confidence interval ranges from -0.07463367 to 0.04899634, which contains the possibility of the true mean of the difference in Sharpe ratios to be zero, resulting in insignificant findings. The announcement of the Consumer Sentiment Index revealed a mean of differences in Sharpe ratios of -0.04790624 (with a SD of 0.04438958). Like in the case of the announcement of Nonfarm Payrolls, the mean difference in Sharpe ratios is expected to decrease within three months after an announcement of the Consumer Sentiment Index. The 95% confidence interval for the differences in Sharpe ratios for the announcement of the Consumer Sentiment Index has been estimated to range from -0.1201717 (lower level) to 0.02752488 (upper level), indicating that these findings are not statistically significant. Furthermore, for announcements of Unemployment rates, the mean differences in Sharpe ratios for emerging market portfolios has

been estimated to be -0.07061415 (with a SD of 0.04469087), indicating that an announcement of US Unemployment rates is associated with a decrease in the mean of differences in Sharpe ratios for emerging markets portfolios. Again, the 95% confidence interval, ranging from -0.14249771 (lower level) to 0.00498662 (upper level), contains the possibility that the true mean of differences in Sharpe ratios to be zero and therefore it is statistically insignificant. The mean of differences in Sharpe ratios for the announcements of the US Consumer Price Index has been estimated to be -0.0353189 (with a SD of 0.03831173), indicating that the announcement of US Consumer Price Index levels is associated with a decrease in the mean of differences in Sharpe ratios for emerging markets portfolios. However, the 95% confidence interval has been estimated to range from -0.09682322 (lower level) to 0.02967828 (upper level), which indicates that the findings are not statistically significant as the true mean of differences in Sharpe ratios can take the value of zero. Moreover, the announcements of US Business Inventory levels have revealed a mean of differences in Sharpe ratios of -0.001079007 (with a SD of 0.04167075). These findings indicate that an announcement of US Business Inventory levels is associated with a decrease in the mean of differences in Sharpe ratios for emerging markets portfolios. However, the 95% confidence interval ranges from -0.06878554 (lower level) to 0.06707555 (upper level), which makes this finding not statistically significant. Furthermore, the announcements of US Trade Balance levels have revealed a mean of differences in Sharpe ratios of -0.02843865 (with a SD of 0.04104799), indicating that such announcements are associated with a decrease in the mean of differences in Sharpe ratios for emerging markets portfolios. However, the 95% confidence interval ranges from -0.09576975 (lower level) to 0.0393506 (upper level) and can take the value of zero, which implies that these findings are not statically significant. Finally, the announcements of US interest rates have resulted in a mean of differences in Sharpe ratios of -0.07472701 (with a SD of 0.0570864), leading to the assumption that announcements of US interest rates are associated with a decrease

in the mean of differences in Sharpe ratios within three months after the announcement has been made. Nevertheless, the 95% confidence interval for the mean of differences in Sharpe ratio ranges from -0.16855617 (lower level) to 0.01978723 (upper level), which leads to the outcome that the true mean of differences in Sharpe ratios can take the value of zero and is therefore not statistically significant.

4.4.3 Results Bootstrap Confidence Intervals Developed Markets Portfolio

Table 3 - Estimation of Bootstrap CI for Mean Differences in Sharpe Ratios for Developed Market Portfolios

	Upper Confidence Value (0.95) for Sharpe Ratio	Lower Confidence Value (0.05) for Sharpe Ratio	Confidence Interval Width	Mean of Differences Bootstrapped Sharpe Ratios	Standard Deviation of Bootstrapped Sharpe Ratios
Announcement					
Nonfarm Payrolls	0.08808174	-0.03575398	0.12383572	0.02659113	0.03777615
University of Michigan Consumer Sentiment Index	0.01692166	-0.08580463	0.10272629	-0.03393086	0.03124607
Unemployment Rates	0.07036061	-0.04256784	0.11292845	0.01291954	0.03427799
Consumer Price Index	0.07623044	-0.0469083	0.12313874	0.0151041	0.03746013
Business Inventories	0.03108413	-0.08322928	0.11431341	-0.02624827	0.03509999
Trade Balance	0.12134977	-0.01011721	0.13146698	0.05505653	0.03953885
FOMC Rate Decision	0.07081393	-0.07428644	0.14510037	-0.002560689	0.04397503
Notes:	Confidence Intervals have been estimated on a 95% confidence level. *, is indicating a statistical significance.				

In conclusion, the results for the confidence intervals for the mean of differences in Sharpe ratios for the developed markets portfolio have also been found as statistically insignificant (Table 3). However, in comparison to the emerging markets portfolio, the estimated mean of differences in Sharpe ratios are more likely to be positive for the developed market portfolios. In the case of the announcement of the US Nonfarm Payrolls, the 95% confidence interval has estimated a mean of differences in Sharpe ratios of 0.02659113 (with a SD of 0.03777615) and ranges from -0.03575398 (lower level) to 0.08808174 (upper level). This finding indicates, that on average an announcement of US Nonfarm Payrolls is associated with an increase in Sharpe ratios for portfolios consisting of developed market equities. However, the confidence interval

indicates that the true mean could be zero, which makes these findings as statistically insignificant. On the other hand, for the announcements of the Consumer Sentiment Index, the 95% confidence interval has been estimated with a negative mean of differences in Sharpe ratios of -0.03393086 (with a SD of 0.03124607) with the range from -0.08580463 (lower level) to 0.01692166 (upper level). This result indicates that within three months after an announcement of the Consumer Sentiment Index the mean of differences in Sharpe ratios for developed market equities tend to decrease. However, the 95% confidence interval includes the possibility for the true mean to equal zero, which makes these findings statistically insignificant. Furthermore, for the announcements of US Unemployment rates, a mean differences in Sharpe ratios of 0.01291954 (with a SD of 0.03427799) has been estimated. Similar to the results of the US Nonfarm Payrolls, the mean of differences in Sharpe ratios for developed market equity portfolios tend to increase within three months after an announcement of US Unemployment rates has been made. However, the 95% confidence interval ranges from -0.04256784 (lower level) to 0.07036061 (upper level), which indicates that these findings are not statistically significant. The 95% confidence interval for the announcement of US Consumer Price Index have revealed a mean of differences in Sharpe ratios of 0.0151041 (with a SD of 0.03746013) with the range from -0.0469083 (lower level) to 0.07623044 (upper level). This result indicates that the mean of differences in Sharpe ratios for developed market portfolios tend to increase within three months after an announcement of US Consumer Prices has been made. However, again the 95% confidence interval indicates the possibility for the true mean to be zero, which makes these findings statistically insignificant. Next, the announcement of US Business Inventory levels has revealed a negative mean of differences in Sharpe ratios of -0.02624827 (with a SD of 0.03509999). The result indicates, that the announcement of US Business Inventory levels is associated with a decrease in the mean of differences in Sharpe ratios for developed market portfolios. Nevertheless, this finding is statistically insignificant as the 95%

confidence interval ranges from -0.08322928 (lower level) to 0.03108413 (upper level) and contains the possibility for the true mean to be zero. Furthermore, the announcement of US Trade Balance has revealed a mean of the differences of Sharpe ratios of 0.05505653 (with a SD of 0.03953885), which has been the highest estimated mean for the developed markets portfolio. This indicates, that the announcement of US Trade Balance seems to have the strongest effect on developed market portfolios, indicating that within three months after an announcement has been made Sharpe ratios tend to increase. However, these findings are not statistically significant, as the 95% confidence interval ranges from -0.01011721 (lower level) to 0.12134977 (upper level) and includes the possibility that the true mean equals zero. Finally, the 95% confidence interval of announcement of US interest rates has estimated a mean of differences in Sharpe ratios of -0.002560689 (with a SD of 0.04397503). This finding reveals that for developed market portfolios, the announcement of interest rates seems to have the lowest effect among all macroeconomic indicators for developed market portfolios. The 95% confidence interval ranges from -0.07428644 (lower level) to 0.07081393 (upper level), which also indicates that the true mean of the differences in Sharpe ratios can be zero.

4.5 Patterns of Changes in Betas among Emerging and Developed Markets

Overall the results of the analysis of the macroeconomic announcements on the changes in systematic risk will be explained by two major concepts, namely volatility and the decoupling–recoupling hypothesis. According to the decoupling–recoupling hypothesis, certain US macroeconomic announcements are more important for emerging markets than for developed markets (Dooley & Hutchison, 2009) which can be viewed as an extension to the concept of market integration and liberalization. When summarizing the results of the changes in betas for emerging and developed markets some patterns can be observed. For five out of the seven analyzed macroeconomic announcements, systematic risk tends to increase across all samples

within three months after an announcement has been made. In all cases except for the announcement of Interest rates, the changes in systematic risk tend to be greater for emerging markets than for developed markets. This finding could be explained by the higher conditional and unconditional volatility of emerging markets compared to the market portfolio (Santis & Imrohoroğlu, 1997). However, these changes in the beta coefficients seem not to differ greatly between emerging and developed markets. Furthermore, the unconditional betas tend to be greater for developed markets compared to emerging markets (Table 5, Appendix), which can be explained by market integration (Bekaert & Harvey, 1995 and De Jong & De Roon, 2005), and the findings from Haugen & Baker (1996), who revealed that stocks with high returns (low returns) exhibit lower level of market betas (higher level of market betas). While the average daily cumulative return for the emerging market sample was 177.91%, it was only 76.00% for the developed market sample over the total sample period, which would confirm the findings from Haugen & Baker (1996). Furthermore, another explanation for the higher changes in betas could be market liberalization. According to Domowitz, Glen & Madhavan (1998), emerging markets tend to be less liberal compared to developed markets, as emerging markets do not allow foreign investors to participate in the market (or only to some degree), which in turn might increase the volatility of the emerging market equities, as the additional information of foreign investors is not reflected within the prices. Moreover, empirical evidence suggests that US macroeconomic announcements are associated with a disproportional large impact on emerging markets compared to local country announcements (Nowak et al., 2011). This evidence could also be an explanation for the greater observed changes in betas for emerging markets. Finally, most of the changes in betas have not been found as statistically significant for developed markets, as the post announcement interaction effects between the dummy variables and the returns of the S&P 500 are statistically insignificant, for the announcements of Business Inventory, Consumer Sentiment, and Nonfarm Payrolls. Consequently, most of the

changes in betas are explained by analyzing the emerging markets volatility in respect to the market portfolio and by the findings from Nowak et al. (2011). The final major observation for the changes in betas is the overall magnitude of the average changes in betas (between ≈ -0.1 and ≈ 0.07), which appear to be small and which partially confirms prior findings from the literature by Braun, Nelson & Sunier (1995), who argue that predictive asymmetry in betas may take place at the firm level, rather than on the aggregated industry and decile level. Nevertheless, unlike the work from Braun, Nelson & Sunier (1995), this study revealed that betas indeed change according to macro events. Although these changes seem to be small, betas are time varying, which confirms the findings from Andersen et al. (2005). In addition to the major observations and patters found regarding the changes in betas, the findings of this study revealed that holding a pooled portfolio consisting of both emerging and developed markets allow for diversification benefits. According to Nikkinen et al. (2006), emerging markets provide global investors with diversification benefits due to market segregation. This is also

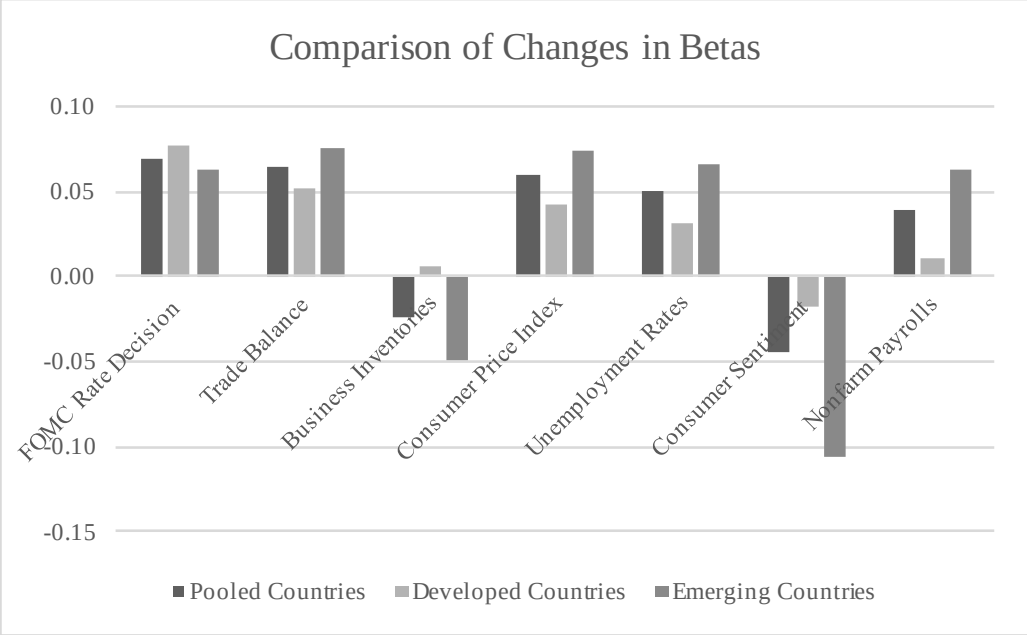

Figure 1 Comparison of Changes in Betas

true for the changes in betas. As for every announcement except for interest rates, the changes in betas are smaller compared to a solely emerging market portfolio, which had the highest changes in betas (Figure 1).

Out of this one important practical implication could be drawn for the estimation of the cost of equity. As greater changes in betas among emerging markets imply that the cost of equity also changes more frequently, when applying traditional pricing models such as the CAPM, this might contribute to findings from Estrada (2002), who argues that the traditional CAPM is not an appropriate pricing model for emerging markets. The reason for his proposition is based on the measure of risk. The measure of risk, by beta, assumes normality and symmetry which is not the case for emerging markets.

Furthermore, for all samples used within this study, the announcement of interest rates leads to an increase of systematic risk within three months after the announcement has been made. Despite this paper cannot explain the reason for the direction of changes in betas due to the announcements of interest rates, interest rates variation seems to explain the variation in betas as well. According to Kasman, Vardar & Tunç (2011), interest rate volatility and exchange rate volatility are an important determinant of equity volatility, as they presented evidence from Turkey. Even though the author's findings are only related to emerging markets, the announcement of interest rates also seem to have an influential effect on stocks' volatility compared to the market volatility, which in turn provides partial explanations for the findings of this paper. Hence, this study assumes that also the announcement of interest rates, in which the variation in the interest rates is announced, drives the equities' volatility and therefore also the systematic risk. Moreover, similar findings have been observed for the announcement of Trade Balance. Throughout all samples, the announcement of Trade Balance is associated with an increase in betas among emerging and developed markets with respect to the US. Like in the case for interest rates, this increase in betas is explained by the effect of announcements of macroeconomic indicators on the volatility of equities, found within the literature. According to Flannery & Protopapadakis (2002), the announcement of Trade Balance is associated with an increase in the conditional volatility of over 15%. Consequently, an explanation for this

increase in betas could be an increase in the conditional volatility of the stock returns in comparison to the market portfolio.

Moreover, the announcement of Business Inventory revealed mixed results. As in the case for developed markets, the announcement of Business Inventories had almost no effect on the changes in beta, as the estimated change in the beta coefficient of ≈ 0.005 suggests. However, on the other hand the announcement of Business Inventory levels has indeed an effect on emerging market betas. Over the total sample period, the announcement of Business Inventory levels has been associated with a decrease in emerging market betas of ≈ -0.05. As the previous literature review revealed, the macroeconomic indicator of Business Inventory provides contentious findings. Despite this paper cannot relate its observations to prior research regarding betas, the contentious findings regarding Business Inventory levels among emerging and developed markets will be explain by the findings from Dooley & Hutchison (2009). The authors have highlighted the importance of the decoupling–recoupling hypothesis for emerging markets, which states, that certain information arriving from the US might be more important for emerging markets and hence would imply that emerging markets tend to move always between market integration and segregation towards developed countries. In general, when assuming this hypothesis is true and certain macroeconomic announcements are more important than others for emerging markets compared to developed markets, would also imply that this will affect the covariances between emerging market equities and the US market portfolio. Hence, the effect of observed differences in betas between emerging and developed markets could be explained by using the decoupling–recoupling hypothesis.

Furthermore, the announcement of the Consumer Price Index led to an increase in betas for all samples. However, when trying to explain this finding based on the volatility effect of inflation on equities, this causes some trouble as prior findings within the finance literature vary. On the one hand, relatively old literature findings, like the finding from Schwert (1989), reveal small

effects of the CPI's volatility on equity's volatility, while on the other hand more recent studies from Flannery & Protopapadakis (2002) indicate that the announcements of CPI figures lead to even reduced volatilities of equities. Consequently, it is difficult to only explain the results of this study by assuming the announcement of CPI will only increase the emerging markets volatility compared to the US market, as it could also be the other way around, meaning developed market volatility increases compared to the US market. Nevertheless, according to the literature volatility is indeed affected by the announcement of CPI and when including the implication of the decoupling–recoupling hypothesis this could be a basis for the explanation of this empirical observation.

Moreover, also the announcement of Unemployment rates led to mixed findings regarding the changes in beta. For emerging markets, announcements of Unemployment rates have resulted in an increase in betas of ≈ 0.07, while these announcements almost seem not to have any effects for developed countries, as the change in betas has been estimated with ≈ 0.03. This paper explains this finding by the decoupling–recoupling hypothesis, implying that Unemployment rates seem to have a greater effect on emerging markets' volatility compared to the US market. However, this explanation could be invalid. According to Cakan, Doytch & Upadhyaya (2015), positive US unemployment announcements are associated with decreased volatility among emerging markets. The authors findings had only been significant for some of the selected countries of their study, however. As no clear explanation can be given regarding the effect of announcements of US Unemployment rates on changes in betas, the paper's explanation will rely on the empirical evidence from Badrinath, Gay, & Kale (1989) and Skinner (1989), who observed that higher betas are associated with higher stock volatility. By using this empirical evidence, the results of this paper would reject the prior findings by Cakan, Doytch & Upadhyaya (2015), as this paper assumes that after an announcement of Unemployment rates,

emerging market equities become more volatile than the market portfolio and hence the betas will increase.

Next, the announcement of the Consumer Sentiment Index resulted in almost no changes in developed market betas (≈ -0.02), while the largest change in betas have been found for emerging markets with a change in beta of ≈ -0.1. The disproportional effect of announcements of Consumer Sentiment levels on emerging markets compared to developed markets could again be explained by the decoupling–recoupling hypothesis and macroeconomic news spillovers from developed markets to emerging markets. According to Hanousek & Kočenda (2011), positive outcomes of Consumer Sentiment are reflected within higher stock returns. Furthermore, negative expectations are associated with proportional higher negative returns, than positive expectations lead to greater positive returns (Kaminsky & Schmukler, 1999). Hence, the changes in betas due to Consumer Sentiment are explained by behavioral aspects and changes in volatility.

As in the case of announcements of Business Inventories and Consumer Sentiment, the announcements of Nonfarm Payrolls lead to proportional greater changes in betas for emerging markets than for developed markets. As the majority of the finance literature regarding the effects of Nonfarm Payrolls is mainly about bond markets, this paper explains the changes in beta with the same logic applied for the announcements of Unemployment rates, as the results do not differ greatly and both indicators refer to the employment situation within the US.

4.6 Relationship between Sharpe Ratios and Changes in Betas

Despite the changes in Sharpe ratios are not significantly influenced by macroeconomic announcements, this paper still wants to give an indication how these changes in Sharpe ratios are related to changes in betas. When comparing the results of the changes in betas with the results of the changes in the Sharpe ratios, some new insights can be disclosed. First, in most

of the cases the Sharpe ratios tend to decrease within three months after an US macroeconomic announcement for the pooled portfolio. Furthermore, over the same period, the changes in betas are mostly positive. In other words, one would assume there is a slight positive linear relationship between the changes in betas and the changes in Sharpe ratios for pooled portfolios. This assumption is partly confirmed when running a correlation analysis. The correlation analysis revealed a weak positive relationship with a Pearson's r of 0.36, which can be considered as a moderate effect (assuming a large effect implies r +/- of 0.75 and weak +/- 0.25). For the pooled sample, four out of the seven analyzed macroeconomic indicators revealed a positive relationship. Meaning, if the change in beta is positive (negative), the change in the Sharpe ratio tends to be positive (negative) as well. For the pooled sample, the largest positive change in beta has been observed for the announcement of Interest rates with ≈ 0.07 (largest negative change for Consumer Sentiment with ≈ -0.04). On the other hand, the largest positive change in Sharpe ratios has been observed for Trade Balance with ≈ 0.02 (largest negative change for Consumer Sentiment with ≈ -0.05). Furthermore, the smallest change (closest to zero) in the Sharpe ratio has been observed for the announcement of Business Inventories with a mean of ≈ -0.02.

When looking at the results for the developed country sample, the effect of the positive relationship between changes in betas and changes in Sharpe ratios becomes even more visible. With obtaining a Pearson's correlation coefficient of around 0.53, a positive linear relationship between changes in betas and changes in Sharpe ratios has been indicated, which can be considered as a moderate effect (assuming a large effect implies r +/- of 0.75 and weak +/- 0.25). For the developed market sample, four out of the seven macroeconomic announcements that led to increased betas have also led to an increase in the Sharpe ratios. Compared to the findings of the pooled sample, the announcement of Interest rates also leads to the greatest change in betas of ≈ 0.08, while this is associated with almost no change in Sharpe ratios (≈ -

0.002). The smallest change in beta has been obtained for US Business Inventory levels (≈ 0.01), while the announcement of the Consumer Sentiment Index led to the largest negative impact in Sharpe ratios (≈ -0.03). Moreover, the announcement of Trade Balance resulted in the largest increase in Sharpe ratios of ≈ 0.05 for developed market portfolios.

The results of the emerging market sample differ for the relationship between the changes in betas and changes in Sharpe ratios. The Pearson's correlation coefficient r has been estimated to be around -0.22, which would indicate there is no linear relationship (assuming a large effect implies r +/- of 0.75 and weak +/- 0.25). Furthermore, all changes in Sharpe ratios are negative. In this case, the announcements of interest rates resulted in the largest negative change in Sharpe ratios of ≈ -0.07, while the announcement of US Business Inventories resulted in the smallest change in Sharpe ratios with a mean of ≈ -0.001. Finally, the announcement of Consumer Sentiment is associated with the largest negative change in betas of ≈ -0.11, while the announcement of US Business Inventories is associated with the smallest change in betas with ≈ -0.05. The announcement of Trade Balance has been associated with the largest positive change in betas of ≈ 0.07.

One striking difference between emerging market portfolios and developed market portfolios is the sign of the change in Sharpe ratios after an US macroeconomic announcement has been made. While in matured markets, US macroeconomic announcements have been associated with good news, as the increase in Sharpe ratios suggests, the announcements have been negative news for emerging markets. However, as the changes in the Sharpe ratios appear to be small (varying between -0.07 and 0.05) and have been found to be insignificant across all samples, these findings can only provide an indication how changes in betas are related to portfolio performances. Therefore, this paper does not provide any explanations for the reasons for the changes in Sharpe ratios due to macroeconomic announcements. The insignificant findings regarding the Sharpe ratios could be explained by the fact that macroeconomic

indicators have lead - lag effects on equities. Also, the post announcement holding period of three months might be too small or too long as certain effects on Sharpe ratios might evaporate.

4.7 Implications for Portfolio Managers

From all the obtained results of the panel data analysis, the confidence intervals, and the findings of the finance literature for explanations of these changes, implications for portfolio managers can be drawn. As the changes in betas and in Sharpe ratios seem to be small in response to macroeconomic announcements, the three months effect in these changes seem not to have significant consequences for the performance of international portfolios. Nevertheless, one major conclusion can be made. This study proves that systematic risk is indeed time varying and influenced by US macroeconomic announcements, which implies that the required rate of return for portfolios also changes with macroeconomic announcements. In addition, it has been observed that the changes in systematic risk are greater for emerging market equities than for developed market equities. Therefore, changes in systematic risk seem to be more important for portfolio managers investing in emerging market securities, who apply traditional pricing models such as the CAPM.

Furthermore, it is recommended for portfolio managers to follow specifically announcements of Interest rates and Consumer Sentiment. While Interest rates have changed betas across all markets in a homogeneous way, Consumer Sentiment has been associated with the greatest change in betas for emerging markets.

5. Conclusion

Overall, the changes in betas caused by the announcements of the US macroeconomic indicators are explained by the fact, that macroeconomic announcements drive the conditional volatility of equities, which in turn leads to the changes betas. In addition, the partially stronger observed

changes in betas for emerging markets compared to developed markets are explained by the concept of market integration and the decoupling–recoupling hypothesis, which indicates that certain US macroeconomic announcements are more important for emerging markets than other US economic news. For the announcement of Interest rates, Trade Balance, and Consumer Price Index, an increase in betas has been observed across all samples, while betas tended to decrease as a result of the announcements of Consumer Sentiment. While in the case for emerging markets, Unemployment rates and Nonfarm Payrolls led to increased betas, these announcements had almost no effects on developed markets. Moreover, for developed markets, no meaningful changes in betas have been observed for the announcement of Business Inventories, while it resulted in decreased betas for emerging markets.

Furthermore, these findings support the disbelieve of the literature about the appropriateness of the CAPM for the estimation of the cost of equity for emerging markets, as beta might not be an accurate measure of risk. Despite systematic risk cannot be diversified away, the changes in betas are reduced for pooled portfolios, consisting of both of emerging and developed market equities, which results in diversification benefits for global investors.

Consequently, this paper answers the research question by stating that changes in systematic risk, due to the announcement of US macroeconomic indicators, tend to be larger for emerging markets than for developed markets, even if the differences in the changes in betas between emerging and developed markets seem not to be large.

Finally, the changes in betas are positively correlated to developed market portfolio's Sharpe ratios, while they seem not to be correlated to emerging market portfolio's performances, as the Pearson correlation indicates.

6. Limitations & Further Research

As in the case of every empirical and academic research, this explorative study also runs some shortages and limitations. First, this study assumes that the entire domestic financial market from the selected emerging and developed countries can be proxied by those countries' major stock indices. Despite those indices are quite efficient portfolios from those countries, most of these indices do not include SMEs, which could affect the observed changes in stock betas. A similar problem occurs with the choice of the S&P 500 as the international market portfolio. Even though the S&P 500 is arguably one of the most efficient equity portfolios, it only includes US companies and therefore this leads to a limitation. However, as most of the companies included in the S&P 500 run global operations, global risks should be reflected within the prices of the S&P and consequently this limitation seems to be acceptable. Regarding the country selection, this study had to set a starting point. No financial assets from the Middle East or Africa are included, which can be considered to become important markets for international portfolio managers within the future. Hence, it could be interesting to see how the influences of US macroeconomic announcements on emerging market betas might change with the inclusion of equities from those markets.

Furthermore, regarding further research, it would be interesting to see how those observed changes in international stock market betas might vary when accounting for pre and post financial crises scenarios. As Dooley & Hutchison (2009) revealed within their analysis, emerging markets tend to respond more sensitive to US macroeconomic news after the global financial crisis of 2007/2008. Since many findings of this paper are explained by the changes in volatilities of equities found within prior research, it would be recommended to also analyze the volatilities around those announcement dates in order to verify whether the changes in betas are indeed explained by the changes in volatilities. Furthermore, it is recommended to also account for subsequent increases or decreases of announced macroeconomic values. In other

words, how do betas or Sharpe ratios behave, if an announcement is positive or negative compared to the previous one. Finally, the inclusion of control variables such as leverage might dissolve the changes in betas which has not been included within the study.

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8. Appendix

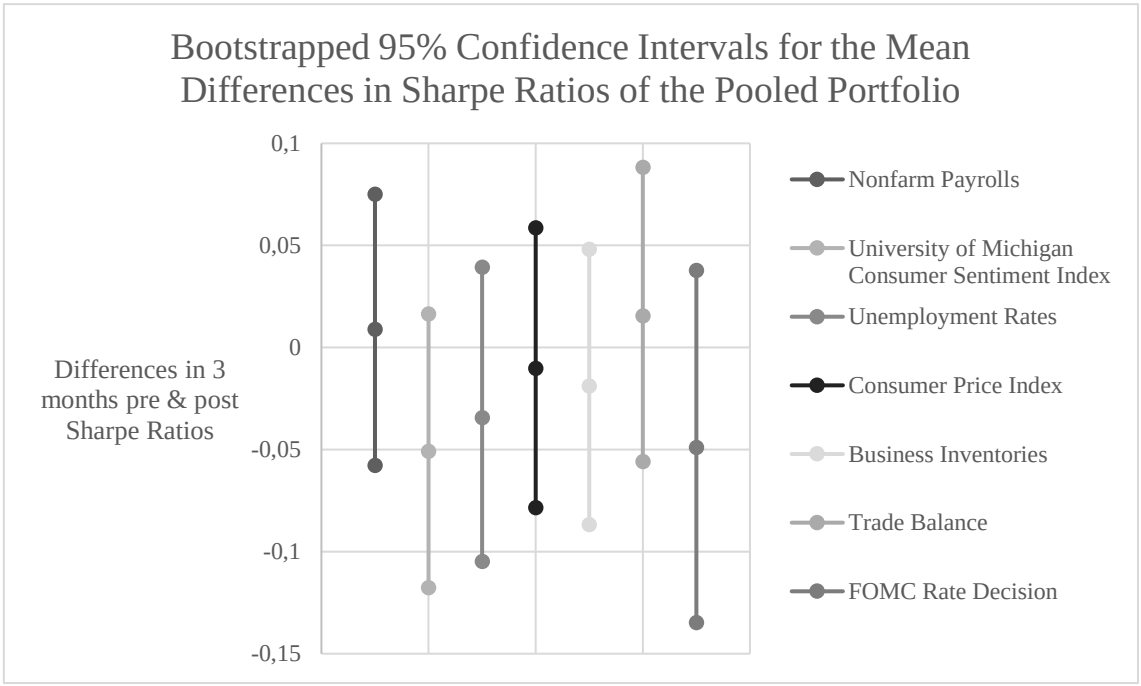

Figure 2 - Confidence Intervals Pooled Sample

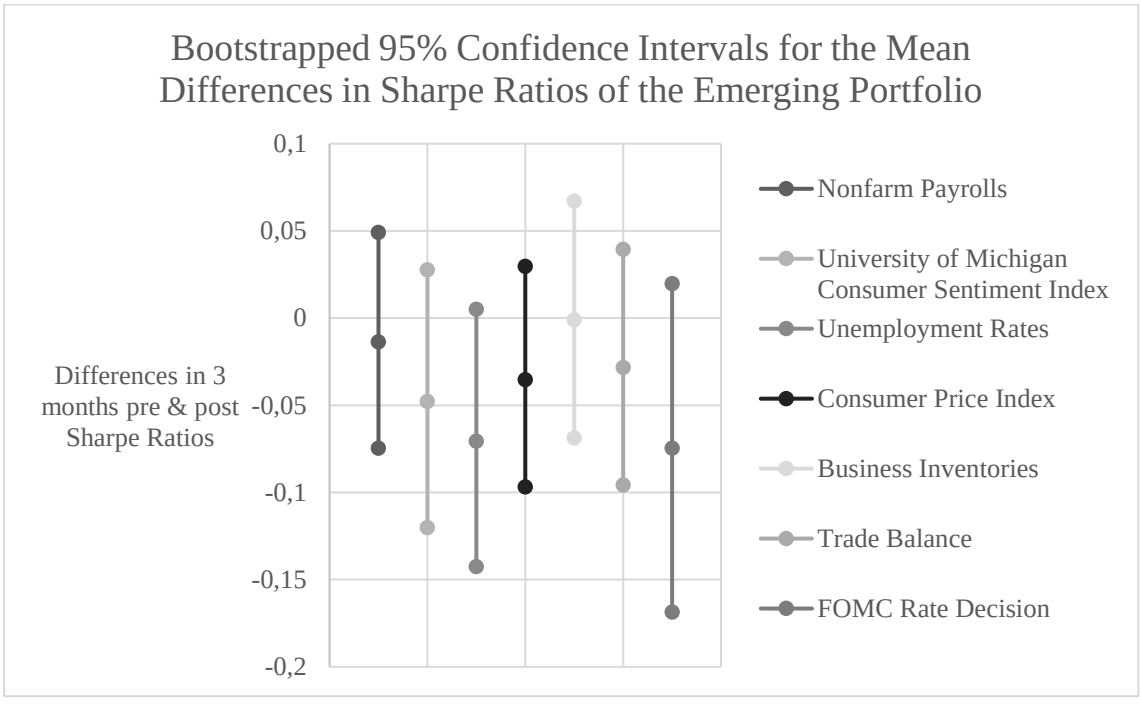

Figure 3 - Confidence Intervals Emerging Sample

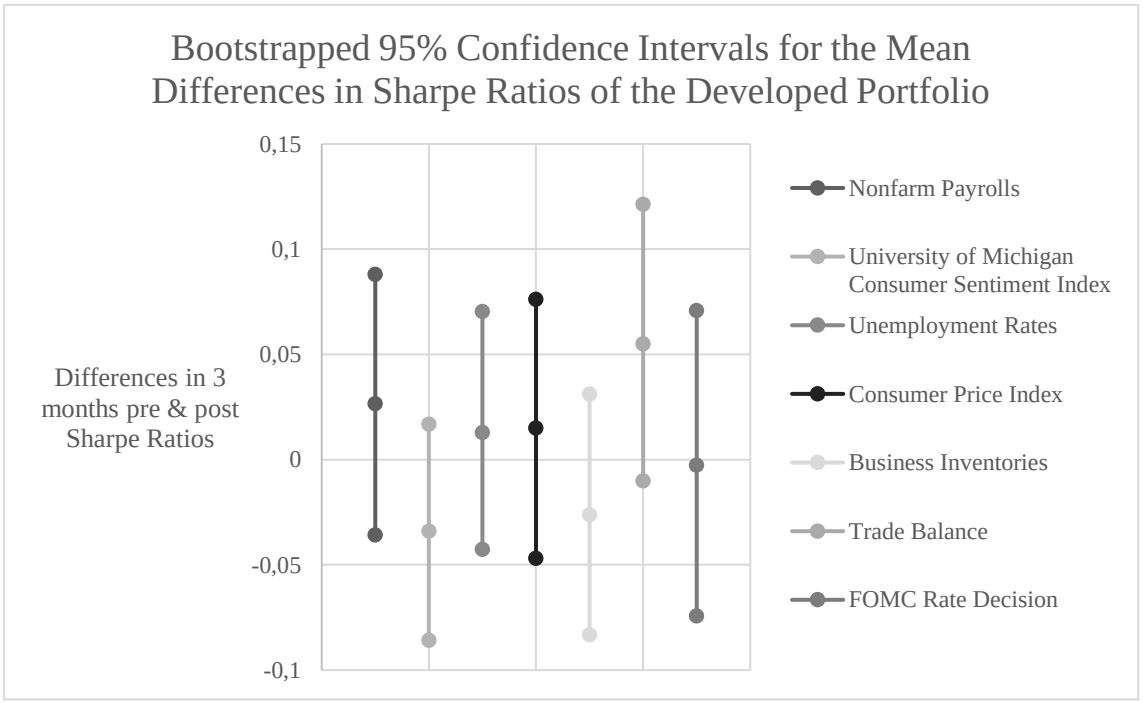

Figure 4 - Confidence Intervals Developed Sample

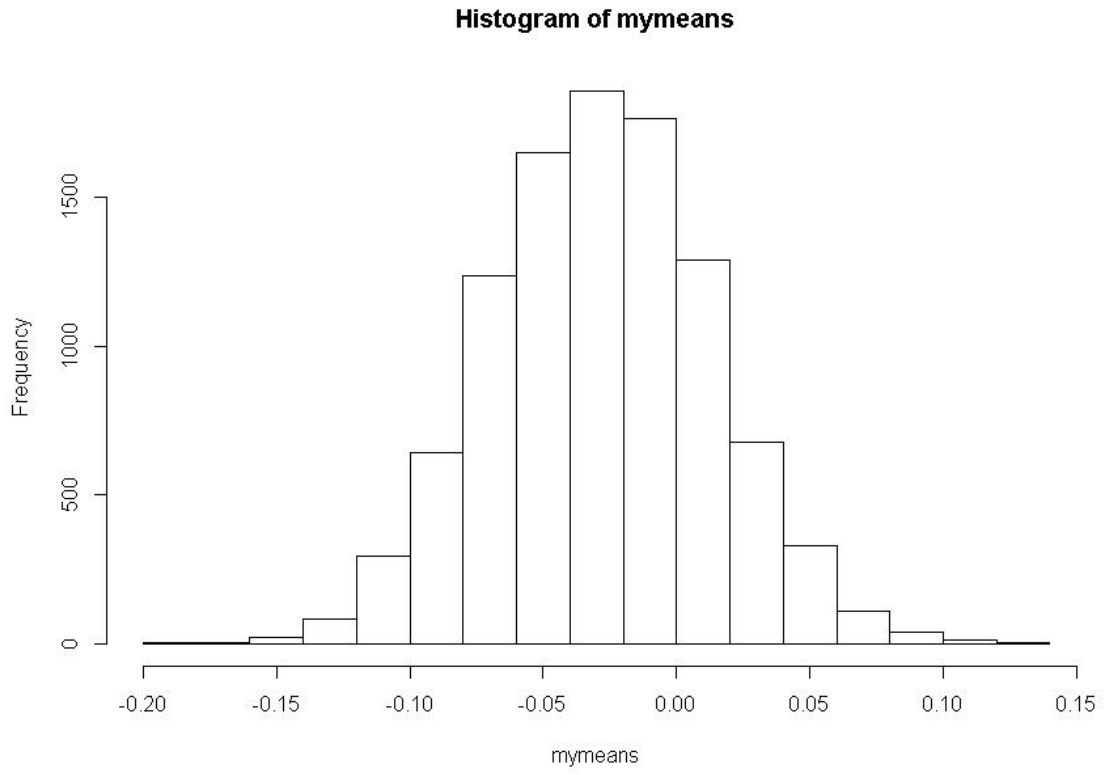

Figure 5 Distribution of the Mean of Differences in Sharpe ratios for the announcement of Trade Balance for the emerging sample

Table 4 - Comparison Changes of Betas with Changes in Sharpe Ratios

	Pooled Markets		Developed Markets		Emerging Markets		Average	
	Changes in Betas	Changes in Sharpe Ratios	Changes in Betas	Changes in Sharpe Ratios	Changes in Betas	Changes in Sharpe Ratios	Changes in Betas	Changes in Sharpe Ratios
FOMC Rate Decision	0.069099	-0.048833	0.077101	-0.002561	0.062522	-0.07472701	0.069574	-0.039538
Trade Balance	0.064204	0.015520	0.051692	0.055057	0.074694	-0.02843865	0.063530	0.019596
Business Inventories	-0.024210	-0.018738	0.005607	-0.026248	-0.048779	-0.001079007	-0.022461	-0.017422
Consumer Price Index	0.059143	-0.010099	0.041887	0.015104	0.073483	-0.03531890	0.058171	-0.007476
Unemployment Rates	0.050581	-0.034256	0.031345	0.012920	0.066452	-0.07061415	0.049459	-0.026342
Consumer Sentiment	-0.043918	-0.050834	-0.017698	-0.033931	-0.106323	-0.04790624	-0.055980	-0.042872
Nonfarm Payrolls	0.039374	0.009007	0.010767	0.026591	0.062944	-0.01372243	0.037695	0.010446

Table 5 - Overview of Changes in Betas between Emerging and Developed Countries

	Pooled Markets		Developed Markets		Emerging Markets		Average	
	Pre announcement Beta	Post announcement Beta	Pre announcement Beta	Post announcement Beta	Pre announcement Beta	Post announcement Beta	Pre announcement Beta	Post announcement Beta
FOMC Rate Decision	0.753523	0.822622	0.804518	0.881619	0.711824	0.774346	0.756622	0.826196
Trade Balance	0.744533	0.808737	0.806147	0.857839	0.693988	0.768682	0.748223	0.811753
Business Inventories	0.796577	0.772367	0.840740	0.846347	0.760592	0.711813	0.799303	0.776842
Consumer Price Index	0.745167	0.804310	0.805563	0.847450	0.695670	0.769153	0.748800	0.806971
Unemployment Rates	0.766419	0.817000	0.829521	0.860866	0.714682	0.781134	0.770207	0.819667
Consumer Sentiment	0.806255	0.762337	0.863686	0.845988	1.058852	0.952529	0.909598	0.853618
Nonfarm Payrolls	0.756034	0.795408	0.826627	0.837394	0.698302	0.761246	0.760321	0.798016

Table 6 - Summary Statistics - Emerging Markets

	FOMC Rate Decision		Trade Balance		Business Inventories		Consumer Price Index	
	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error
Intercept	0.000729 (2.078093)**	0.000351	-0.000310 (-0.891453)	0.000348	0.000557 (1.573287)	0.000354	0.000172 (0.495598)	0.000348
Dummy Pre&Post	-0.000308 (-0.798171)	0.000385	0.000787 (2.055565)**	0.000383	-0.000450 (-1.157377)	0.000388	0.000170 (0.443940)	0.000383
Dummy Post	-0.000579 (-2.562544)**	0.000226	-0.000502 (-2.219257)**	0.000226	0.0000817 (0.362221)	0.000226	-0.000324 (-1.432581)	0.000226
Return S&P 500 lag	0.275834 (30.67215)***	0.008993	0.275489 (30.63560)***	0.008992	0.275119 (30.59104)***	0.008993	0.275385 (30.62936)***	0.008991
Return S&P 500	0.373505 (10.50401)***	0.035558	0.520329 (19.51227)***	0.026667	0.498269 (16.52440)***	0.030154	0.512097 (18.03603)***	0.028393
Return S&P500 lead	0.020479 (2.277428)**	0.008992	0.020731 (2.305520)**	0.008992	0.021018 (2.336006)**	0.008997	0.020636 (2.295566)**	0.008989
Return S&P 500*Dummy Pre&Post	0.042006 (1.100626)	0.038165	-0.122561 (-4.088830)***	0.029975	-0.033814 (-1.029454)	0.032846	-0.112448 (-3.566617)***	0.031528
Return S&P 500*Dummy Post	0.062522 (3.352533)***	0.018649	0.074694 (3.922097)***	0.019044	-0.048779 (-2.597004)***	0.018783	0.073483 (3.886611)***	0.018907

Note: ***,**,* Statistical significance at a 1%, 5%, 10% level, respectively.

This table represents the results of the estimated pre&post announcement beta, the post beta, as well as the unconditional beta of the emerging market sample in respect to the S&P500.

Table 7 - Summary Statistics - Emerging Markets

	Unemployment Rates		University of Michigan Consumer Sentiment Index		Nonfarm Payrolls	
	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error
Intercept	-0.0000221 (-0.068783)	0.000322	-0.000986 (-1.748624)*	0.000564	-0.000706 (-2.028545)**	0.000348
Dummy Pre&Post	0.000563 (1.619981)	0.000348	0.001459 (2.198671)**	0.000664	0.001083 (2.827817)***	0.000383
Dummy Post	-0.000645 (-2.919305)***	0.000221	-0.000208 (-0.419558)	0.000495	-0.000227 (-1.005417)	0.000226
Return S&P 500 lag	0.275530 (30.65341)***	0.008989	0.111852 (5.908605)***	0.018930	0.276625 (30.76142)***	0.008993
Return S&P 500	0.364031 (13.21949)***	0.027537	1.223202 (25.96025)***	0.047118	0.542797 (21.38608)***	0.025381
Return S&P 500 lead	0.020875 (2.322361)**	0.008989	0.001057 (0.055839)	0.018931	0.021675 (2.410383)**	0.008992
Return S&P 500*Dummy Pre&Post	0.054246 (1.771469)*	0.030622	-0.277259 (-4.974575)***	0.055735	-0.142795 (-4.948752)***	0.028855
Return S&P 500*Dummy Post	0.066452 (3.525007)***	0.018852	-0.106323 (-2.581085)**	0.041193	0.062944 (3.283276)***	0.019171

Note: ***,**,* Statistical significance at a 1%, 5%, 10% level, respectively.

This table represents the results of the estimated pre&post announcement beta, the post beta, as well as the unconditional beta of the emerging market sample in respect to the S&P500.

Table 8 - Summary Statistics - Developed Markets

	FOMC Rate Decision		Trade Balance		Business Inventories		Consumer Price Index	
	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error
Intercept	0.000179 (0.671610)	0.000267	-0.000520 (-1.975069)**	0.000263	0.000101 (0.373969)	0.000269	-0.0000898 (-0.341239)	0.000263
Dummy Pre&Post	-0.000224 (-0.763555)	0.000293	0.000530 (1.830597)*	0.000290	-0.000165 (-0.558198)	0.000295	0.0000720 (0.248631)	0.000290
Dummy Post	-0.0000592 (-0.347132)	0.000171	-0.0000444 (-0.259526)	0.000171	-0.0000079 (-0.046301)	0.000171	-0.0000772 (-0.452081)	0.000171
Return S&P 500 lag	0.391522 (57.72557)***	0.006782	0.390840 (57.61796)***	0.006783	0.391002 (57.61296)***	0.006787	0.390578 (57.62576)***	0.006778
Return S&P 500	0.379628 (14.07551)***	0.026971	0.509308 (25.18124)***	0.020226	0.430502 (18.80542)***	0.022892	0.566805 (26.34341)***	0.021516
Return S&P 500 lead	0.021821 (3.217595)***	0.006782	0.021509 (3.171193)***	0.006783	0.021687 (3.194196)***	0.006790	0.021445 (3.164495)***	0.006777
Return S&P 500*Dummy Pre&Post	0.011547 (0.399310)	0.028917	-0.115510 (-5.083899)***	0.022721	-0.002451 (-0.098447)	0.024898	-0.173265 (-7.255902)***	0.023879
Return S&P 500*Dummy Post	0.077101 (5.486267)***	0.014053	0.051692 (3.599510)***	0.014361	0.005607 (0.395659)	0.014171	0.041887 (2.939288)***	0.014251

Note: ***,**,* Statistical significance at a 1%, 5%, 10% level, respectively.

This table represents the results of the estimated pre&post announcement beta, the post beta, as well as the unconditional beta of the developed market sample in respect to the S&P500.

Table 9 - Summary Statistics - Developed Markets

	Unemployment Rates		University of Michigan Consumer Sentiment Index		Nonfarm Payrolls	
	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error
Intercept	0.000184 (0.752671)	0.000244	-0.000262 (-1.205994)	0.000218	-0.000372 (-1.412739)	0.000263
Dummy Pre&Post	-0.000172 (-0.652260)	0.000264	0.000397 (1.583830)	0.000250	0.000405 (1.397412)	0.000290
Dummy Post	-0.000183 (-1.095443)	0.000167	-0.000298 (-1.701681)*	0.000175	-0.000125 (-0.733837)	0.000171
Return S&P 500 lag	0.390859 (57.61331)***	0.006784	0.391818 (57.73595)***	0.006786	0.391907 (57.76612)***	0.006784
Return S&P 500	0.395051 (18.85231)***	0.020955	0.372621 (20.58583)***	0.018101	0.522439 (27.22653)***	0.019189
Return S&P 500 lead	0.021542 (3.175116)***	0.006784	0.022352 (3.293593)***	0.006787	0.022398 (3.301358)***	0.006784
Return S&P 500*Dummy Pre&Post	0.022069 (0.948665)	0.023263	0.076895 (3.669742)***	0.020954	-0.110117 (5.044647)***	0.021829
Return S&P 500*Dummy Post	0.031345 (2.204382)**	0.014219	-0.017698 (-1.213196)	0.014588	0.010767 (0.744270)	0.014467

Note: ***,**,* Statistical significance at a 1%, 5%, 10% level, respectively.

This table represents the results of the estimated pre&post announcement beta, the post beta, as well as the unconditional beta of the developed sample in respect to the S&P500.

Table 10 - Summary Statistics Pooled Markets

	FOMC Rate Decision		Trade Balance		Business Inventories		Consumer Price Index	
	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error
Intercept	0.000483 (2.119093)**	0.000228	-0.000403 (-1.788847)	0.000225	0.000353 (1.535328)	0.000230	0.0000549 (0.243325)	0.000226
Dummy Pre&Post	-0.000271 (-1.082646)	0.000250	0.000670 (2.701458)***	0.000248	-0.000323 (-1.280977)	0.000252	0.000125 (0.505526)	0.000248
Dummy Post	-0.000345 (-2.360988)**	0.000146	-0.000296 (-2.023467)**	0.000147	0.0000416 (0.284801)	0.000146	-0.000213 (-1.454822)	0.000146
Return S&P 500 lag	0.327876 (56.32065)***	0.005822	0.327378 (56.23608)***	0.005822	0.327250 (56.19939)***	0.005823	0.327203 (56.22363)***	0.005820
Return S&P 500	0.376509 (16.31507)***	0.023077	0.515448 (29.78477)***	0.017306	0.468053 (23.90891)***	0.019576	0.536680 (29.13350)***	0.018421
Return S&P 500 lead	0.021049 (3.616012)***	0.005821	0.021048 (3.615893)***	0.005821	0.021282 (3.653294)***	0.005825	0.020961 (3.602378)***	0.005819
Return S&P 500*Dummy Pre&Post	0.028089 (1.134596)	0.024757	-0.119341 (-6.136690)***	0.019447	-0.020008 (-0.938925)	0.021310	-0.139677 (-6.829977)***	0.020451
Return S&P 500*Dummy Post	0.069099 (5.725834)***	0.012068	0.064204 (5.208457)***	0.012327	-0.024210 (-1.990987)**	0.012160	0.059143 (4.833091)***	0.012237

Note: ***,**,* Statistical significance at a 1%, 5%, 10% level, respectively.

This table represents the results of the estimated pre&post announcement beta, the post beta, as well as the unconditional beta of the pooled sample in respect to the S&P500.

Table 11 - Summary Statistics Pooled Markets

	Unemployment Rates		University of Michigan Consumer Sentiment Index		Nonfarm Payrolls	
	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error	Beta (t-statistic)	Std. Error
Intercept	0.0000701 (0.335642)	0.000209	-0.000723 (-3.929621)***	0.000184	-0.000557 (-2.467527)**	0.000226
Dummy Pre&Post	0.000233 (1.033033)	0.000226	0.001095 (5.155820)***	0.000212	0.000779 (3.137713)***	0.000248
Dummy Post	-0.000438 (-3.057039)***	0.000143	-0.000327 (-2.175438)***	0.000151	-0.000182 (-1.240176)	0.000146
Return S&P 500 lag	0.327412 (56.25457)***	0.005820	0.327662 (56.26885)***	0.005823	0.328481 (56.42098)***	0.005822
Return S&P 500	0.377928 (21.11761)***	0.017869	0.471109 (30.76351)***	0.015314	0.533839 (32.45711)***	0.016448
Return S&P 500 lead	0.021142 (3.632422)***	0.005820	0.021700 (3.726413)***	0.005823	0.021964 (3.772611)***	0.005822
Return S&P 500*Dummy Pre&Post	0.039937 (2.008323)**	0.019886	-0.014216 (-0.798825)	0.017796	-0.128250 (-6.856874)***	0.018704
Return S&P 500*Dummy Post	0.050581 (4.144941)***	0.012203	-0.043918 (-3.501146)***	0.012544	0.039374 (3.172075)***	0.012413

"Note: ***,**,* Statistical significance at a 1%, 5%, 10% level, respectively.
This table represents the results of the estimated pre&post announcement beta, the post beta, as well as the unconditional beta of the pooled sample in respect to the S&P500."