Does Interest Rate Change at the FED Affect European Stock Markets?

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Abstract

This study explores how unexpected changes in the federal funds rate made by the FOMC influenced selected European stock markets between 2014 and 2024. This thesis focuses on sectoral and country (indices)-specific responses. Using the event study methodology, the daily stock returns of 300 companies in seven European indices were analysed for 4 different event windows. It measured CAARs for negative and positive outcomes of FOMC. Findings reveal that FED interest rate increases generally lead to significantly negative stock returns across most sectors, with the Utilities, Materials and Energy being the most adversely affected. Technology and Healthcare sectors demonstrated greater resilience, often yielding positive cumulative average abnormal returns. At the country level, most indices experienced negative returns during rate hikes. However, Italy (FTSEMIB) stands out as an exception, providing positive CAAR when interest rate increases probably due to its Financials sector's composition. During rate cuts, Sweden emerges as the only country with sustained positive returns. The study underscores the critical role of monetary policy spillovers in global financial markets. These results give investors useful information. They suggest sector-specific strategies and country-level diversification in response to changes in FED monetary policy. Limitations, such as overlapping global events and the interplay of European Central Bank policies, are acknowledged. This research contributes to the growing literature on international market integration and monetary policy effects.

Keywords: FED, FOMC, CAAR, event-study, interest rate, federal fund rate, US

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Resumo

Este estudo explora a forma como alterações inesperadas na taxa dos fundos federais efectuadas pelo FOMC influenciaram mercados de acções europeus selecionados entre 2014 e 2024. Esta tese centra-se em respostas específicas por sector e por país (índices). Utilizando a metodologia de estudo de eventos, foram analisadas as rendibilidades diárias das acções de 300 empresas em sete índices europeus para 4 janelas de eventos diferentes. Foram medidos os CAARs para resultados negativos e positivos do FOMC. Os resultados revelam que os aumentos das taxas de juro do FED conduzem geralmente a rendibilidades das acções significativamente negativas na maioria dos sectores, sendo os sectores dos serviços públicos, dos materiais e da energia os mais afectados. Os sectores da tecnologia e da saúde demonstraram maior resistência, produzindo frequentemente rendibilidades anormais médias acumuladas positivas. A nível nacional, a maioria dos índices registou retornos negativos durante as subidas das taxas. No entanto, a Itália (FTSEMIB) destaca-se como uma exceção, apresentando um CAAR positivo quando as taxas de juro aumentam, provavelmente devido à composição do seu sector financeiro. Durante as descidas das taxas, a Suécia surge como o único país com rendibilidades positivas sustentadas. O estudo sublinha o papel fundamental das repercussões da política monetária nos mercados financeiros mundiais. Estes resultados fornecem aos investidores informações úteis. Sugerem estratégias sectoriais específicas e diversificação a nível nacional em resposta a alterações na política monetária do FED. São reconhecidas as limitações, como a sobreposição de acontecimentos mundiais e a interação das políticas do Banco Central Europeu.

Palavras-chave: FED, FOMC, CAAR, estudo de eventos, taxa de juro, taxa dos fundos federais, EUA

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1. Introduction

Thousands of research studies investigate how monetary policy adjustments affect equity markets. To comprehend the current state of this effect, we can focus on the past decade, a period marked by significant developments and many extreme conditions in the global economy. Throughout the period, significant fluctuations in inflation have arisen in the global world, and recent global events have either frozen or elevated the economy in certain cases. The most recent events were the Russian War, which has invaded Ukraine, supply shortages around the world and the largest pandemic in this century, Covid-19. The central banks of diverse countries made crucial decisions to improve financial stability and boost the economy during these events. As one of the strongest economies, the United States of America (US) central bank of the Federal Reserve System (FED) significantly influenced monetary policies, particularly interest rates, which served as the primary tool in controlling inflation and production.

Analysts and investors consistently strive to maximise returns; therefore, in some cases, like unexpected fluctuations in interest rates, they can enhance their portfolios through swift adjustments in the stock market, particularly in interconnected markets such as Europe and the US, which has one of the strongest equity markets in the world. Researchers have written articles about the phenomenon of how the central banks of different countries can influence an entire continent, particularly the impact of interest rate changes on the stock markets. As the United States has the strongest economy in the world, it can influence other countries' economies by changing its monetary policies. Therefore, it is important to understand what the correlation is between the FED and the strongest European country's indexes and their different sectors for 300 companies. I will analyse a crucial link in the transmission process for the topic: Does interest rate change at the FED affect European stock markets? I will try to answer this question by considering the companies in the selected indexes of DAX40, CAC40, AEX, OMX30, FTSEMIB, FTSE100 and IBEX35 linked with Euro Stoxx 50 and 11 different sectors. The return of stocks prices will be used to find how interest rates by FED affects each country and sector.

2. Background

2.1 Federal Reserve System

The Federal Reserve System is the central bank of the United States. In this case, the primary goal of the Federal Reserve System, also known as the FED, is to maintain price stability, which typically translates into a low and stable rate of inflation, a crucial aspect of sustainable economic growth (European Central Bank, 2015). To achieve this, central banks use monetary policy to manage economic changes. There are five functions that the FED uses to suspend the economy. According to federalreserve.gov, the FED conducts monetary policy to decrease the unemployment rate, generate a balanced price, and maintain interest rates to ensure a robust economy. Another function is to elevate stability and minimise risk regarding factors from abroad governments. Furthermore, it involves closely monitoring financial companies to ensure compliance with regulations, as well as overseeing US dollar payments from overseas to prevent fraudulent activities. The final functions involve the promotion of consumer laws and the resolution of consumer issues.

In 1913, the Federal Reserve Bank (FED) was established, with the primary objective of maintaining all these functions. As previously mentioned in the functions section, their primary goal was to establish a central bank that would provide a more stable and secure monetary and financial system for all states in the country. An aspect of creating the FED was to avoid political pressures that could appear and try to improve life quality for the people. Therefore, the president selects 7 governors of the Federal Reserve System to ensure long-term stability and curb political populism. The board of governors oversees Federal Reserve Banks and looks after the banking system. The Federal Reserve Banks consist of 12 regional banks located in various specific districts across the country, which are responsible for daily operations, financial services, and the collection of regional economic data.

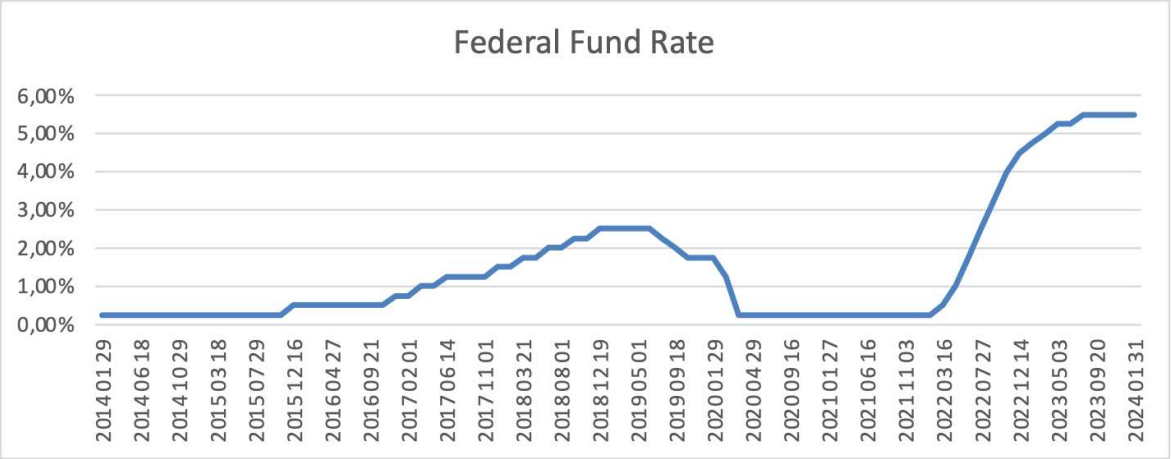
The Federal Reserve System, as a whole governing body for financial institutions, has a policymaking body—the Federal Open Market Committee (FOMC). Created in 1933, it assumed responsibility for guiding US monetary policy. The president appoints 7 governors, including 4 out of 11 rotating bank presidents and the president of the Federal Reserve Bank of New York, to conduct the FOMC. All of these 12 selected personnel meet 8 times a year for two-day sessions. The primary policy tool of the FOMC is to modify the federal funds rate based on the economic conditions. A federal rate is greatly influenced by its money-related strategy. When it comes to putting a money-related plan into action, the US central bank is essential. The FED has used a variety of working frameworks throughout the years, including

a significant transition from a passage framework to a narrative framework. This development has important implications for how the monetary system functions, particularly for banks. This explanation will explore the ways in which US financial policy operates from a macroeconomic perspective, explore the differences between the floor and passage frameworks, and dissect the reasons for the Federal Reserve's change. The primary goals of US money-related strategy in a macroeconomic context are to reduce expenses, grow the economy, and foster monetary progress. To accomplish these objectives, the central bank uses a range of instruments, including open market operations, rebate rate changes, and savings requirements. These tools mostly affect lending costs and the cash supply, which in turn affect the financial system as a whole. Finding a balance between joblessness and growth is a fundamental aspect of the central bank's work. In addition to attempting to maintain an environment conducive to job creation and financial extension, the national bank works to prevent needless expansion that eliminates the purchasing power of the currency.

2.2 Federal Fund Rate

The overnight interest rate at which commercial banks lend money to one another in the federal funds market is known as the Federal Funds Target Rate. Therefore, one of the market's functions is to allow banks to control their excess or deficit in order to meet Federal Reserve criteria. As a significant economic indicator, it reflects assessments of the economy's current state and future outlook, along with the Fed's intentions on monetary policy issues. Through open market operations, the Federal Open Market Committee manipulates the rate by purchasing and disposing of government bonds in an effort to increase or decrease the amount of available reserves. This indirect method of control enables the Fed to influence the cost of money. Changes in the Fed Funds rate affect short-term interest rates, which in turn affect mortgages, credit card interest, corporate loans, and the decisions made by individuals and businesses on investments and spending. Another control mechanism is the Overnight Reverse Repurchase Agreement (ON RPP), which entails the short-term sale of government assets to financial institutions with the guarantee that they will buy them back the following day with interest.

Figure 1 – Changes in the Federal Funds Rate (2014–2024)



In this research, we selected a period of 10 years for analysis. During the period from 2014/01/01 to 2024/01/02, there were 82 FOMC meetings and discussions aimed at changing the interest rate. Figure 1 provides all the meeting dates and the adjustments that appeared. Throughout this sample, there were 25 events where interest rates expanded, thus leading to higher costs of borrowing to prevent inflation, maintain stability, and foster sustainable growth. However, only 4 events saw a decrease in the federal rate, indicating a need for economic stimulation which happended during the outbreak of Covid-19. In the remaining 53 meetings, the FOMC decided to postpone any actions, citing their belief that interest rates should align with economic levels.

2.3 European Stock Market

The European stock market plays a crucial role in the financial region of developed countries, serving as a central hub where businesses raise their capital, and investors seek to explore the possibility of growth with limited risk. Companies operate across various countries with diverse regulatory, legal, environmental, and cultural conditions, reflecting the overall health of the continent's market. Almost every country has its own stock market and primary indexes for publicly traded companies. Thus, well-established exchanges serve as the backbone of European stock trading. Looking to different European states, the London Stock Exchange, with its main index of FTSE100, is one of the most known and prominent stock exchanges. Like Frankfurt, it enjoys significant foreign investor participation, which leads to high liquidity. These markets assist investors in identifying niche sectors and opportunities within local companies, often offering unique investments that align with the country's growth plans. These

lists of companies that are included in all indices facilitate billions of euros worldwide. I will use companies from the indices presented in Table 1.

Table 1 – European Stock Market Indices and Market Capitalization

Country	Index	Companies	Market Cap
United Kingdom	FTSE100	100	2.484T
France	CAC40	40	1.67T
Germany	DAX40	40	1.46T
Netherlands	AEX	25	891.23B
Spain	IBEX35	35	604,46B
Sweden	OMX30	30	529,17B
Italy	FTSEMIB	30	512.92B

The aspect that connects all these markets is the diversity of their listed companies. European markets closely align with the economic foundation, historical development, and strategic niche of each nation. There you can find cyclical and long-standing sectors of Industrials, giant Energy companies producing nuclear power or transferring to renewable energy, the oldest Financial companies, Technology giants, or Communications services. Every country has a diversified preference for the main sector, which offers greater growth opportunities and political support. For example, the Swedish government supports and gives advantages to Technology and Healthcare start-ups. The German equity market concentrates on Consumer Discretionary and Industrials, with a primary focus on the production of final goods. Despite the United Kingdom's exit from the European Union, it maintains its reputation as a financial hub, attracting global banks and insurance firms. The Netherlands is renowned for its stable, internationally oriented growth market, where the majority of investments and the largest companies focus on Consumer Staples, Energy, and Technology. Prominent financial services not only distribute Spanish markets, but also provide investors with exposure to rapidly evolving countries by offering greater risks as well as main index of IBEX35 has a lot of companies from Utilities sector. While the French equity market represents Consumer Discretionary, Industrials, and its Consumer Staples, it provides investors with a more diversified portfolio, featuring all these well-known companies within each sector. The Industrial Classification Benchmark (ICB) standards, which helped determine the structure of individual companies and their operating principles, provide the list of all sectors in Table 2.

Table 2 - Sectoral Composition of Selected European Indices

Sector/Index	FTSE100	CAC40	DAX40	AEX	IBEX35	OMX30	FTSEMIB
Consumer Discretionary	18	6	8	0	4	2	5
Consumer Staples	10	4	2	3	1	1	1
Energy	2	1	1	1	1	0	3
Financials	21	5	6	6	6	6	11
Healthcare	5	3	6	1	3	2	3
Industrials	16	7	6	2	5	10	3
Technology	1	5	2	5	2	3	0
Materials	9	3	5	3	2	2	0
Real Estate	5	1	1	0	2	1	0
Telecommunication	8	3	1	4	2	3	1
Utilities	5	2	2	0	7	0	3

Table 2 provides the sectoral composition of major European stock market indices, highlighting the distribution of companies across 11 sectors. The majority of the selected companies are conducted from the Financials, Industrials, and Consumer Discretionary sectors, which is a total of 153 companies. It shows significant variation of companies among the countries, whereas the FTSE100 and FTSEMIB are more concentrated in the Financials sectors. However, the indices IBEX35, OMX30, AEX, CAC40, and DAX40 have more mixed companies in their structure.

Table 3 – Average Sectoral Debt Ratios of Different Selected European Indices

Sector/Index	Average Debt Ratio	FTSE100	CAC40	DAX40	AEX	IBEX35	OMX30	FTSEMIB
Consumer Discretionary	**1,163**	0,899	0,929	0,855	N/A	3,107	2,632	0,740
Consumer Staples	**0,955**	1,145	0,982	0,083	1,231	0,216	0,789	0,771
Energy	**0,594**	0,667	0,410	0,562	0,518	0,535	N/A	0,663
Financials	**2,581**	1,574	4,276	1,914	2,006	3,371	4,192	3,098
Healthcare	**0,842**	0,798	0,587	1,066	0,606	0,797	0,499	1,076
Industrials	**0,846**	0,819	0,911	0,868	0,583	1,591	0,574	0,636
Technology	**0,578**	0,893	0,586	0,301	0,656	0,734	0,408	N/A
Materials	**0,479**	0,454	0,457	0,576	0,565	0,542	0,193	N/A

Real Estate	**1,185**	0,471	1,915	1,688	N/A	0,880	4,129	N/A
Telecommunication	**1,457**	1,184	1,018	2,474	1,543	2,578	1,123	2,353
Utilities	**2,151**	2,638	2,792	1,472	N/A	1,644	N/A	2,550

Table 3 gives an overview of the average debt ratios across various sectors and selected indices. This information is critical in understanding which indices and sectors are the most sensitive to changes in FOMC interest rates. Sectors such as Financials, Utilities and Real Estate should be significantly impacted by interest rate changes due to their reliance on borrowing to fund operations and investments. Countries whose picked indices have a high concentration of the sectors, such as FTSEMIB, which has a higher concentration of Financials and Real Estate or DAX40 with dominant sectors like Utilities and Financials, should be more exposed to monetary changes. However, sectors like Technology, Helathcare Materials which have lower average debt ratios, should demonstrate greater resilience to the changes in the federal fund rate. These factors should more or less affect OMX30 and AEX due to lower average debt ratios across most sectors, particularly of Technology and Healthcare. To summarise, Table 3 highlights that the Finacials, Utilities and Real Estate sectors should be mostly affected by negative or positive changes in the interest rate, which should reflect in FTSEMIB and DAX40 results. Conversely, countries like Sweden or the Netherlands and their indices should be less sensitive to the changes. These insights are critical in shaping investment strategies and understanding the interest rate changes across European indices.

3. Literature review

3.1 Impact of monetary policy on stock markets

Analyzing the previous literature is necessary to compare this paper's results, demonstrate the topic's relevance, and clarify any differences between it and others. Researchers have conducted numerous studies to examine the impact of interest rate changes on stock market returns. These studies differ from each other and present significant challenges for investors seeking higher returns. It is important for traders to have knowledge about the mechanism to have a better view of their investments. One of the studies was by Cook and Hanh (1989), where the publishers tested if FED interest rate changes had an effect on the US securities market. They used a 5-year period, and the findings were that interest rate changes and securities had a negative correlation with each other. Thus giving us the results that if interest rate decreases, stocks are gaining, and investors should buy and vice versa. Moreover, Titman & Warga (1989) have found a confident correlation for the interest rate and stock markets. Another article written by Andersson (2007) investigates the returns of different European stock markets regarding the changes of the interest rate of the FED and if European Central Bank rate decisions have effects on the United States market. Article conducted that when the FED changes interest rate, both the American market and European have significant change in the return, while the European Central Bank does not have that effect on the US markets. Other authors in their research had similar findings that securities and interest rates are negatively correlated. These findings were conducted by these authors in their literatures: He (2006), Jensen et al. (1972). Bernanke and Kutter (2005), using event study methodology with VAR, have discovered that unexpected changes in monetary policy have strong and persistent effects on the markets where they have the potential to raise by 1% in stock prices when the FED reduces interest rate by 0,25% in the period of 1989 to 2002. Some literatures, like Mackowiak (2007), tested this method with the emerging markets from East Asia and Latin America. In the period from 1986 to 2000, he found that the shocks have a huge effect on these markets. Additionally, Wongswan (2006) provided further evidence, showing that FED announcements lead to immediate adjustments in European equity indices. The study also emphasized that volatility is highest in the hours following FED announcements, suggesting that markets quickly incorporate new information about U.S. monetary policy.

3.2 Sectoral responses to interest rate changes

Moving to the literatures where authors have tested sectorial affects. There is diverse effect of monetary policies across sectors. Certain sectors exhibit higher sensitivity to federal fund rate changes due to their capital structure or operational dependencies. For example, in some cases, authors like Duran et al. (2020) found that diverse sectors have negative returns or positive ones regarding their main business aspects. The author noted that the Financial sector, which directly benefits from higher interest margins and faces challenges in a low-rate environment due to compressed net interest margins, had the highest volatility from changes. Same results had shown Ehrmann & Fratzcher (2004) initiated research using the event study methodology, which yielded results indicating that Financial stocks are among the most sensitive. As well as, Industrial sectors, representing more capital-intensive and cyclical companies, are responsive to changes in interest rate in S&P 500 constituent stocks. Chen & Chou (2022) found that growth-orientated sectors like Technology are disproportionately affected by changes in interest rates due to the cost of capital for the firms. Other for example, the Real Estate sector, according to Case & Shiller (2003), observed that stocks experience notable declines during the hikes due to the mortgages, which are directly influenced by housing demands. Ibbotson & Sinquefield (1976) assume that stocks of Consumer Discretionary companies are negatively impacted by the rise of interest rates due to society spending less on the produced products. Although the Energy sector tends to be less directly affected by federal fund rate changes, it has indirect effects on global demand, which can influence commodity prices due to slowdowns of the economy, according to Jones & Kaul (1996). Companies for Healthcare and Consumer Staples sectors are safe havens for investors during the changes in interest rates, which was found in the article by Chen et al. (1986). Güntay et al. (2020) observed that Utility sector stocks are the most negatively affected because of their reliance on long-term debt for infrastructure investments.

4. Methodology

4.1 Intro and purpose

This part of the paper introduces the foundation of the empirical analysis of the research. The literature wants to identify the effects done to the European stock market by the changes of the interest rates by the FED. To be able to collect needed results, the methodology part needs to be shown with the data and the treatment of it. The main idea of the methodology part is to make the analysis clear to the investors. The following part will provide the steps for the final results.

4.2 Event description

The research expects adjustments to the Federal Reserve's interest rates, covering both increases and decreases, to function as instruments of monetary policy to affect only economic conditions in the United States of America markets. However, these changes may have difference that go beyond local markets. The worldwide connection of financial markets means that FED rate decisions frequently have spillover effects on foreign markets, especially those in Europe which is very reliable with the US markets. Official announcements, including resolutions at FOMC meetings, will determine significant Federal Reserve rate events. However, I will check the European stock market for any negative or positive returns to 7 different stock markets in the European Union.

4.3 Hypothesis

Number 1 and 2 hypothesis measures that the sensitivity of abnormal returns to Federal Reserve interest rate changes varies across selected firms sectors. This research is done to check if in all selected sector tendency is the same. For the hypothesis number 3 and 4 research discovers the countries and their index companies impact to the stock market.

H1: FED rate hikes negatively affect stock prices across all selected sectors.

H2: FED rate cuts positively affect stock prices across all selected sectors.

H3: FED rate hikes lead to significant positive abnormal returns in countries with Financial-dominant indices.

Nevertheless, I want to take into consideration the previous literatures and introduce couple of hypothesis regarding the sector.

H4: Stock prices in interest rate-sensitive sectors Financials, Utilities, Real Estate exhibit large sensitivity to FED rate changes.
H5: Defensive sectors Healthcare, Technology show reduced sensitivity to FED rate changes due to their reliance on stable demand.

4.4 Event study Data

According to Campbell et al. (1997), this methodology has a very long and rich history. Various applications of the event study methodology make it widely used by researchers for this method worldwide. The main idea of this approach is to find the impact of the event and what value it can bring to the investors, either in the short or long term.
In order to implement this methodology, I must first identify the appropriate event windows. There are different ideas about how to select the right event window; however, Peterson (1989) indicates that the factors of the investigated topic should determine the length of the event and its estimation window. Most of the event study estimation periods start around -250 to -150 and close to -20 to -10 to reach the best conclusions before the first announcements. In this paper, case estimation winow outset is -150 due to it best outlining the stability and volatility of the economy and may avoid sudden crashes of the financial world. To determine the best closing period, the -10 was selected for it. In some cases after it, the financial world initiates talks about the event where the results can pervert. Therefore, the estimation window for this research is determined to be from -150 to -10 in daily returns data. The next step is to figure out the event window. I chose to select 4 windows that show more diversified results. The more short-term windows were selected as well as longer ones. Shorter event window intervals (-1;1) provide short-term results to the investors who want to have as much information before the event and to be able to fold up after their accessed expectations. The longest interval from (-7;7) is to provide long-term gains after the initial news of the changes in interest rates can be made. The other 2 intervals are in the middle; one starts from (-7;1), which shows that investors invest after first announcements, and they profit straight away, and the other one (-1;7) is different, waiting for future gains. Therefore, I will provide for intervals: (-7;7), (-7;1), (-1;1), and (-1;7).

4.5 Research Data

Trusted databases, Trading Economics and Refinitiv Eikon, provided all relevant data for this research, including FED interest rates, stock prices, and company financial numbers, for the selected period from January 1st, 2014, to January 2nd, 2024. The study focuses only on cuts

and hikes of interest rates made by the Federal Open Market Committee and assesses through the calculations their impact on the selected 7 European stock market companies' prices.

In that selected period, the research extracts 25 event changes in the Federal Fund Rate. However, after looking more closely at the data, one of the announcements was done during the weekend; thus it was not included in the bundle. All the announcements where either interest rate increased or decreased are displayed in Table 4. In total there are 4 changes where the federal fund rate had been cut and 20 where it rose.

The research mainly addresses European stock market companies; therefore, daily market data for selected market firms and their largest indexes are taken. There are in total 7 European countries and consist of the United Kingdom (FTSE100), Spain (IBEX35), Germany (DAX40), France (CAC40), the Netherlands (AEX), Sweden (OMX30 Stockholm), and Italy (FTSEMIB). The main idea of the selection is that these indices are some of the largest in Europe, and the companies inside have quite a bit of volatility, which is especially needed for the results. 300 companies were in total gathered to comprehend the needed calculations. To overall control for the market effects, returns are compared with the Euro Stoxx 50 index. The analysis is made to understand the sector and countries inclination to FED policy.

Table 4 - FED Interest Rate Change Announcements (2014–2024)

Event date	Old interest rate %	New interest rate %	Change %	Days	Change
16/12/2015	0.25%	0.50%	0.25%		Increase
14/12/2016	0.50%	0.75%	0.25%	364	Increase
15/03/2017	0.75%	1.00%	0.25%	91	Increase
14/06/2017	1.00%	1.25%	0.25%	91	Increase
13/12/2017	1.25%	1.50%	0.25%	182	Increase
21/03/2018	1.50%	1.75%	0.25%	98	Increase
13/06/2018	1.75%	2.00%	0.25%	84	Increase
26/09/2018	2.00%	2.25%	0.25%	105	Increase
19/12/2018	2.25%	2.50%	0.25%	84	Increase
31/07/2019	2.50%	2.25%	-0.25%	224	Decrease
18/09/2019	2.25%	2.00%	-0.25%	49	Decrease
30/10/2019	2.00%	1.75%	-0.25%	42	Decrease
03/03/2020	1.75%	1.25%	-0.50%	125	Decrease
15/03/2020	1.25%	0.25%	-1.00%	12	Decrease
16/03/2022	0.25%	0.50%	0.25%	731	Increase
04/05/2022	0.50%	1.00%	0.50%	49	Increase
15/06/2022	1.00%	1.75%	0.75%	42	Increase
27/07/2022	1.75%	2.50%	0.75%	42	Increase
21/09/2022	2.50%	3.25%	0.75%	56	Increase

02/11/2022	3.25%	4.00%	0.75%	42	Increase
15/12/2022	4.00%	4.50%	0.50%	43	Increase
01/02/2023	4.50%	4.75%	0.25%	48	Increase
22/03/2023	4.75%	5.00%	0.25%	49	Increase
03/05/2023	5.00%	5.25%	0.25%	42	Increase
26/07/2023	5.25%	5.50%	0.25%	84	Increase

Furthermore, analysis uses the Industry Classification Benchmark (ICB), which is a well-known indicator to companies and their industries. ICB will help to classify companies that were selected into 11 different sectors. Table 5 gives all the information of the appeared sectors with the total companies that were used. In Table 5 there is information about the percentage, which represents the total amount of companies that were in each of the sectors, with the largest number for Financials being 61 companies (20.33%) and the lowest being Energy with 9 entities (3.00%).

Table 5 - Sector Distribution of Selected Companies (ICB Classification)

Sector	**Number of companies**	**Percentage**
Consumer Discretionary	43	14,33%
Consumer Staples	22	7,33%
Energy	9	3,00%
Financials	61	20,33%
Healthcare	23	7,67%
Industrials	49	16,33%
Technology	18	6,00%
Materials	24	8,00%
Real Estate	10	3,33%
Telecommunication	22	7,33%
Utilities	19	6,33%

4.6 Research method

The research paper follows Brown and Warner's (1985) event study approach, where it absorbs daily stock returns. Additionally, it examines the influence of interest rate announcements, necessitating the computation of daily returns, abnormal returns, average abnormal returns, and cumulative average abnormal returns for every company.

To obtain the FED impact on the interest rate spikes, we use the Brown & Warner (1980) market-adjusted model to calculate abnormal returns. It is important to understand how the market reacted before the event occurred.

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (1)$$

$AR_{i,t}$ represents abnormal returns, which provides daily information on how normal returns of the selected stock deviate from its expected returns. $R_{i,t}$ observes daily percentage log-returns (normal returns), while $E(R_{i,t})$ giving us information about expected returns of the stock (i) on the selected day (t).

To examine the effect of monetary policy on stock prices, we first adopt the method used by Bernanke and Kuttner (2005), which can be characterized as the regression-based event-study approach. In equation (2) we have a regression of the Euro Stoxx 50 Index return on the raw change in the repurchase rate as follows:

$$R_{i,t} = \alpha_i + \beta_i * R_{M,t} + \epsilon_{i,t} \quad (2)$$

α_i gives the intercept of the dependent variable, β_i is the beta of the given security, $R_{M,t}$ represents market return of a particular date for selected index, and $\epsilon_{i,t}$ is the error term, which is constant.

In the event window, to be able to find the stock (i) expected return for given data (t) research integrates formula (2) sum of alpha with the beta multiplied by the day (t) percent of the market log-return.

$$E(R_{i,t}) = \alpha_i + \beta_i * R_{M,t} \quad (3)$$

The next move is to follow the abnormal returns for the multiple event windows and reach the average abnormal return (AAR) of the stocks during the given day (t).

$$AAR_{i,t} = \frac{1}{N} \sum_{i=1}^{N} AR_{i,t} \quad (4)$$

Where N represents the number of selected companies.

It is necessary to identify multiple-day event window for the concept of CAR (cumulative abnormal return) which is used after the estimation of abnormal returns. It lets you understand the total impact of the selected event over the chosen time interval.

$$CAR_{i,t} = \sum_{t=T1+1}^{T1+k} AR_{i,t} \quad (5)$$

The aggregate effect of the events builds up for the final results with the cumulative average abnormal returns ($CAAR_{i,t}$) result. It provides total abnormal performance that will attribute to the event over multiple event windows.

$$CAAR_{i,t} = \sum_{t=t1}^{t2} AAR_t \quad (6)$$

A substantial step for the event-study methodology is to do the framework to find the right significance level. Search of statistical significance is crucial for the raised hypothesis for the

selected factors. T-tests of AAR, CAAR are major conductors to find if the raised hypothesises have effect on the markets.

Standardized abnormal return (SAAR) identifies the standard deviation for the estimation period for stock which has been divided by the average abnormal return for each day of the event window.

$$\boldsymbol{SAAR}_{i,t} = \frac{AARi,t}{5var(AAR_i)} \quad \textbf{(7)}$$

Standardized cumulative average abnormal returns (SCAAR) in the event for the selected stock (i)

$$\boldsymbol{SCAAR}_{i,t} = \frac{CAARi,t}{5var(CAAR_i)} \quad \textbf{(8)}$$

To find the T-test if our hypothesis is correct, we use formula 8 and 9 in our calculations. 8 equation gives us the p-value for average abnormal returns

$$t = \frac{AA^{\leq}R_{i,t}}{S>AAR_t} \quad \textbf{(9)}$$

T-test for cumulative average abnormal return results.

$$t = \frac{CAAR_{i,t}}{S>CAAR_t} \quad \textbf{(10)}$$

These equations is going to help us find the right results for thesis analysis and give investors the information regarding the price and significance for different country and sector.

4.7 Limitations

1. European Central Bank policies often coincide with or react to FED decisions. This could make it difficult to avoid the effect of the impact of FED rate changes on European stock markets because the market response might be influenced by expectations of ECB actions.
2. Changes of interest rates made by FOMC can not be linked to the returns for the publicaly traded companies because there are woldwide economic events, such as wars (Russia war against Ukraine), crises like Covid-19 and other, may have a significant impact on stock returns during your analysis period due to the high volatility.
3. The increasing globalization in the financial markets may effect more towards other markets due to multinational firms which are in Europe indices may react strongly to global economic conditions than local monetary policy shifts.

5. Empirical Results

This section of the research obtains information gather from the calculation and does deep examination following the selected methodology and gathered data. As mentioned in the methodology part research has 4 different intervals of (-7;7); (-7;1); (-1;1) and (-1;7) which will be conducted in 2 diversified factors. All these calculations are the results of the of the event study methodology. Selected announcements will separate into two bases one where FOMC changes in interest rate adjustment has risen in this case 20 separate event dates and 4 announcements where it had fallen. The first section's results will accommodate the sector analysis. Following part explains the cumulative average abnormal returns for the country factor and gives information where this affect can happen and why.

5.1 Sector analysis

5.1.1 Decreasing federal fund rate

Table 6 reports the results achieved regarding the study event methodology and searching for the sector factor when the federal fund rate has decreased, providing evidence to support strategic investment decisions during periods of monetary easing to buy or short equity markets. I think that during a contraction period, federal fund rate sectors should start to increase their market price. Table 6 represents the 11 sectors and the returns for each different event window with the p-value to test the significance level.

Table 6 - Cumulative Average Abnormal Returns (CAAR) for Decreasing Federal Fund Rates by Sector

Sector	Window (-7;7)	P-value	Window (-7;1)	P-value	Window (-1;7)	P-value	Window (-1;1)	P-value
Consumer Discretionary	-0,721%	0,003%***	-1,148%	0,008%***	-1,278%	0,007%***	-1,706%	1,169%**
Consumer Staples	-1,920%	0,000%***	-0,528%	0,260%***	-0,402%	1,310%**	0,990%	1,031%**
Energy	-3,523%	0,000%***	-0,101%	64,869%	-5,145%	0,000%***	-1,723%	6,942%*
Financials	-1,776%	0,000%***	-1,110%	0,002%***	-2,164%	0,000%***	-1,498%	2,071%**
Healthcare	1,100%	0,000%***	1,195%	0,029%***	1,870%	0,000%***	1,965%	2,606%**
Industrials	0,005%	94,624%	0,301%	1,892%**	-1,028%	0,000%***	-0,732%	5,606%*
Technology	2,821%	0,000%***	1,138%	0,006%***	1,441%	0,001%***	-0,242%	32,655%
Materials	2,789%	0,000%***	0,798%	0,433%***	0,270%	16,724%	-1,722%	1,559%**
Real Estate	-1,882%	0,000%***	-0,356%	0,484%***	-1,203%	0,001%***	0,323%	12,268%
Telecommunication	-1,223%	0,000%***	0,071%	32,498%	-1,284%	0,000%***	0,010%	96,734%

Utilities	-4,412%	0,000%***	0,857%	0,135%***	-3,767%	0,000%***	1,502%	7,772%*

*,**,*** represents p-value of 1%,5% and 10% accordingly.

All selected windows showed statistically significant returns for the majority of the sectors, indicating sufficient evidence of their effects. In the Consumer Discretionary sector, CAAR for all windows was negative, giving our hypothesis different results. During the broader window (-7;7), the results were -0,721% (p = 0.00003), while in the shortest period (-1;1), it was a sharper decline of -1,706% (p = 1,169). The statistically significant results show a negative reaction to the rate reduction and suggest that other market forces may counterbalance the monetary easing decisions for the consumer-driven sector during these events. The results should show that it is better to short stocks of these companies that are in this sector. Looking for the Consumer Staples that are more reflective of the production of goods and services essential for everyday life, the results vary. 3 events have negative returns, and the largest one is the broadest event window (-7;7). During this time the return of the equity is negative with -1,92% (p = 0,000). However, in the shortest event window, the results are positive with the increase of 0,99% (p = 1,031%), meaning that the raised hypothesis corresponds to a decreasing federal fund rate. These results suggest that rate cuts in longer event periods do not favour the sector; however, the companies are gaining in equity in the shortest window. It can give information that it has lower reliance on interest rate cuts in the longer term. The Energy sector demonstrates the most significant negative response of CAARs in all sectors, with the results of the event (-1;7) seeking to the -5,145% (p = 0,000%). The event window of (-7;1) suggests that the market is not interested in early announcements, and it is affected after the announcement date, as we can see in the (-1;1) event -1,723% (p = 6,942%). These resolutions explain that rate reductions intensify existing challenges for the sector. Moving to the Financials, the findings of all the events are negative. The Table 6 informs that the largest equity decrease was from (-1;7) with -2,164% (p = 0,000%) and in the short term (-1;1) -1,498% (p = 2,071%). This information leads to the conclusion that when the markets begin to share knowledge about the negative interest rate, companies start to lose their price, while before the event it eases more rapidly. This is due to lower borrowing costs, which compress interest margins, limiting the positive impacts typically associated with monetary easing policy. The Healthcare sector exhibits the flourished hypothesis with the positive CAARs. The findings provide information that the start of the discussions of interest rate gives positive news; however, the largest impact is in the events before the announcement (-1;1) 1,965% (p

= 2,606%) and (-1;7) 1,87% (p = 0,000%). It reflects the sector's defensiveness and ability to benefit from reduced financing costs. The industrial sector shows negligible reaction after the announcement date. Although the shortest window (-1;1) gives negative returns of -0.732% (p = 5,606%), It can be seen that negative returns follow throughout the trading days, and the (-1;7) window gives even more dissenting equity market returns of -1,028% (p = 0,000%). Thus, it suggests that monetary easing by the FED has a limited impact on industrial stocks over the examined periods. The technology sector emerges as one of the strongest performers. This sector is opposite to the healthcare sector, in comparison, it reacts more to the news and the announcements, giving the significant CAAR's returns of 2,821% (p = 0,000%) of window (-7;7). Both (-7;1) and (-1;7) CAARs have significant positive returns. Nevertheless, in the smallest period, it can be seen that companies react negatively to the announcements. These results confirm the sector's sensitivity to economic growth and reduced borrowing costs. Furthermore, the Materials sector exhibits the largest positive CAAR of 2,789% (p = 0.000%) in the broadest (-7;7) window, recording the news that FED interest rate negative adjustments give positive returns to the equity market. Although 3 windows provide positive returns, the shortest one (-1;1) gives -1,722% (p = 1,559%). These results highlight the sector's mixed reaction, as its reliance on capital investments benefits from lower interest rates, though short-term factors may hinder its performance. In the Real Estate sector, negative CAARs of -1,882% (p = 0,000%) in the event (-7;7) do not align with the hypothesis. It can be seen that the market only reacts to the announcement during the event, as the event (-1;7) has a larger statistically significant negative return than (-7;1) with more than -0,847%. These negative returns can be attributed to structural challenges or external economic pressures overshadowing the benefits of reduced financing costs. Another sector of Telecommunications shows negative sensitivity to rate reductions. CAAR of (-1;7) event has -1,284% (p = 0,000%), giving understanding that it was affected only after the event and may have resulted in different situations in the world. Lastly, the Utilities sector records the largest negative response for the longest window (-7;7) with a CAAR of -4,412% (p = 0,000%). This may be the result of other factors, because during the event window (-1;1), there is a positive return of 1,502% (p = 7,772%) and affirms our hypothesis. These results suggest short-term benefits may arise from reduced financing costs as well as we do for long event window.

In conclusion, the hypothesis that monetary easing positively impacts stock prices is, in some cases, true. Sectors such as Healthcare, Materials, and Technology exhibit significant positive returns, aligning with expectations. However, in other cases, sectors like Consumer Staples or Utilities have a short-term effect on the negative interest rate. However, other sectors exhibit a

negative response to our hypothesis, prompting investors to opt for shorting equities or the sector's index instead.

5.1.2 Increasing federal fund rate

Table 7 presents the CAAR's returns for each sector following the announcement of interest rate increases by the FED. In total there were 20 events that had this impact. The hypothesis position is that such announcements have a significant negative impact on stock price returns across all sectors. The results reveal considerable variation in sectoral responses, providing insights into the sensitivity of different sectors to monetary tightening.

Table 7 - Cumulative Average Abnormal Returns (CAAR) for Increasing Federal Fund Rates by Sector

Sector	Window (-7;7)	P-value	Window (-7;1)	P-value	Window (-1;7)	P-value	Window (-1;1)	P-value
Consumer Discretionary	-0,640%	0,000%***	-0,304%	0,056%***	-0,433%	0,001%***	-0,097%	54,457%
Consumer Staples	-0,453%	0,000%***	-0,270%	0,008%***	-0,072%	5,312%*	0,111%	8,823%*
Energy	-0,791%	0,000%***	-1,522%	0,000%***	0,233%	8,126%*	-0,499%	10,891%
Financials	-0,138%	1,389%**	0,097%	22,664%	-0,181%	2,077%**	0,054%	78,371%
Healthcare	0,419%	0,000%***	-0,345%	0,000%***	0,591%	0,000%***	-0,173%	5,193%*
Industrials	-0,579%	0,000%***	-0,364%	0,003%***	-0,264%	0,012%***	-0,049%	68,906%
Technology	0,014%	76,919%	-0,287%	0,631%***	0,580%	0,001%***	0,278%	29,232%
Materials	-1,096%	0,000%***	-1,174%	0,000%***	-0,429%	0,064%***	-0,508%	14,013%
Real Estate	-0,188%	0,156%**	0,204%	0,557%***	-0,673%	0,000%***	-0,280%	4,453%**
Telecommunication	-0,262%	0,000%***	-0,262%	0,000%**	-0,199%	0,004%***	-0,199%	1,165%**
Utilities	-4,412%	0,000%***	0,857%	0,135%**	-3,767%	0,000%***	1,502%	7,772%*

*,**,*** represents p-value of 1%,5% and 10% accordingly.

The Consumer Discretionary sector demonstrates a negative reaction in all its windows. CAAR of (-7;7) has the highest negative -0,64% (p = 0,000%). The return of window (-1;7) has a larger negative return than before the first talks of (-7;1). These results suggest that the broader event window reflects negative impact, and it has decreased more after the announcement; thus it reacts more to the changes. Although another sector of Consumer Staples also has a negative impact during the (-7;7) -0,453% (p = 0,00%), the shortest window has positive returns of

0,111% (p = 8,823%), meaning that sector reacts positively to the federal fund rate changes. However, it can be seen as a small effect on the companies after the announcement due to a decrease in the event (-1;7) -0,072% (p = 5,312%). The Energy sector exhibits a strong negative response for the whole period (-7;7) with CAAR -0,791% (p = 0,00%). It is interesting that in the window (-7;1) it has large negative results of -1,522%. The companies have negative returns from the interest rate changes, meaning that the impact for this sector suggests capital-intensive operations and reliance on debt financing. The Financials present mixed results. In the short term, it has invariable relations with the increase by a small margin; however, it can be seen as a strange factor for Financials that it is decreasing after the announcement day. Thus, this sector should benefit from the higher rates due to improved interest margins; these results suggest that other factors, such as economic growth concerns, may counterbalance the potential gains. In contrast, the Healthcare sector shows relative resilience, with a CAAR of 0,419% (p = 0,00%) in (-7;7) and (-1;7) 0,591% (p = 0,000%). However, this positive reaction diminishes in the shortest window -0,173% (p = 5,193%). These findings indicate that sectors reflect changes but quickly return to gains in the equity markets. The Industrials sector records negative CAAR in all of the windows. The largest marginal deficit counted for the (-7;7) -0,579% (p = 0,000%). The results underscore the sector's vulnerability to economic tightening, driven by reduced growth expectations and higher capital costs. The Technology shows negligible reactions to the hypothesis. In the event (-1;7), it gains 0,58% (p = 0,001%). This significant result suggests that the Technology sector does not have sensitivity to the rate increases after the announcement and continues to increase the capital. The Material sector experiences a notable statistically significant negative impact for both long and middle timelines. The start of media discussions, you can see that the sector lost the largest share price of -1,174% (p = 0,000%). The string reaction highlights the sector's dependence on favorable financing conditions and global growth. The Real Estate contributes to the modest declines, with the CAAR in window (-1;7) providing the effect that it reacts to the increasing interest rates by -0,673% (p = 0,000%). The sector's capital-intensive nature makes it vulnerable to higher rates, though its reaction is less pronounced than other sectors. The Telecommunications sector exhibits a small, consistent negative response throughout all windows. These findings suggest moderate sensitivity to interest rate hikes, likely due to debt reliance and reduced consumer demand. Finally, the Utilities sector demonstrates the sharpest decline with a CAAR of -4.412% (p = 0,000) in (-7;7). However, short-term position exhibits the increase of the company's equity by 1,502% (p = 7,722%). However, due to heavy reliance on debt financing

and the competition from tighter bond yields, short-term positions quickly turn negative, making them particularly vulnerable to monetary tightening.

In conclusion, most of them support the hypothesis that interest rates negatively affect stock prices in the sector. Utilities, Materials, Energy and Industrials exhibit the strongest adverse reaction, as they are most sensitive to monetary tightening.

5.1.3 Suggestion for investors

Table 8 - Best Investment Strategies by Sector (Interest Rate Decrease and Increase)

Best investment	**Interest rate decrease**			**Interest rate increase**		
Sector	**Window**	**Return**	**Action**	**Window**	**Return**	**Action**
Consumer Discretionary	(-1;1)	-1,706%	Short	(-7;7)	-0,640%	Short
Consumer Staples	(-7;7)	-1,920%	Short	(-7;7)	-0,453%	Short
Energy	(-1;7)	-5,145%	Short	(-7;1)	-1,522%	Short
Financials	(-1;7)	-2,164%	Short	(-1;7)	-0,181%	Short
Healthcare	(-1;1)	1,965%	Long	(-1;7)	0,591%	Long
Industrials	(-1;7)	-1,028%	Short	(-7;7)	-0,579%	Short
Technology	(-7;7)	2,821%	Long	(-1;7)	0,580%	Long
Materials	(-7;7)	2,789%	Long	(-7;1)	-1,174%	Short
Real Estate	(-7;7)	-1,882%	Short	(-1;7)	-0,673%	Short
Telecommunication	(-1;7)	-1,284%	Short	(-7;1)	-0,262%	Short
Utilities	(-7;7)	-4,412%	Short	(-1;7)	-0,471%	Short

When interest rates decrease, most sectors show a negative return, suggesting a tendency for short-selling strategies. For example, Energy and Utilities exhibit the most significant losses at -5,145% and -4,412%, respectively, during the (-1;7) and (-7;7) windows, supporting a strong short position. Conversely, the Healthcare and Technology sectors experience positive returns of 1,965% and 2,821%, respectively, with event windows (-1;1) and (-7;7). These results indicate that a long strategy in these two sectors could be beneficial in a falling interest rate environment. Materials, with a return of 2,789% during (-7;7), also prove favourable for long investments.

Under increasing interest rate conditions, the results demonstrate a predominantly negative impact across sectors, though the magnitude of decline is less severe than during interest rate cuts. The Energy sector again experiences the steepest decline at -1,522% in the (-7;1) window, followed by Materials (-1,174%) and Real Estate (-0,673%). Healthcare and Technology,

however, provide a contrasting picture, offering returns of 0,591% and 0,580% during the (-1;7) window, making these sectors suitable for long positions.

Overall, the findings underline the importance of sectoral dynamics in response to interest rate changes. While interest rate decreases offer lucrative opportunities in Healthcare, Technology, and Materials, rate increases present more limited options, with only Healthcare and Technology yielding modest positive returns. The results emphasize the critical role of event windows in capturing sectoral sensitivities toward monetary policy shifts. Investors can leverage these insights for precise decision-making tailored to interest rate trends.

5.2 Country analysis

5.2.1 Decreasing federal fund rate

This section evaluates the effects of FED announcements of interest rate decreases on selected stock indices of 7 European countries. The hypothesis posited is that such announcements positive impact stock prices in each country. Table 9 shows CAAR results for given event window.

Table 9 - Cumulative Average Abnormal Returns (CAAR) for Decreasing Federal Fund Rates by Country Index

Index	Window (-7;7)	P-value	Window (-7;1)	P-value	Window (-1;7)	P-value	Window (-1;1)	P-value
France	-0,730%	0,000%***	0,199%	0,027%***	-0,945%	0,000%***	-0,017%	25,567%
Germany	-0,281%	0,006%***	0,129%	5,106%*	-0,601%	0,004%***	-0,192%	31,385%
Netherlands	-0,605%	0,000%***	0,139%	4,217%**	-1,142%	0,000%***	-0,398%	0,039%***
Spain	-1,925%	0,000%***	-0,265%	2,387%**	-2,150%	0,000%***	-0,490%	19,706%
Sweden	1,785%	0,000%***	1,181%	0,001%***	0,329%	4,702%**	-0,275%	47,838%
Italy	-2,203%	0,000%***	-1,289%	0,003%***	-2,484%	0,000%***	-1,571%	2,472%**
UK	-1,174%	0,000%***	-0,520%	0,170%***	-1,319%	0,000%***	-0,665%	5,014%*

*,**,*** represents p-value of 1%,5% and 10% accordingly.

The French selected stock index countries record a negative CAAR of -0,73% (p = 0,000%) in the window (-7;7). However, some sensitivity was seen from the first talks (-7;1) when the

companies in the index had positive returns of 0,1999 (p = 0,027%). However, it suggests that broader negative adjustment precedes initial market optimism. For Germany, the same effect as France had happened. The CAAR for window (-7;7) is -0,281% (p = 0,006%). The slight increase was from the first talks (-7;1) 0,129% (p = 5,106%), however, after the announcement of the event, it indicates a negative response to monetary easing rates (-1;7) -0,601% (p = 0,004%). The Netherlands reflects the results from both French and German markets. The difference is that it had the biggest negative returns during the window of -1,142% (p = 0,000%). Spain experiences the sharpest declines, with a CAAR of -2,15% (p = 0,000%) in the window (-1; 7). The negative reaction in the Spain index aligns with its market's sensitivity to external economic conditions, which brings negative returns. Conversely, Sweden demonstrates a positive response to interest rate decreases, with a CAAR of 1,785% (p = 0.0000) in the (-7;7) window and 1,329% (p = 4.702%) in the (-1, 7) window. These results suggest that Sweden's market perceives rate cuts as economically beneficial, potentially due to the country's strong monetary policy alignment with growth initiatives. Italy reports significant negative returns during all event windows. The strongest negative returns are after the announcements of window (-1;7) with the return -2,484% (p = 0,000%). Moreover, the significant negative return can be analyzed for the (-1;1) window with -1,571% (p = 2,472%). The results are mainly due to the largest number of companies being from the Financial sector, and they are dependent on favorable financing conditions. Finally, the United Kingdom index also shows significant negative reactions, with a CAAR of -1,174% (p = 0,0000) in the (-7;7) window and -1,319% (p = 0,0000) in the (-1;7) window. The short-term (-1;1) window records a small negative CAAR of -0,665% (p = 5,014%), indicating a steady but slower adjustment to monetary easing announcements.

In summary, only Sweden shows significant positive CAARs across all windows, supporting the hypothesis that interest rate cuts positively impact stock prices. Conversely, Italy, Spain, and the UK exhibit the strongest negative reactions thus giving investors information to short the index, while making Sweden the most favorable investment destination to buy in response to interest rate declines.

5.2.2 Increasing federal fund rate

This section evaluates the effects of FED announcements of interest rate increases on selected stock indices. The hypothesis posited is that such announcements negatively impact stock prices in each country. Table 10 shows CAAR results for given event window.

Table 10 - Cumulative Average Abnormal Returns (CAAR) for Increasing Federal Fund Rates by Country Index

Index	Window (-7;7)	P-value	Window (-7;1)	P-value	Window (-1;7)	P-value	Window (-1;1)	P-value
France	-0,625%	0,000%***	-0,449%	0,000%***	-0,397%	0,000%***	-0,221%	10,815%
Germany	-0,265%	0,000%***	-0,142%	0,323%***	-0,147%	0,398%***	-0,025%	79,593%
Netherlands	-0,093%	0,449%***	-0,244%	0,023%***	0,096%	4,615%**	-0,055%	66,669%
Spain	-0,320%	0,000%***	-0,120%	2,682%**	-0,508%	0,000%***	-0,307%	6,406%*
Sweden	-0,415%	0,000%***	-0,207%	0,019%***	-0,391%	0,000%***	-0,183%	5,182%*
Italy	0,519%	0,000%***	0,174%	3,050%**	0,712%	0,000%***	0,367%	6,655%*
UK	-0,619%	0,000%***	-0,437%	0,003%***	-0,293%	0,069%***	-0,112%	53,624%

*,**,*** represents p-value of 1%,5% and 10% accordingly.

The French index demonstrates a significant negative impact, with a CAAR of -0,625% (p = 0.000%) in the (-7;7) window and -0,449% (p = 0,000%) in the (-7;1) window. A sharp decline of -0,397% (p = 0,000%) is observed in the (-1;7) window. These results align with the hypothesis and suggest a strong negative reaction to rate increases. Germany shows a low negative response in comparison to France, with a CAAR of -0,265% (p = 0,000%) in the (-7;7) window and -0,147% (p = 0,398%) in the (-1;7) window. The (-7;1) window reveals an insignificant decline which seeks to -0,142% (p = 0,323%). The Netherlands exhibits a very small negative reaction, contributing -0,093% (p = 0,449%) in the broadest window (-7;7). Other countries like Spain, Sweden, and the United Kingdom also demonstrate negative reactions to the increase of interest rates. Spain had the largest negative impact of -0,307% (p = 6,406%) for the shortest window (-1;1) compared to the other 2 countries' indexes. However, the United Kingdom shows a decline of -0.619%, and it is the biggest for the event (-7;7). These three countries all positively explain the risen hypothesis. Nevertheless, Italy, in contrast to other countries, shows a significant positive CAAR of 0,519% (p = 0,000%) in the (-7;7) window and 0.174% (p = 3,050%) in the (-7;1) window. In the (-1;7) window, the CAAR is also positive at 0,712% (p = 0,000%), and the short-term (-1;1) window shows a CAAR of 0.367% (p = 6,655%). These findings suggest that the Italian market views rate hikes positively, possibly because FTSEMIB has a significant number of companies contributing to the financial sector.

In conclusion, the hypothesis is largely supported, with country indexes of 6 countries showing strong negative reactions to rate hikes and responding positively to the hypothesis, which can show investors that they need to short the indexes to gain needed profits. However, Italy stands out as an exception, exhibiting positive CAARs across all event windows, making it the most interesting opportunity for long-term investment during periods of monetary tightening.

5.2.3 Suggestion for investors

Table 11 - Best Investment Strategies by Country Index (Interest Rate Decrease and Increase)

Best investment	**Interest rate decrease**			**Interest rate increase**		
Country's Index	**Window**	**Return**	**Action**	**Window**	**Return**	**Action**
France	(-1;7)	-0,945%	Short	(-7;7)	-0,625%	Short
Germany	(-1;7)	-0,601%	Short	(-7;7)	-0,265%	Short
Netherlands	(-1;7)	-1,142%	Short	(-7;1)	-0,244%	Short
Spain	(-1;7)	-2,150%	Short	(-1;7)	-0,508%	Short
Sweden	(-7;7)	1,785%	Long	(-7;7)	-0,415%	Short
Italy	(-1;7)	-2,484%	Short	(-1;7)	0,712%	Long
UK	(-1;7)	-1,319%	Short	(-7;7)	-0,619%	Short

During periods of interest rate cuts, most country indexes experience negative returns, suggesting a short-selling strategy as the optimal approach. Italy and Spain are the most adversely affected, with returns of -2,484% and -2,150%, respectively, in the (-1;7) event window. The UK (-1,319%), Netherlands (-1,142%), and France (-0,945%) also reflect negative returns, reinforcing the short position recommendation. However, Sweden stands out with a positive return of 1,785% during the (-7;7) window, indicating that a long investment strategy in Sweden's index is advantageous under such conditions.

In an environment of rising interest rates, the impact on country indexes is predominantly negative but less pronounced than during rate decreases. Sweden’s index, which performed well during rate cuts, records a modest negative return of -0,415% during the (-7;7) window, supporting a short position. Similarly, France, Germany, Netherlands, and Spain exhibit slight declines, with returns ranging from -0,244% (Netherlands) to -0,625% (France). In contrast, Italy’s index shows resilience, offering a positive return of 0,712% during the (-1;7) window, suggesting that a long strategy is beneficial in this case.

To conclude the results reveal that monetary policy changes impact country indexes differently. Interest rate decreases favor short positions across most indexes, with Sweden as a notable exception for long strategies. Conversely, rate hikes yield more modest movements, with Italy

offering a rare opportunity for long positions. These findings underscore the importance of tailoring investment strategies to specific country dynamics and monetary policy conditions for optimal returns.

6. Conclusion

This thesis investigates the impact of Federal Reserve interest rate changes on European stock markets, focusing on sectoral and country-specific responses. By means of event study approach, the study offers a detailed investigation of how variations in the federal funds rate affect European stock values, therefore offering the interdependence of world financial markets.

The results expose many important tendencies. First, across all industries and nations, European stock market returns suffer mostly from Federal Reserve interest rate rises. Because of their great reliance on debt financing and vulnerability to economic tightness, sectors such Utilities, Materials, and Energy show the biggest negative effects. On the other hand, industries like Technology and Healthcare show greater resilience with positive abnormal returns in some event windows, which reflects their defensive traits and less reliance on borrowing costs.

At the national level, the data highlight the varied impacts of Federal Reserve policies over European indices. Most European markets react adversely to federal fund rate rises indexes in Spain, the United Kingdom, and France show notable decreases. Italy is an interesting exception, nevertheless, where rate increases match positive returns, most likely because of the great presence of banking sector companies in its index. Sweden stands out as the only economy with sustained positive abnormal returns throughout rate-cutting times, hence stressing its unique economic structure and monetary alignment.

Policymakers and investors should find great ramifications from these results. The sectoral and country-specific sensitivities found in this study allow investors to maximise portfolio strategies in reaction to expected Federal Reserve policy changes. For instance, although long positions in Technology and Healthcare are good during both rate cuts and rises, short-selling techniques may be successful in sectors such Energy and Utilities during rate increases. Likewise, whereas Italy's financial sector presents special prospects during tightening cycles, Sweden's market stands out as a possible refuge during times of monetary relaxation.

Although the study offers strong proof of the FED's impact on European equities markets, several constraints should be given thought. Significant world events such the COVID-19 epidemic and the Russia-Ukraine war overlap with the analysis period and could have increased market volatility and complicated the isolated consequences of interest rate changes. Furthermore, it is impossible to fully separate the interaction between European Central Bank policy and FED operations, thereby affecting market responses.

In conclusion, this thesis contributes to the growing body of literature on global financial market integration, offering a nuanced perspective on the ripple effects of US monetary policy on European stock markets. By identifying key trends and actionable insights, the study equips investors and policymakers with a deeper understanding of the complex linkages between interest rate changes and equity markets, enabling more informed decision-making in an increasingly interconnected global economy.

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