

The Short-Term and Medium-Term Implications of the Brexit on the British Economy and its Industries

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Affidavit

I hereby affirm that this Bachelor's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

The thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

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Abstract

Due to the Brexit being such a recent topic, the overall objective of this thesis is to close the present research gap on how the Brexit does influence the British economy and its industries with regards to the short- and medium-term. Therefore, seven key Brexit events and four British indices, one representing the British economy and three representing the three largest British industries have been selected during this thesis in order to conduct individual event studies. An event study is a tool used for testing abnormal returns that a certain asset experiences due to an event. Thereby, the thesis evaluates the separate event analyses and provides detailed information about the findings of the significance tests, including if certain Brexit events and announcements resulted in positive or negative impacts, alongside with the amount of variety in abnormal returns that the underlying assets of the indices experienced. From the conducted analysis, it could be proven that statistically significant abnormal returns in the short-term could be detected for the UK referendum on the Brexit and the actual Brexit day for all four observed indices. Thereby, the UK referendum resulted in pure positive short- and medium-term results, in comparison to the actual Brexit day which resulted in pure negative cumulative abnormal returns. With regards to the other five events, only the announcements of the Article 50 having been triggered and the Brexit having been extended to the 31st of October 2019 showed no significant abnormal returns neither in the short- nor the medium-term. Overall, this thesis, acknowledging various risks and limitations, acts as a starting point for further research that can be conducted on the analysis of how the Brexit has been impacting the British economy and its industries.

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List of Abbreviations

Abnormal Return – AR

Absolute Cumulative Abnormal Return – absCAR

British exit – Brexit

Cumulative Abnormal Return – CAR

Efficiency Market Hypothesis – EMH

European Economic Community – EEC

European Union – EU

Financial Times Stock Exchange – FTSE

Great British Pound – GBP

Industry Classification Benchmark – ICB

Morgan Stanley Capital International – MSCI

Ordinary Least Squares – OLS

Significance – SIG

United Kingdom – UK

1 Introduction

Thursday the 23rd of June in the year 2016 marked a very important day not only for the United Kingdom and its residents, but also for the European Union, as the UK voted in a referendum to be the first nation that leaves the EU. This result did not only come to a surprise to many UK residents, but also international experts. The UK reaching into territories that have not been experienced before, brought a lot of open questions and unknowns, about how the UK's international relationships will proceed in the future. The exit from the European Union does not only have an impact on the internationals living in, working in and travelling to the UK, but also on the domestic economy. The UK accommodates many companies that act on a global scale, which means that the imports and the exports play an important role. Entering this time of uncertainty, brought a lot of volatility into the financial markets by companies being differently impacted by the Brexit.

Due to the Brexit being such a recent topic, there are just a limited number of studies dealing with the topic of what influence the separation of the UK and the EU will have on the UK's economy and its industries. Additionally, since a case like this, where a nation wants to leave the EU, never happened before in this form, there can be no information found on how the announcement of the United Kingdom's exit influences their economy. This thesis aims to address this gap by detecting whether the individual events and respective news announcements of the Brexit had an influence on the UK economy and its industries in the short- and medium-term.

Therefore, it is necessary to shed more light onto the various variables concerning this thesis. This will be done in the literature review, which will provide background information on the Brexit, including the individual Brexit events and news announcements, the event study, the stock market, industries and how in general news announcements are connected to a country's indices in order to be able to come up with a research model.

Additionally, an example from the past will help to understand the dynamics of a country trying to leave the European Union. After the literature review, the outline of the research model and the various components covering the analysis trying to contribute to the research aim, will be explained further in the methodology section. In the analysis part of this thesis the individual event studies will be conducted and their results will be explained in more detail. The results of these event studies will be summarized in an analysis overview and in the last part of this thesis conclusions will be drawn on the research question.

2 Literature Review

2.1 Brexit

Since the beginning, the UK has always been a member that wanted to stay their own, as they are not part of the Euro zone with having their own currency the Great British Pound, in short GBP, and are not members of the Shengen area (Gudgin, Coutts, and Gibson, 2016). Therefore, it was not a surprise that they didn't see themselves as a full member of the EU (Gudgin et al., 2016). In the last years, the British exit or more commonly known Brexit has been a current and much discussed topic. The Brexit refers to the event of the United Kingdom leaving the European Union (Bashir, Zebende, Yu, Hussain, and Abbas, 2019). In 2013, the British Premier David Cameron decided that it was time to let the British folk come to word, to decide if the relationship between the UK and the EU should be negotiated on new terms (Walker, 2020). In 2015 he started working on renegotiating the relationship between the UK and EU (Walker, 2020). One year after this he announced the results of these negotiations and set the date for the referendum where the folk should decide on whether to leave or stay in the EU, to the 23rd of June 2016 (Walker, 2020).

On the 23rd of June 2016 residents of the United Kingdom have in a vote decided to exit the European Union (Bashir et al., 2018). Thereby, it is worth

mentioning that the United Kingdom consists of England, Northern Ireland, Wales and Scotland. While England and Wales voted for Brexit, both Scotland and Northern Ireland voted to stay in the EU (BBC, 2020). While it was not a surprise that the population didn't see themselves as full members of the EU, the decision to leave came as a shock to many. The following day after the referendum took place and the results have been published, David Cameron, who was the one to initiate the referendum, resigned from his positions (Walker, 2020). He has been replaced by Theresa May as the new leader of the Conservative Party and Prime Minister (Walker, 2020).

Article 50, a clause in the EU Lisbon Treaty (European Union, 2012, Appendix 1) which has been signed by all members and took effect in 2009, made it possible for the UK to start Brexit and provided them with the necessary steps to be taken to exit (Gadd, 2019). Until now, the UK is the first EU nation that has ever made use of the Article 50 (Kenton, 2020). The Article 50 notice of withdrawal was submitted by Prime Minister May in March 2017 (Walker, 2020). In the following two years after the decision to leave the EU, many negotiations between the United Kingdom and the European Union followed, to agree on the conditions of the Brexit. Theresa May's proposed Brexit deal got rejected by the British Parliament just two months before the original parting date of the EU and UK (Walker, 2020). The original date of the exit was supposed to be the 29th of March 2019, but since no agreements were set at this date the Brexit was postponed (Walker, 2020). After the deal got rejected, the United Kingdom asked the European Union for an extension and the EU decided to grant it (Walker, 2020).

After three failed attempts to get a deal accepted by the British Parliament, Theresa May voluntarily stepped back and resigned from her position in June 2019 (Walker, 2020). In July 2019, Boris Johnson took her position and his stance towards Brexit was that even without a deal the UK would leave the EU in October 2019 (Walker, 2020). In October 2019, the attempt to agree on a

deal failed again and another extension was granted by the EU until the 31st of January 2020 (Walker, 2020).

The decision to leave the EU will have an impact on both the United Kingdom and the European Union. For this reason, both parties strive for a regulated Brexit, so that not all ties will be broken as it is believed it could harm the economy (BBC, 2020). The terms soft Brexit and hard Brexit refer to how close the EU and UK will still work together after the Brexit (Dhingra, Machin, and Overman, 2017). A hard Brexit would refer to the event where the UK will no longer be a member of the EU's single market, which would make it no longer possible to trade with the countries in the EU without tariffs, and subsequently the countries from there on would have to trade under World Trade Organization rules (Dhingra et al., 2017). In this case the UK would have to set up and negotiate their own trade agreements with the individual countries of the EU, to make trade more affordable, which is time consuming and not possible to achieve quickly. Due to tariffs and customs this would harm many UK companies since it would be more expensive to trade with companies from the EU, that are a major proportion of the UK's import and export business. In 2018, 45% of the UK's exports were done to countries of the EU, while the UK imported 53% of their products from the EU (Ward, 2019). Furthermore, other countries the UK imports from and exports to, have trade agreements with the EU (Harari, 2018). This means in the case of a hard Brexit the UK does not only need to set up new trade agreements with the countries of the EU, but also with countries they can currently trade with due to the EU having trade agreements with. In the option of a soft Brexit, trade with the EU would still be possible as before, but this is only the case if both countries agree on all conditions (Gadd, 2019). In the case of failed negotiations between the two parties no agreements between the EU and UK would be made, the UK could leave the EU without a deal. All ties would be cut immediately with the exit of the UK.

In sequence to these negotiations many announcements about updates or decisions have followed and the aim of this thesis is to detect whether these key events and announcements in the timeline of the Brexit have made an impact on the British economy and its industries. The UK left the EU on the 31st of January 2020 and from there on the transition period until the 31st of December 2020 started, which was agreed on in the withdrawal agreement (Walker, 2020). The majority of this withdrawal agreement was negotiated under Theresa May's command, but some changes have been made after Boris Johnson took over her position (BBC, 2020). During this transition period the UK still stays within the EU customs union and in the single market which means, travelling, living and trading is still possible the same way as before (Edgington, 2020). While everything stays the same for the common people, the UK has no voting rights anymore and has to follow all rules set by the EU (Edgington, 2020). The purpose of this transitional period is to further negotiate the outstanding terms, which are not agreed on yet (Edgington, 2020).

While at the beginning, Prime Minister Johnson's stance was that in no case this transition period will be extended, this statement is unsure as of now. Due to the situation of the COVID-19 pandemic which started in February 2020, the focus of both parties has been put onto fighting the spread of the pandemic. In March 2020, the negotiations have been put on hold, but have been continued in April 2020 (BBC, 2020; Raphael, 2020). While Prime Minister Johnson has seen it as highly unlikely that the period will be extended (Wishart, 2020), the circumstances of the pandemic could not have been foreseen at this point in time. This opinion has been formed under the impression that negotiations will be performed without any major interruptions. Nevertheless, it is clear that due to this situation the negotiations have been slowed down and the countries have put their focus in saving their own. Should no free trade agreement be reached until the transition period is over, the UK will have to trade under World Trade Organization's rules with the EU, which means from

this point on tariffs and controls would apply (Edgington, 2020). For an extension to be granted, both parties would have to agree until the 1st of July 2020 on said extension which can either be 12 or 24 months (Edgington, 2020).

2.1.1 Exit Greenland

As already mentioned, the United Kingdom is the first nation wanting to exit the European Union. Never before did a nation decide to leave the European Union, but in fact a territory of a member state already exited (BBC, 2020). In 1985 Greenland decided to exit the EU (Gad, 2016). Thereby, Denmark decided to stay in the European Union and Greenland exited the EU or at this point called European Economic Community, short EEC. Greenland now fell into a category called “Overseas Countries and Territories with constitutional links to a member state” (Gad, 2016). Rules for this category already existed at this point in time (Gad, 2016). While due to their size difference only limited comparisons can be made, Greenland still has a huge trade dependency with the European Union. Furthermore, their exit and separation of Denmark can be seen as an example of how the possible separation of Great Britain and Scotland could work. In 1985 when Greenland exited there was no Article 50 as found in Appendix 1, while since 2009 this article serves as a plan if a country decides to leave the European Union as before this point in time only the separations of territories was possible (BBC, 2020; Gad, 2016). This example shows that there are possible ways that Scotland and Northern Ireland can stay in the EU. On the terms and conditions of how this could work only speculations can be made, as also in the case where no agreements can be found the risk of a separation of the United Kingdom itself is possible (Douglas-Scott, 2015).

2.2 Events and News Announcements

With regards to the Brexit, which has been going on for several years now, an immense number of news announcements have been shared with the public. Due to the number of different events that happened in the sequence of the

Brexit, the announcements have a variety of focus. News have been posted almost daily about official announcements made about the Brexit (Walker, 2020). News are published to uphold the transparency and to inform the public about developments of the Brexit together with breakthroughs in the ongoing negotiations. The Brexit events and respective news announcements looked at in this thesis, will be the major news publications that have been shared with the public, about the updates and the progress on the Brexit. A relevant and complete source from where to get information about the Brexit timeline is a document published by the UK House of Commons Library, which provides a list of all events that lead to the UK exiting the EU. The House of Commons Library is a research and information service, that is based in the parliament of the United Kingdom. Their research papers created by experts are supposed to help the members of the parliament to do their job, which is why the quality of the reports has to be insured and detached from any political party (House of Commons Library, 2020). The materials published by the House of Commons Library are open for everyone to access on their website. The timeline has been split into eight phases, starting from the events leading to the referendum up until the key dates during the transition period. The list provides an overview of all events and highlights the key events of each of the eight phases, from which the relevant events will be selected throughout this thesis in order to analyze them on their impact.

Thereby, it is worth mentioning, that news announcements concerning macroeconomic events have an impact on the changes in stock prices (Bomfim, 2001). Correspondingly, it can be assumed that the Brexit news announcements have an impact on the British economy and its industries. Therefore, this thesis will elaborate on the theory that events and news announcements concerning the Brexit result in measurable fluctuations in the corresponding company stock prices captured by the observed indices expressing the British economy and its industries. The investigation of stock prices, also called stock price analysis, can be conducted in two major ways,

fundamental and technical analysis. Throughout this thesis fundamental analysis will be used as the impact of news announcements is a vital part of it.

2.3 Fundamental Analysis

In fundamental analysis, the value of the underlying security is investigated with associated economic and financial considerations (Segal, 2020). The aim of fundamental analysis is to come up with the real value of a security, which is a tradable financial asset in order to see if the security is overvalued or undervalued (Segal, 2020). Everything is relevant to be taken into consideration that is influencing the value of the asset (Segal 2020). This can range from microeconomic to macroeconomic aspects (Segal 2020). The goal of this analysis is to determine a stock's real market value and if it is valued appropriately (Segal, 2020). Investors doing fundamental analysis use data which is of open source (Segal, 2020). In practice, fundamental analysis is most often done for stocks, but it is not limited to this (Segal, 2020). For the analysis, quantitative as well as qualitative data can be used (Segal, 2020). Quantitative data is measurable, whereby the most common source for quantitative data is the financial statement of the company (IG Group, 2020). Qualitative data can for example be external incidents and impacts (IG Group, 2020). While none of them is better over the other, most consider a mix of both of them (Segal, 2020).

When talking about fundamental analysis, it can be divided into a top-down and bottom-up approach (IG Group, 2020). In the top-down approach in which a wider view of the economy is taken into account, the analysis starts out with looking at the market, then going into sectors or industries and in the end looking at a particular company (IG Group, 2020). While in the bottom-up approach it will be first looked into a particular stock and continues until all components which influence the price are taken into consideration (IG Group, 2020).

This thesis will focus on the top-down approach, where a macroeconomic view

is narrowed down to the individual stock. Within the concept of fundamental analysis in order to draw conclusions on the Brexit events and announcements that this thesis wants to analyze in terms of their effects on the British economy and its industries, a so-called event study will be performed.

2.4 Event Study

“Economists are frequently asked to measure the effects of an economic event on the value of firms” (MacKinlay, 1997, p.13). To do so, they make use of an event study. The impact of the event will be seen as fluctuations in the price of the respective security (MacKinlay, 1997). To do this, the price of the respective security needs to be attended over a short amount of time (MacKinlay, 1997). The application of an event study can range from specific company announcements to macroeconomic ones, but it is not limited to the stock market, as it can also be used in other fields like law and economics (MacKinlay, 1997).

Thereby, the stock market consists of various markets and exchanges where stocks of public companies are bought, sold and issued (The Economic Times, 2020). Thereby, it is worth mentioning that its practices are underlying regulations (The Economic Times, 2020). These markets are a platform where sellers and buyers are meeting to make transactions (The Economic Times, 2020). Due to the size of the market and the number of participants the prices are viewed as being fair and efficient (Chen, 2020).

2.4.1 Types of Market Efficiency

The efficiency market theory also known as efficiency market hypothesis (EMH), declares that the price of stocks traded is always fair, which means that the price reflects the fair value of the security (Faris, 2019). Advocates of the EMH, state that investors should invest in low-cost, passive portfolios and not take a high amount of risk, by making predictions about how the market will behave in the future (Downey, 2020). Since the price of the stock represents

its real value, there is no possibility for an investor to invest into undervalued stocks, the only chance an investor has to receive higher returns is by investing into riskier securities (Downey, 2020). However, when speaking of the efficiency market theory, it has to be distinguished between three versions.

In the first version, the weak form, it is believed that all information about historic stock market prices are reflected in the price of the security (Faris, 2019). Furthermore, in the weak form, with the help of classic fundamental company analysis overvalued and undervalued stocks can be found (Faris, 2019). For example, this can be done with the help of investigating the financial statements of companies (Faris, 2019).

On the contrary, in the strong form there is nothing existing that would help an investor to predict the market and achieve higher results, as not only all publicly available information, but also all private information is already acknowledged in the price of the stock (Faris, 2019).

Lastly, in between the weak and the strong form, the semi-strong form of the EMH, is stating that “stock prices adjust rapidly to all publicly available information” implying that using this information will not help the investor to earn any excess risk-adjusted returns (Chandra, 2008, p. 280). In order to test for this market efficiency, an event study, as laid out in the event study model section of the methodology part of this thesis, tests for the market’s reaction and the possible observed excess returns, of certain events and news announcements that the public was not aware of or did not know before (Chandra, 2008).

2.5 Investigated Indices

The aim of this thesis is to draw conclusions on the Brexit events and announcements having an effect on the British economy and its industries in the short- and medium-term via an event study performed. Thereby, indices have to be determined that represent the overall British economy and a similar

procedure will be applied for its industries. In a stock index a variety of stocks are compiled to represent a sector, exchange or economy (IG Group, 2020). Investors take those as a benchmark to compare with other investments (Chen, 2020). Every index has its own calculation method (Chen, 2020). For an investor, it is not possible to invest directly into a stock index, but often the indices are recreated by a tradable index fund, in which all the companies of the index are represented (Chen, 2020).

2.5.1 British Economy

2.5.1.1 FTSE 100

The Financial Times Stock Exchange Group or in short FTSE Group is an unconventional group that specialty it is to create offerings of indices for the overall financial exchange (Young, 2019). The FTSE Group is a joint venture between the London Stock Exchange and the Financial Times (Wiener Börse, 2020).

The FTSE 100 Index, also called the Financial Times Stock Exchange 100 Index, is an index which consists of the 100 largest companies listed on the London Stock Exchange (Wiener Börse, 2020). The FTSE 100 is informally known as the “Foodsie” (Wiener Börse, 2020). The companies inside the FTSE 100 are weighted according to their market capitalization, whereby the higher the market capitalization of the company, the higher it is weighted in the index (London Stock Exchange Group, 2020). The companies inside the index get adjusted once every quarter and on average two or three companies get replaced by better performing ones (London Stock Exchange, 2020). The list of companies can be downloaded at www.ftserussell.com, whereby the published documents include also the weighting of each of the 100 companies listed. The FTSE 100 can be seen as an indicator which represents the UK economy (Young, 2019). Most of the stocks in the FTSE 100 are blue-chip stocks, which are companies large in size, well established for years, having a good reputation and most of the times pay out dividends to its shareholders

(IG Group, 2020). Their market capitalization ranges into the billions and in many cases, these companies are the market leaders in their industries (IG Group, 2020). The stocks are favored to be bought by investors (IG Group, 2020). It is to be said that blue-chips survive more disturbances than other companies due to trading internationally, but nevertheless an investor should still diversify his portfolio because during a recession or a financial crisis also blue-chips struggle and have a certain risk of bankruptcy (IG Group, 2020). Due to the FTSE 100 representing the 100 biggest UK companies, a generalization can be drawn on the effects on the economy.

After the referendum, the GBP has jumped to the lowest point which it hasn't reached in the past 30 years (Macadam, 2016). Many investors have prognosed that the UK economy will suffer after the decision to leave the EU (Macadam, 2016). The companies in the FTSE 100 which coped the best after the referendum were those who have most of their transaction in different currencies other than the GBP and are not dependent on the UK economy (Macadam, 2016). Investors have focused their investments into companies inside the FTSE 100, with a majority of their trade outside of the UK (Macadam, 2016).

2.5.2 British Industries

Within an industry, companies are categorized with regards to their main business activity, which is based on the largest source of the company's revenue (Kenton, 2019). To classify industries and sectors, the London Stock Exchange, like many other stock exchanges in the world, uses the Industry Classification Benchmark (ICB) (Kenton, 2019). ICB is a by FTSE Russell developed standardized industry and sector classification (FTSE Russell, 2020). When comparing the classification to others, the ICB uses the terms industry and sector in the opposite way, in comparison to other classification standards (Pinto, Henry, Robinson, & Stowe, 2015). The ICB is categorized into four layers. As of the 1st of July 2019, the first layer is comprised of 11 industries,

with 20 super-sectors in the second layer, 45 sectors in the third layer and 173 subsectors in the last one (FTSE Russell, 2019). It is easier to compare companies which operate in the same industry, their stock movements tend to be similar (Kenton, 2019). Following this analogy, companies within a certain type of industry are expected to be impacted similarly from events and news announcements allowing to draw conclusion which industries are impacted by certain announcements.

With regards to the industries that will be analyzed within this thesis, the 3 largest industries of the UK measured by the current market capitalization will be analyzed. Thereby, the following top three industries, biggest to smallest, have been chosen according to the stock market industries of the United Kingdom by the charting platform “Tradingview”: 1. Integrated Oil, 2. Telecommunications equipment, 3. Pharmaceuticals: Major. These 3 industries have been compared with the ICB industry sector classification, which lead to the following three indices that will be analyzed throughout this thesis best representing those industries: FTSE 350 Oil & Gas, FTSE 350 Mobile Telecommunications and FTSE 350 Pharmaceuticals & Biotechnology. Within the analysis the FTSE 350 Mobile Telecommunications will be abbreviated with FTSE 350 Telecom and the FTSE 350 Pharmaceuticals & Biotechnology will be abbreviated with FTSE 350 Pharma.

3 Methodology

Throughout this part of the thesis, the overall research method will be defined and broken down into its various parts, each individually explained in more detail. Starting with the research model, laying out the analyzed dynamics, next the research question and all the hypotheses will be laid out and discussed. Thereby, it is worth mentioning that the individual hypotheses will describe all impacts and dynamics outlined throughout the research method. Additionally, the applied research tools, the event and announcement

selection process and the data collection will be explained in more detail in the process analysis. Lastly, this section of the thesis will critically discuss the various limitations and risks that come with the designed research model and its simplifications giving valuable ideas for future research.

3.1 Research Model

Since the main objective of this thesis will be to explain if and to what extent the Brexit events and accompanying news announcements have an impact on the British economy and its industries in order to make predictions about future events and announcements, the thesis will follow an explanatory research design. To be precise, for this study, quantitative research will be conducted whereby it is going to be tested if a statistically significant relationship between two or more variable can be detected (Creswell, 2014). It will be analyzed if an independent variable has an impact on the dependent variable, in which the outcome is caused by the independent variable (Kumar, 2011). Thereby the dependent variable will be the index value and the independent variable will be the Brexit event as laid out in Figure 1.



Figure 1 ... Simple research model

With regards to the time component of the research model, the existing dynamics can be extended by the observed timeframe. Throughout this thesis the short- and medium-term impact of the independent variable will be analyzed on having an effect on the dependent variable. Subsequently the presented research model can be extended to the following:

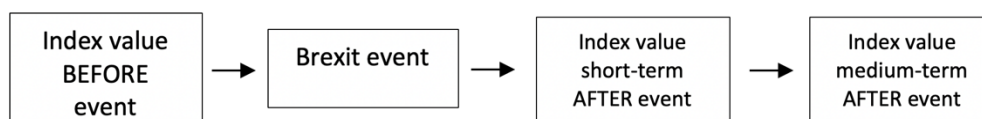


Figure 2 ... Extended research model

The thesis will follow a non-experimental design as the index value is defined by a certain value at a certain point in time and therefore cannot be derived through an experimental design. Thereby, it is worth mentioning that the price of the underlying company stock is always set by the collateral market and therefore accessible to the public at any point in time. Subsequently, the price of a stock and hence the index value can be seen *as* observational data that can be accessed from the market. Consequently, the index data can be referred to as secondary data.

3.1.1 Research Question and Hypotheses

In accordance of the overall aim of this thesis and the present research gap, the following research question can be defined which is building upon the outlined research model:

What short- and medium-term effects do the Brexit events and news announcements have on the British economy and its industries?

Building upon the research question and the model described before, the thesis can be divided into four different levels of hypotheses. As it can be detected, the research question can be split into two different timeframes and two different scopes, summing up to overall four different levels of analysis. The timeframes refer to the short- and medium-term and the scope refers to analysis of the British economy and the British industries. Therefore, with regards to the overall scope, the first main question is concerned with the Brexit events and news announcements having an impact on the British economy. Subsequently, also the British industries will be analyzed, in order to be able to draw conclusion on the individual impacts within the economy. Thereby the 3 biggest industries, selected by market capitalization, will be individually tested for being impacted.

Furthermore, the thesis will distinguish between the short-term and the medium- term impacts of the events and news announcements. Depending on

the trading horizon, the timeframes regarding short- and medium-term can vary. Therefore, in this thesis the short-term horizon will be set to end after the 3rd trading day and the medium-term one after the 10th trading day after the event.

Following further, hypotheses about the individual key events and announcements can be set up in order to draw conclusions on their impact on the British economy and its industries. Therefore, seven events have been chosen for this thesis, whereby, the selection process will be explained in more detail in section 3.2.2 called “Events and News announcements”. Following the structure above, also hypotheses about the short-term and medium-term effects of the individual announcements can set up. Respective to each event, hypotheses can be formulated analog to this example:

H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British economy.

H1 The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British economy.

and

H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British economy.

H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British economy.

The same hypotheses can be set up for the individual industries that will be analyzed throughout this thesis. A complete list of the individual hypotheses for every single event with the respective timeframe and scope, can be found in Appendix 2.

3.2 Process of the Analysis

Having set up the hypotheses and the research design method, it is now possible to elaborate further on the actual process of the analysis and the various components that will be necessary to conduct the analyses. Starting with the applied research tool, it can be inferred which and what kind of data will be required. This will allow to further define the selected research sites, the selected data and its processing in order to lastly point out the way in which the findings will contribute to the overall research aim of the thesis.

3.2.1 Research Tool: Event Study Analysis

The research tool used for answering the research question will be the event study. In order to be able to perform the event study not only the timeframe, but also the respective testing approach has to be defined as they will influence the data collection process. The data will be analyzed by the spreadsheet program called "Microsoft Excel" and will be imported into the software in order to perform various tests to gain more insights into the influences of the Brexit events and news announcements to draw conclusions on the various hypotheses. Thereby, each individual hypothesis will be tested. Based on the individual result of the statistical test for each hypothesis, it will be either possible to reject or retain the null hypothesis. The information gathered from proving or denying the individual hypotheses makes it possible to narrow the research gap.

3.2.1.1 Event Study Model

Brown and Warner (1980) used three different models for the event study calculation of abnormal returns including the mean-adjusted returns model, the market-adjusted returns model and the market model. For all three models the following equation for calculating the prediction error for a security, which is also called the abnormal return, holds true:

$$\epsilon_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where:

R_{it} ≡ the actual return on security i for day t ,

R_{mt} ≡ the market return for day t ,

ϵ_{it} ≡ prediction error for security i for day t , and

α_i, β_i ≡ firm-specific constants.

Equation 1 ... Abnormal return (Dyckman, Philbrick, and Stephan, 1984)

The mean-adjusted returns model disregards the market return by setting the beta to zero, while alpha is set equal to the average return of the security over the estimation period (Dyckman, Philbrick & Stephan, 1984). The market adjusted return model assumes that the expected returns of the security are not constant over time, but equal to the market return, meaning that alpha is set to zero and beta is set to one (Dyckman et. al., 1984). In the last model, the market model, the alpha and the beta are both taken into consideration by calculating them over the estimation period through ordinary least squares (OLS) regression (Dyckman et. al., 1984). Depending on the asset and market data, sometimes only a certain type of model can be used for the event study. Nevertheless, it is worth mentioning that these 3 models used by Brown and Warner (1980) are not the only models that exist.

Throughout this thesis a single factor market model will be used as it is superior to the other two models in terms of including relevant data, to better calculate the abnormal return. Thereby, the analyzed index will be correlated with another asset that should be an instance higher than the observed index. For example, in the market model a company stock will be correlated to the corresponding market in order to detect the abnormal return of the company stock in comparison to the normal market return over the observed time period. In this study, the FTSE 100 was chosen to be the index that describes the British economy and therefore, the Morgan Stanley Capital International (MSCI) World Index, which will be referred to as the MSCI World in the analysis, was chosen to be the correlated index for the single factor market model. The MSCI World Index is a world equities index that tracks over 1650 different

large- and mid-cap stocks from 23 developed countries all over the world, capturing the worldwide equity market (Finanzen.net, 2020).

Therefore, the calculated abnormal return for the FTSE 100 is revised for the normal return of the MSCI World Index during the observed event time, based on the calculated alpha and beta derived through OLS. Additionally, the OLS for the single factor market model, provides a coefficient of determination, also called the r-square value. The r-square value ranges from 0% to 100% explaining “the percent of variation in one variable explained by the other variable” (Ratner, 2009). A coefficient of determination of 0% means the market model does not explain any “variability of the response data round its mean”, whereby a r-square value of 100% means that the respective model “explains all the variability of the response data around its mean” (Minitab, 2013). In general, it can be said the higher the r-square value the better when analyzing a linear relationship.

Once the individual abnormal returns for the observed event dates have been calculated, the test-statistics for significance testing can be calculated by dividing the corresponding abnormal return by the standard error calculated through the single factor market model (Van Dalsem, 2016). Performing significance testing allows to draw conclusions on the abnormal returns caused by an event, by correcting for the correlated normal return of the market or industry above. Similarly, the benchmark index for the UK industry indices used to perform the single factor market models will be the respective MSCI World Industry Indices. Thereby, the MSCI World/Oil Gas & Consmb1 Fuels Index, abbreviated by MSCI Oil & Gas later on, is the equivalent index for the FTSE 350 Oil & Gas. The MSCI World/Telecom SVC Index, from now on called the MSCI Telecom, is the respective MSCI index for the British FTSE 350 Telecom index. Lastly, the MSCI World/Pharma & Biotech Index, shortened to MSCI Pharma in the analysis, is the chosen world index for the FTSE 350 Pharma index.

As Shane Van Dalsem, an associate professor in finance at the School of Business at Washburn University, (2016) explained, if the result of the test-statistic, later abbreviated as t-stat in the analysis, is higher than 1.96 in absolute terms, the observed abnormal return can be classified as being statistically significant at least by a 5% level. This means that the null hypothesis can be rejected, and the alternative hypothesis can be accepted. The higher the calculated test-statistic is above 1.96, the smaller is the percentage of random error.

Additionally, it is worth mentioning that it will be of great interest if a certain Brexit event had a positive or negative impact on the British economy in the short- or medium-term. Therefore, the so-called “cumulative abnormal return” (CAR), which is the sum of the individual abnormal returns over the event window can be calculated with Equation 2 in order to give more insights about if the individual Brexit announcement had a positive or negative effect on the index value.

$$CAR_{m_1, m_2} = \sum_{j=m_1}^{m_2} AR_{T+j}, 1 \leq m_1 \leq m_2 \leq m$$

Equation 2 ... Cumulative abnormal return (Samitas & Kenourgios, 2004)

Furthermore, the absolute cumulative abnormal return (absCAR), which is the cumulation of the absolute abnormal returns over the investigated period, will be calculated in order to draw conclusions on the amount of the total abnormal return that can be spotted during the event window. This allows to get more insights into the overall abnormal return variability. If for example the CAR is 0 at the end of a certain timeframe, the absCAR can give more information about how much abnormal return was seen during the time period even though it evened out at the end, as the index could have seen high abnormal returns which just zeroed themselves out.

$$absCAR_{m_1, m_2} = \sum_{j=m_1}^{m_2} |AR_{T+j}|, 1 \leq m_1 \leq m_2 \leq m$$

Equation 3 ... Absolute cumulative abnormal return

3.2.1.2 Event Study Timeframe

With regards to the timeframe, the event being the only fixed date, four other dates have to be decided on. In Figure 3 the event study timeline which will be used for all Brexit events can be seen. The time interval chosen for the event study throughout this thesis will be the daily timeframe.

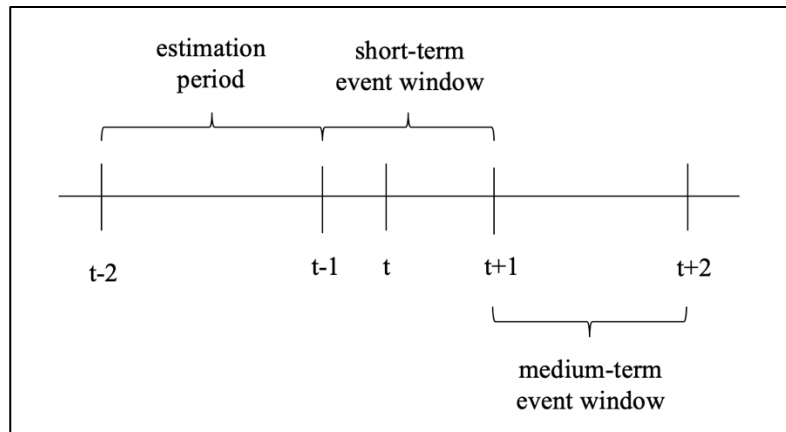


Figure 3 ... Event study timeframe

- t-2 – t-1 estimation period: market estimation for normal return
- t-1 – t pre-event window: possible news already leaked > 2 days before
- t event: event happened / news announcement hit the market
- t – t+1 short-term post-event window
- t+1 – t+2 medium-term post-event window
- t-1 – t+1 short-term event window: short term impact of news > total of 6 trading days
- t+1 – t+2 medium-term event window: medium term impact of news > total of 7 trading days

Starting at the far left, the beginning of the timeline, the estimation period that serves as a data pool for the single factor market model to calculate the regression model for the normal return, the data of one year in advance before the pre-event window opens is chosen. The short-term event window starts with the opening of the pre-event window and ends at the pre-determined short-term post-event window after the event has happened. Thereby, the pre-event timeframe is defined to be 2 days before the event. By including this

two-day pre-event window, possible abnormal returns happening right before the event due to insider information or fear can be excluded from the normal return which would otherwise skew the data. As already mentioned before, the event date is the only fixed date which is not subject to be determined.

The event date is the date when the analyzed Brexit event took place. The short-term post-event window starts directly after the announcement and is chosen to be trading 3 days long for measuring the short-term impact and trading 7 days long for measuring the medium-term impact starting after the short-term event window finished. Therefore, the total short-term event window starts 2 days before the event and finishes 3 days after the event, totaling 6 days including the event date. Similarly, the medium-term event window starts after the short-term event window and ends on the 10th trading days after the event summing up to a total of 7 observed days.

Depending on the duration of the various windows and phases, the results can vary slightly, which has to be acknowledged by analyzing the results of the event study. Throughout the analysis a more detailed conclusion can be drawn on the accuracy and effectivity of the chosen event window time intervals by analyzing the respective index changes on the selected days.

3.2.2 Brexit Events and News Announcements

The Brexit events and news announcements analyzed throughout this thesis were carefully chosen from all the announcements there were included in the list of the Brexit timeline published by the UK House of Commons Library. This published list of events served as the starting point for the selection process, as hundreds of individual Brexit announcements and events took place over the last years. Throughout the selection process, the most relevant key events were separated from the ones that are seen to be not from that much of importance. Thereby, several key events have already been pre-selected by the House of Commons Library and highlighted in their report. These key events summed up to a list totaling 81 different events, from which the most

important ones have been chosen for this thesis. The list of the published key events can be found in Appendix 3.

From all 81 key events that the UK House of Commons Library published in the paper, a cross-check with economic market calendars was done in order to filter out the most important announcements. An economic market calendar is an online calendar that allows to filter for news announcements and events within certain markets and asset classes according to their respective impacts. For this cross-check, announcements and events have been restricted to the UK and the high-impact level. Comparing the individual key event dates of the House of Commons Library list with the economic calendars, made it possible to find overlaps that have been classified to have a high-impact from both the economic calendar and the House of Commons Library. Two different, independent and well-acknowledged economic calendars have been chosen to increase the validity of the chosen events. Thereby, the Bloomberg and the FXStreet economic calendar haven been chosen to do the cross-check, which made it possible to filter out the seven most important key events. As already mentioned before, there are many more events that might be interesting to investigate through event analysis. In the following timeline the seven events that will be analyzed within in this thesis, can be seen with their dates and description:



Figure 4 ... Brexit event timeline

3.2.3 Data Collection

Having set the event study timeline and having selected the specific Brexit events and announcements that will be analyzed, it will now be possible to gather the corresponding data for the indices in order to be able to perform the event studies. Thereby, the historical secondary data for the FTSE 100 and the MSCI World will be collected from the recognized website called “finanzen.net” operated by the finanzen.net GmbH. Finanzen.net does not only provide data about various financial assets, news and analyses from experts, but also acts as a market broker as they run their very own trading platform. The historical data for the UK industry indices will be downloaded from “investing.com” operated by Fusion Media Limited, which also provides market data, news and education material. Lastly, the historical data for MSCI industry indices are retrieved from “onvista.de” operated by the onvista media GmbH, which provides similar services as finanzen.net.

Depending on the researched index the historical data can be accessed and selected by the time period. Thereby, the daily open, close, highest and lowest value can be retrieved and transferred into the data processing software. For

this analysis the data was imported into Microsoft EXCEL. Throughout this study only the closing value of the respective day will be analyzed, as this will be of the most interest when analyzing the impact of events and announcements that happened during a certain day.

However, it is worth mentioning that, when performing the event study, the data of the two tested indices had to be manually cleaned from missing values in order to prevent any distortions. For example, the British holidays on which the FTSE 100 was not traded had to be cleaned with regards to the MSCI World Index that has been traded on this day. Therefore, if there was a British holiday and it was a MSCI World trading day, then the corresponding FTSE 100 value was chosen to be the previous day's closing value, meaning that on the holiday the value did not change. This process was repeated whenever a trading day was missing in the data for one of the two tested indices, while the other index was traded on this respective day. The same approach was followed to manually clean the data for the industry indices.

3.3 Risks and Limitations of this Thesis

Throughout this thesis several assumptions, generalizations and simplifications had to be applied to fit the scope of the research model that has been set up. Therefore, it is important to mention these and the subsequent risks and limitations in more detail to clearly define the validity of the results.

One important limitation of this research which needs to be taken into consideration is that fluctuations in stock prices can be caused by a variety of causes. The price of a stock can be influenced by company news, industry performance, investor confidence and various economic factors, such as, interest rate, economic outlook, inflation, deflation, shocks, changes in policy and much more (Ontario Securities Commission, 2018). Correspondingly, the index is influenced by the stock price of all the individual companies that are included in the index. Also, the domestic currency, the Great British Pound (GBP), influences indices such as the FTSE 100 and the FTSE 350 industry

indices as the currency affects the underlying companies. Therefore, all the mentioned reasons cannot be taken into consideration and the focus of this study is solely set on the assumption that the observed change in the index throughout the event study is solely caused by the Brexit events and announcements.

Additionally, some of the British companies included in the FTSE 100 or the FTSE 350 industry indices might also be in the respective MSCI indices. This could decrease the probability of getting a significant result if the components of the benchmarked index overlap with the analyzed index. For example, if the change in return of the FTSE 100 would be also in the change of return of the MSCI World, this would reduce the observed abnormal return on the specific day.

Furthermore, it has to be acknowledged that this thesis is only observing the short- and medium-term impact with regards to the daily time interval, meaning that other time intervals may lead to significant results too that could not have been found within this thesis. Especially, in times of hyper frequency trading, where price changes can happen within seconds, it can be the case that the observed events only had significant impacts within the intraday data, which rebounded after the initial shock and led to an insignificant result for the day.

Lastly, also the quality of data represents a potential risk that has to be mentioned, as the data used for the event study was collected from third party providers. Therefore, it was not possible to proof the validity of this data, even though spot checks with other data providers have been done and recognized sources haven been chosen.

4 Analysis

Throughout this part of the thesis the analysis of the seven events in terms of their short- and medium-term impact on the British economy and its industries will be discussed in more detail. The analysis starts at the beginning of the Brexit timeline with the UK referendum and chronologically continues till the actual Brexit day. Therefore, each individual event will be analyzed separately according to 4 different event studies, one for the British economy, the FTSE 100, and then 3 for the industries, including the FTSE 350 Oil & Gas, Telecom and Pharma indices. In this process the overall model fit, the significance testing, the maximum abnormal returns, the cumulative abnormal returns and the absolute cumulative abnormal returns will be of major focus to describe the impact of the individual event. The analysis section of this thesis will finish with providing an overall analysis summary, allowing not only to give an overview about the individual event studies described before, but also draw conclusions across the individual indices and events with a more holistic view. Additionally, in this section the overview of accepted and rejected hypotheses will be presented. The main goal of this part of the thesis is to clarify and give more information about the research question raised.

4.1 UK Referendum on Brexit

The UK referendum on the Brexit took place on the 23rd of June 2016. The analyzed pre-event window started on the 21st of June 2016, two days before the event, the short-term post event window lasted till the 28th of June 2016 and the medium-term post event window till the 07th of July 2016. The estimation period for the single factor market model was one year and included the data between the 19th of June 2015 till the 20th of June 2016. Following, the analysis of the four individual indices with a more-detailed description to this event can be found.

4.1.1 FTSE 100

DATE	FTSE 100	MSCI World	FTSE 100 CHANGE	MSCI World CHANGE	FTSE 100 LN	MSCI World LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
07.07.16	6,533.79	1,643.94	70.20	3.19	1.08%	0.19%	0.87%	1.17		6.52%	10.93%	Intercept	-0.00002
06.07.16	6,463.59	1,640.75	-81.78	-4.79	-1.26%	-0.29%	-0.94%	-1.26		5.65%	10.06%	Slope	1.07655
05.07.16	6,545.37	1,645.54	23.11	-15.34	0.35%	-0.93%	1.35%	1.81		6.59%	9.12%	Standard error	0.00747
04.07.16	6,522.26	1,660.88	-55.57	0.62	-0.85%	0.04%	-0.89%	-1.19		5.23%	7.77%	R-square	0.63251
01.07.16	6,577.83	1,660.26	73.50	7.03	1.12%	0.42%	0.67%	0.90		6.12%	6.88%		
30.06.16	6,504.33	1,653.23	144.27	18.82	2.24%	1.14%	1.01%	1.36		5.45%	6.21%		
29.06.16	6,360.06	1,634.41	219.67	35.29	3.51%	2.18%	1.17%	1.56		4.44%	5.20%		
28.06.16	6,140.39	1,599.12	158.19	27.36	2.61%	1.73%	0.75%	1.01		3.27%	4.03%		
27.06.16	5,982.20	1,571.76	-156.49	-37.03	-2.58%	-2.33%	-0.07%	-0.10		2.52%	3.28%		
24.06.16	6,138.69	1,608.79	-199.41	-82.97	-3.20%	-5.03%	2.22%	2.97	SIG	2.59%	3.20%		
23.06.16	6,338.10	1,691.76	76.91	23.85	1.22%	1.42%	-0.31%	-0.41		0.37%	0.98%		
22.06.16	6,261.19	1,667.91	34.64	-0.87	0.55%	-0.05%	0.61%	0.82		0.68%	0.68%		
21.06.16	6,226.55	1,668.78	22.55	4.64	0.36%	0.28%	0.07%	0.09		0.07%	0.07%		

Table 1... Event study results: UK Referendum on the Brexit – FTSE 100 with MSCI World

The overall fit of the single factor market model can be described to be of a relatively good fit, as the coefficient of determination was 63.25%. With regards to Equation 1, calculating the AR, represented in the research methodology section of this thesis, the bespoke alpha is the calculated intercept of the single factor market model and the beta the slope. Thereby, the event study only shows one significant result which was on the 24th of June 2016, which is the day after the actual event. This can be explained as the final results of the referendum were published after the market closed on the 23rd of June. Even though the overall market explained by the MSCI World was -5.03% down on the 24th of June 2016, the British economy explained by the FTSE 100 was only down by -3.2%. Therefore, it can be seen that the event showed a 2.22% positive influence on the British economy with respect to the normal equities market. Overall, the cumulative abnormal return in the short-term resulted in a positive abnormal return of 3.27% and 6.52% in the medium-term.

4.1.2 FTSE 350 Oil & Gas

DATE	FTSE 350 Oil & Gas	MSCI Oil & Gas	FTSE 350 Oil & Gas CHANGE	MSCI Oil & Gas CHANGE	FTSE 350 Oil & Gas LN	MSCI Oil & Gas LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
												Intercept	0.00008
07.07.2016	7,710.19	346.28	73.37	-1.91	0.96%	-0.55%	1.48%	1.22		13.50%	19.21%	Slope	0.96905
06.07.2016	7,636.82	348.19	-89.95	-0.28	-1.17%	-0.08%	-1.10%	-0.91		12.02%	17.73%	Standard error	0.01216
05.07.2016	7,726.77	348.47	168.81	-2.92	2.21%	-0.83%	3.01%	2.48	SIG	13.12%	16.63%	R-square	0.61818
04.07.2016	7,557.96	351.39	-59.74	0.00	-0.79%	0.00%	-0.80%	-0.65		10.11%	13.62%		
01.07.2016	7,617.70	351.39	116.73	2.04	1.54%	0.58%	0.97%	0.80		10.90%	12.82%		
30.06.2016	7,500.97	349.35	187.98	3.82	2.54%	1.10%	1.46%	1.20		9.93%	11.85%		
29.06.2016	7,312.99	345.53	322.04	8.83	4.50%	2.59%	1.99%	1.63		8.47%	10.39%		
28.06.2016	6,990.95	336.7	80.61	7.24	1.16%	2.17%	-0.95%	-0.79		6.48%	8.40%		
27.06.2016	6,910.34	329.46	90.90	-5.14	1.32%	-1.55%	2.82%	2.32	SIG	7.43%	7.45%		
24.06.2016	6,819.44	334.6	50.32	-10.26	0.74%	-3.02%	3.66%	3.01	SIG	4.62%	4.63%		
23.06.2016	6,769.12	344.86	141.32	5.88	2.11%	1.72%	0.44%	0.36		0.96%	0.97%		
22.06.2016	6,627.80	338.98	6.08	-1.56	0.09%	-0.46%	0.53%	0.43		0.52%	0.54%		
21.06.2016	6,621.72	340.54	53.42	2.83	0.81%	0.83%	-0.01%	-0.01		-0.01%	0.01%		

Table 2 ... Event study results: UK Referendum on the Brexit – FTSE 350 Oil & Gas with MSCI Oil & Gas

The event study described with a 61.8% fit of the estimation period with regards to the market model, resulted in 3 significant results, whereby two were in the short-term and one in the medium-term. The two significant short-term results were the two days directly following the event, showing both a positive influence on the British oil and gas industry with a positive abnormal return of 3.66% and 2.82%. Even, though the global oil and gas market shows a negative change in index value during these days, the British oil and gas industry reacts positively. With regards to the medium-term impact it can be seen that the event study showed a significant result on the 8th trading day after the event happened with an abnormal return of 3.01%. With regards to the direction of the impact it can be seen, that the event also had a positive impact on the British oil and gas industry with a cumulative abnormal return of 6.48% in the short-term and 13.50% in the medium-term. Additionally, this event shows high absolute cumulative abnormal returns both in the short- and the medium-term with 8.40% and 19.21%.

4.1.3 FTSE 350 Telecom

DATE	FTSE 350 Telecom	MSCI Telecom	FTSE 350 Telecom CHANGE	MSCI Telecom CHANGE	FTSE 350 Telecom LN	MSCI Telecom LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
07.07.2016	5,094.97	145.31	41.54	-0.90	0.82%	-0.62%	1.60%	1.60		2.36%	21.19%	Intercept	-0.00053
06.07.2016	5,053.43	146.21	-87.41	-0.68	-1.71%	-0.46%	-1.11%	-1.11		0.76%	19.59%	Slope	1.18049
05.07.2016	5,140.84	146.89	45.42	-0.48	0.89%	-0.33%	1.33%	1.32		1.87%	18.48%	Standard error	0.01002
04.07.2016	5,095.42	147.37	-70.18	0.00	-1.37%	0.00%	-1.31%	-1.31		0.54%	17.15%	R-square	0.54659
01.07.2016	5,165.60	147.37	35.66	0.87	0.69%	0.59%	0.05%	0.05		1.86%	15.84%		
30.06.2016	5,129.94	146.5	118.51	1.63	2.34%	1.12%	1.07%	1.07		1.81%	15.79%		
29.06.2016	5,011.43	144.87	112.92	2.87	2.28%	2.00%	-0.03%	-0.03		0.74%	14.72%		
28.06.2016	4,898.51	142	195.21	1.94	4.07%	1.38%	2.50%	2.49	SIG	0.77%	14.69%		
27.06.2016	4,703.30	140.06	-230.78	0.44	-4.79%	0.31%	-5.11%	-5.10	SIG	-1.72%	12.19%		
24.06.2016	4,934.08	139.62	29.06	-5.18	0.59%	-3.64%	4.94%	4.93	SIG	3.39%	7.09%		
23.06.2016	4,905.02	144.8	38.19	1.82	0.78%	1.26%	-0.66%	-0.66		-1.56%	2.14%		
22.06.2016	4,866.83	142.98	39.69	0.70	0.82%	0.49%	0.29%	0.29		-0.90%	1.48%		
21.06.2016	4,827.14	142.28	-30.44	0.74	-0.63%	0.52%	-1.19%	-1.19		-1.19%	1.19%		

Table 3 ... Event study results: UK Referendum on the Brexit – FTSE 350 Telecom with MSCI Telecom

With regards to the British telecom industry it can be seen that the single factor market model also shows a good coefficient of determination with 54.6%. The significance testing only resulted in statistically significant results in the short-term, whereby all 3 days after the event were significant. Thereby, the first day after the event, a positive abnormal return of 4.94% can be detected, followed by a negative abnormal return of -5.11% and a positive day with an abnormal return of 2.50% again. Even though the abnormal return is the second biggest among all other event studies performed on this particular event, the cumulative abnormal return is considerably low with 0.77% in the short-term and only 2.36% in the medium-term. This can be explained by the second day showing a big negative abnormal return, as the absolute cumulative abnormal return, describing the variability of positive and negative abnormal returns during the event window resulted in the highest among all other indices for this event.

4.1.4 FTSE 350 Pharma

DATE	FTSE 350 Pharma	MSCI Pharma	FTSE 350 Pharma CHANGE	MSCI Pharma CHANGE	FTSE 350 Pharma LN	MSCI Pharma LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
07.07.2016	14,149.17	175.37	105.96	0.55	0.75%	0.31%	0.46%	0.45		13.61%	15.01%	Intercept	0.00024
06.07.2016	14,043.21	174.82	59.75	0.65	0.43%	0.37%	0.09%	0.09		13.14%	14.54%	Slope	0.84144
05.07.2016	13,983.46	174.17	257.95	-0.34	1.86%	-0.20%	2.00%	1.96	SIG	13.05%	14.45%	Standard error	0.01019
04.07.2016	13,725.51	174.51	0.30	0.00	0.00%	0.00%	-0.02%	-0.02		11.05%	12.45%	R-square	0.42675
01.07.2016	13,725.21	174.51	43.43	1.38	0.32%	0.79%	-0.38%	-0.37		11.07%	12.43%		
30.06.2016	13,681.78	173.13	371.14	1.63	2.75%	0.95%	1.93%	1.89		11.45%	12.06%		
29.06.2016	13,310.64	171.5	432.81	3.70	3.31%	2.18%	1.45%	1.42		9.52%	10.13%		
28.06.2016	12,877.83	167.8	327.67	3.78	2.58%	2.28%	0.64%	0.62		8.07%	8.68%		
27.06.2016	12,550.16	164.02	123.38	-1.81	0.99%	-1.10%	1.89%	1.85		7.44%	8.04%		
24.06.2016	12,426.78	165.83	337.97	-5.95	2.76%	-3.53%	5.70%	5.59	SIG	5.55%	6.16%		
23.06.2016	12,088.81	171.78	68.40	1.72	0.57%	1.01%	-0.30%	-0.30		-0.15%	0.46%		
22.06.2016	12,020.41	170.06	58.94	0.70	0.49%	0.41%	0.12%	0.12		0.15%	0.15%		
21.06.2016	11,961.47	169.36	-1.48	-0.14	-0.01%	-0.08%	0.03%	0.03		0.03%	0.03%		

Table 4 ... Event study results: UK Referendum on the Brexit – FTSE 350 Pharma with MSCI Pharma

Even though the market model for the pharma industry shows the weakest model fit of the respective others for this event with only 42.68%, the biggest abnormal return of a positive 5.70% on the day after the event can be detected. Additionally, there is a second significant day in the medium-term on the 8th trading day with a positive 2.00% abnormal return. Correspondingly, the cumulative abnormal return is the highest with a positive 8.07% in the short-term and 13.61% in the medium-term.

Overall it could be detected, that the results of the UK referendum showed a positive influence not only in the short-, but also in the medium-term. Thereby, all four analyzed indices showed a significant positive result on the day after the event, as this was the day that the results were presented to the public. The UK referendum showed the biggest impact on the pharma industry with regards to the highest abnormal return and the oil and gas industry together with the telecom industry showed the highest amount of significant results. With regards to the overall variability in abnormal returns the event created in the medium-term, it can be seen that the telecom industry showed the highest absolute cumulative abnormal returns with 21.19%, followed by the oil and gas industry with 19.21%, the pharma industry with 15.01% and lastly the FTSE 100 with the lowest variability of 10.93%. This may be explained as the FTSE 100 is the index which is the most diversified one in comparison to the other indices and therefore less subjective to specific shocks.

4.2 Article 50 triggered by Prime Minister

Article 50 has been triggered on the 29th of March 2017, by the Prime Minister. The pre-event time window started two trading days before the event happened. The short-term time window for the event ranging to the 3rd of April 2017 and the medium-term time window until the 12th of April 2017. In the single factor market model, the time period which included one year of data ranged from the 24th of March 2016 until the 24th of March 2017. In the following four categories, a detailed analysis about the effect of the event can be found in detail.

4.2.1 FTSE 100

DATE	FTSE 100	MSCI World	FTSE 100 CHANGE	MSCI World CHANGE	FTSE 100 LN	MSCI World LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
12.04.17	7,348.99	1,842.99	-16.51	-4.89	-0.22%	-0.26%	0.00%	0.00		0.03%	4.14%	Intercept	0.00021
11.04.17	7,365.50	1,847.88	16.56	1.10	0.23%	0.06%	0.15%	0.27		0.04%	4.14%	Slope	0.91895
10.04.17	7,348.94	1,846.78	-0.43	1.32	-0.01%	0.07%	-0.09%	-0.17		-0.11%	3.99%	Standard error	0.00556
07.04.17	7,349.37	1,845.46	46.17	-1.13	0.63%	-0.06%	0.67%	1.20		-0.02%	3.90%	R-square	0.53346
06.04.17	7,303.20	1,846.59	-28.48	0.64	-0.39%	0.03%	-0.44%	-0.79		-0.69%	3.23%		
05.04.17	7,331.68	1,845.95	9.86	-4.07	0.13%	-0.22%	0.32%	0.57		-0.24%	2.79%		
04.04.17	7,321.82	1,850.02	39.13	1.05	0.54%	0.06%	0.46%	0.83		-0.56%	2.48%		
03.04.17	7,282.69	1,848.97	-40.23	-4.72	-0.55%	-0.25%	-0.34%	-0.61		-1.02%	2.01%		
31.03.17	7,322.92	1,853.69	-46.60	-6.26	-0.63%	-0.34%	-0.35%	-0.62		-0.69%	1.68%		
30.03.17	7,369.52	1,859.95	-4.20	3.18	-0.06%	0.17%	-0.24%	-0.42		-0.34%	1.33%		
29.03.17	7,373.72	1,856.77	30.30	-2.11	0.41%	-0.11%	0.50%	0.89		-0.11%	1.10%		
28.03.17	7,343.42	1,858.88	49.92	13.73	0.68%	0.74%	-0.02%	-0.04		-0.60%	0.60%		
27.03.17	7,293.50	1,845.15	-43.32	-0.66	-0.59%	-0.04%	-0.58%	-1.04		-0.58%	0.58%		

Table 5 ... Event study results: Article 50 triggered – FTSE 100 with MSCI World

The coefficient of determination shows a relatively good fit of the single factor market model with 53.35%. Nevertheless, the event shows no significant result on the effect of this announcement on the British economy, neither in the short-term, nor in the medium-term. The cumulative abnormal return results in a negative of -1.02% in the short-term, which evens out in the medium-term to 0.03%. Therefore, it can be seen that the event did not have a significant impact on the British economy with literally no residual abnormal return being left after the medium-term.

4.2.2 FTSE 350 Oil & Gas

DATE	FTSE 350 Oil & Gas	MSCI Oil & Gas	FTSE 350 Oil & Gas CHANGE	MSCI Oil & Gas CHANGE	FTSE 350 Oil & Gas LN	MSCI Oil & Gas LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
12.04.2017	7,988.52	373.55	-14.93	-1.04	-0.19%	-0.28%	0.05%	0.05		-0.38%	5.85%	Intercept	0.00030
11.04.2017	8,003.45	374.59	-8.21	-0.54	-0.10%	-0.14%	0.00%	0.00		-0.43%	5.80%	Slope	0.95290
10.04.2017	8,011.66	375.13	-8.13	2.07	-0.10%	0.55%	-0.66%	-0.66		-0.43%	5.80%	Standard error	0.00993
07.04.2017	8,019.79	373.06	122.22	0.57	1.54%	0.15%	1.36%	1.37		0.23%	5.14%	R-square	0.47474
06.04.2017	7,897.57	372.49	10.31	2.36	0.13%	0.64%	-0.50%	-0.51		-1.13%	3.78%		
05.04.2017	7,887.26	370.13	38.72	-0.49	0.49%	-0.13%	0.59%	0.59		-0.63%	3.27%		
04.04.2017	7,848.54	370.62	97.14	3.26	1.25%	0.88%	0.37%	0.38		-1.22%	2.68%		
03.04.2017	7,751.40	367.36	-52.06	-1.12	-0.67%	-0.30%	-0.41%	-0.41		-1.59%	2.31%		
31.03.2017	7,803.46	368.48	-99.47	-1.61	-1.27%	-0.44%	-0.88%	-0.89		-1.18%	1.90%		
30.03.2017	7,902.93	370.09	-8.41	0.94	-0.11%	0.25%	-0.38%	-0.38		-0.30%	1.02%		
29.03.2017	7,911.34	369.15	90.96	4.17	1.16%	1.14%	0.04%	0.04		0.08%	0.64%		
28.03.2017	7,820.38	364.98	117.20	4.43	1.51%	1.22%	0.32%	0.32		0.03%	0.60%		
27.03.2017	7,703.18	360.55	-36.97	-0.86	-0.48%	-0.24%	-0.28%	-0.28		-0.28%	0.28%		

Table 6 ... Event study results: Article 50 triggered – FTSE 350 Oil & Gas with MSCI Oil & Gas

A mediocre fit of the coefficient of determination could be detected with 47.47%. Similar to the event study of the FTSE 100, this event does not show a significant impact on the British oil and gas industry, neither in the short- or the medium-term. In the short-term the cumulative abnormal return is negative at -1.59% and also stays negative with -0.38% in the medium-term. Therefore, it can be seen that the events overall direction of effect resulted in a negative impact on the British oil and gas industry, showing a higher impact directly after the event in comparison to the medium-term.

4.2.3 FTSE 350 Telecom

DATE	FTSE 350 Telecom	MSCI Telecom	FTSE 350 Telecom CHANGE	MSCI Telecom CHANGE	FTSE 350 Telecom LN	MSCI Telecom LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
12.04.2017	4,646.26	146.41	22.88	0.07	0.49%	0.05%	0.49%	0.49		-1.64%	4.65%	Intercept	-0.00035
11.04.2017	4,623.38	146.34	-13.48	-0.07	-0.29%	-0.05%	-0.22%	-0.22		-2.12%	4.16%	Slope	0.84020
10.04.2017	4,636.86	146.41	15.07	-0.16	0.33%	-0.11%	0.45%	0.45		-1.91%	3.95%	Standard error	0.00999
07.04.2017	4,621.79	146.57	-19.35	0.13	-0.42%	0.09%	-0.46%	-0.46		-2.36%	3.49%	R-square	0.24030
06.04.2017	4,641.14	146.44	-55.84	-0.64	-1.20%	-0.44%	-0.79%	-0.80		-1.90%	3.04%		
05.04.2017	4,696.98	147.08	2.86	-0.15	0.06%	-0.10%	0.18%	0.18		-1.11%	2.24%		
04.04.2017	4,694.12	147.23	-2.66	0.01	-0.06%	0.01%	-0.03%	-0.03		-1.29%	2.06%		
03.04.2017	4,696.78	147.22	-33.89	0.07	-0.72%	0.05%	-0.72%	-0.72		-1.26%	2.03%		
31.03.2017	4,730.67	147.15	-9.50	-0.47	-0.20%	-0.32%	-0.10%	0.10		-0.54%	1.31%		
30.03.2017	4,740.17	147.62	-38.08	-0.11	-0.80%	-0.07%	-0.70%	-0.70		-0.64%	1.21%		
29.03.2017	4,778.25	147.73	12.62	0.04	0.26%	0.03%	0.28%	0.28		0.06%	0.50%		
28.03.2017	4,765.63	147.69	2.42	0.54	0.05%	0.37%	-0.22%	-0.22		-0.22%	0.23%		
27.03.2017	4,763.21	147.15	-22.89	-0.79	-0.48%	-0.54%	0.01%	0.01		0.01%	0.01%		

Table 7 ... Event study results: Article 50 triggered – FTSE 350 Telecom with MSCI telecom

In comparison to the other indices, in this single factor market model, the coefficient of determination shows a relatively poor fit of only 24.03%. Additionally, neither in the short-term, nor in the medium-term a significant result of the event on the telecom industry can be detected. A cumulative abnormal return of -1.26% is discovered in the short-term, which turns to an

even higher negative one of -1.64% in the medium-term, suggests that the event had a negative impact on the industry.

4.2.4 FTSE 350 Pharma

DATE	FTSE 350 Pharma	MSCI Pharma	FTSE 350 Pharma CHANGE	MSCI Pharma CHANGE	FTSE 350 Pharma LN	MSCI Pharma LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
12.04.2017	13,996.37	172.54	13.36	0.31	0.10%	0.18%	-0.10%	-0.12		-2.87%	5.19%	Intercept	0.00057
11.04.2017	13,983.01	172.23	24.25	0.05	0.17%	0.03%	0.09%	0.11		-2.77%	5.09%	Slope	0.76980
10.04.2017	13,958.76	172.18	-61.93	-0.42	-0.44%	-0.24%	-0.31%	-0.38		-2.87%	4.99%	Standard error	0.00828
07.04.2017	14,020.69	172.6	-15.05	-0.04	-0.11%	-0.02%	-0.15%	-0.18		-2.56%	4.68%	R-square	0.35791
06.04.2017	14,035.74	172.64	-223.69	-0.31	-1.58%	-0.18%	-1.50%	-1.81		-2.41%	4.53%		
05.04.2017	14,259.43	172.95	-124.71	-0.68	-0.87%	-0.39%	-0.63%	-0.75		-0.91%	3.04%		
04.04.2017	14,384.14	173.63	134.71	0.73	0.94%	0.42%	0.56%	0.68		-0.29%	2.41%		
03.04.2017	14,249.43	172.9	-30.63	-0.29	-0.21%	-0.17%	-0.14%	-0.17		-0.85%	1.85%		
31.03.2017	14,280.06	173.19	-135.84	-0.79	-0.95%	-0.46%	-0.65%	-0.79		-0.70%	1.71%		
30.03.2017	14,415.90	173.98	-54.34	0.00	-0.38%	0.00%	-0.43%	-0.52		-0.05%	1.05%		
29.03.2017	14,470.24	173.98	34.34	-0.28	0.24%	-0.16%	0.30%	0.37		0.38%	0.62%		
28.03.2017	14,435.90	174.26	-1.45	0.12	-0.01%	0.07%	-0.12%	-0.14		0.08%	0.32%		
27.03.2017	14,437.35	174.14	95.86	0.93	0.67%	0.54%	0.20%	0.24		0.20%	0.20%		

Table 8 ... Event study results: Article 50 triggered – FTSE 350 Pharma with MSCI Pharma

A relative low coefficient of determination was revealed at 35.79% with regards to the estimation period. There are no significant results discovered on the effect of this announcement on the pharma industry. The cumulative abnormal return is both negative in the short- and medium-term with -0.85% and -2.87%. This implicates that the overall impact of the event on the British pharma industry has had a negative direction. Additionally, in comparison to the other observed indices, the lowest absolute cumulative abnormal return can be detected.

Overall, it could be detected that there was not a single significant result neither in the short- or the medium-term with regards to the Article 50 triggering event having an impact on the British economy and its industries. Nevertheless, there was a negative impact that could be seen across all indices in the short run, which nearly evened out in two out of the four analyzed indices, but turned slightly more negative for the other two. With regards to the overall variety in abnormal returns that this event caused, it can be said that all four indices only showed relatively low absolute cumulative abnormal returns not only in the short- but also in the medium-term.

4.3 Withdrawal Agreement published

On the 14th of November 2018, the withdrawal agreement to leave the European Union has been agreed on and was shared with the public afterwards. The pre-event window started two days before the event happened. For the single factor market model, the time period which included one year of data ranged from the 9th of November 2017 until the 9th of November 2018. In the short-term event window, the date ranged to the 19th of November 2018 and the medium-term event window to the 28th of November 2018.

4.3.1 FTSE 100

DATE	FTSE 100	MSCI World	FTSE 100 CHANGE	MSCI World CHANGE	FTSE 100 LN	MSCI World LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
28.11.18	7,004.52	2,029.78	-12.33	29.71	-0.18%	1.47%	-0.96%	-1.57		-0.23%	6.09%	Intercept	-0.00023
27.11.18	7,016.85	2,000.07	-19.15	0.86	-0.27%	0.04%	-0.27%	-0.44		0.73%	5.13%	Slope	0.54806
26.11.18	7,036.00	1,999.21	83.14	24.12	1.19%	1.21%	0.55%	0.89		1.00%	4.86%	Standard error	0.00613
23.11.18	6,952.86	1,975.09	-7.46	-8.94	-0.11%	-0.45%	0.16%	0.27		0.46%	4.31%	R-square	0.27335
22.11.18	6,960.32	1,984.03	-89.91	-0.70	-1.28%	-0.04%	-1.24%	-2.02	SIG	0.29%	4.15%		
21.11.18	7,050.23	1,984.73	102.31	7.82	1.46%	0.39%	1.27%	2.07	SIG	1.53%	2.91%		
20.11.18	6,947.92	1,976.91	-52.97	-32.70	-0.76%	-1.64%	0.16%	0.27		0.26%	1.64%		
19.11.18	7,000.89	2,009.61	-12.99	-22.15	-0.19%	-1.10%	0.44%	0.72		0.10%	1.47%		
16.11.18	7,013.88	2,031.76	-24.13	5.46	-0.34%	0.27%	-0.47%	-0.76		-0.34%	1.04%		
15.11.18	7,038.01	2,026.30	4.22	11.16	0.06%	0.55%	-0.22%	-0.36		0.13%	0.57%		
14.11.18	7,033.79	2,015.14	-19.97	-11.38	-0.28%	-0.56%	0.05%	0.08		0.35%	0.35%		
13.11.18	7,053.76	2,026.52	0.68	-2.10	0.01%	-0.10%	0.09%	0.15		0.30%	0.30%		
12.11.18	7,053.08	2,028.62	-52.26	-34.54	-0.74%	-1.69%	0.21%	0.34		0.21%	0.21%		

Table 9 ... Event study results: Withdrawal Agreement published – FTSE 100 with MSCI World

The r-square value for this event in the single factor market model is being relatively low at 27.33%. In the analysis, no significant results can be detected in the short-term, but two significant results are found in the medium-term with one having a positive and one with a negative abnormal return. On the fifth day after the event a significant positive impact of 1.27% in abnormal return can be found. On the contrary, on the sixth day a significant negative impact of the event on the British economy can be detected with a negative abnormal return of -1.24%. The cumulative abnormal return in the short-term is very low at 0.1% and because of the both positive and negative significant results in the medium-term which are similar in number, also the medium-term cumulative abnormal return is not very high at -0.23%. Therefore, when comparing the CAR with the absCAR, it can be seen the even that though the

cumulative abnormal returns nearly cancel each other out, some absolute cumulative abnormal return can be found.

4.3.2 FTSE 350 Oil & Gas

DATE	FTSE 350 Oil & Gas	MSCI Oil & Gas	FTSE 350 Oil & Gas CHANGE	MSCI Oil & Gas CHANGE	FTSE 350 Oil & Gas LN	MSCI Oil & Gas LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
28.11.2018	8,692.67	394.57	-12.56	3.63	-0.14%	0.92%	-0.95%	-1.11		1.26%	9.61%	Intercept	-0.00017
27.11.2018	8,705.23	390.94	-35.30	-1.23	-0.40%	-0.31%	-0.11%	-0.13		2.22%	8.66%	Slope	0.89176
26.11.2018	8,740.53	392.17	229.59	5.60	2.66%	1.44%	1.40%	1.63		2.32%	8.55%	Standard error	0.00855
23.11.2018	8,510.94	386.57	-287.72	-13.19	-3.32%	-3.36%	-0.32%	-0.37		0.93%	7.16%	R-square	0.51150
22.11.2018	8,798.66	399.76	-94.39	0.00	-1.07%	0.00%	-1.05%	-1.23		1.24%	6.84%		
21.11.2018	8,893.05	399.76	199.84	6.08	2.27%	1.53%	0.92%	1.08		2.29%	5.79%		
20.11.2018	8,693.21	393.68	-121.37	-9.53	-1.39%	-2.39%	0.76%	0.89		1.37%	4.87%		
19.11.2018	8,814.58	403.21	-50.35	-1.19	-0.57%	-0.29%	-0.29%	-0.34		0.61%	4.10%		
16.11.2018	8,864.93	404.4	-1.85	2.49	-0.02%	0.62%	-0.56%	-0.65		0.90%	3.81%		
15.11.2018	8,866.78	401.91	184.87	6.31	2.11%	1.58%	0.71%	0.83		1.45%	3.26%		
14.11.2018	8,681.91	395.6	-59.18	-0.95	-0.68%	-0.24%	-0.45%	-0.53		0.74%	2.55%		
13.11.2018	8,741.09	396.55	-212.61	-8.69	-2.40%	-2.17%	-0.45%	-0.53		1.19%	2.10%		
12.11.2018	8,953.70	405.24	60.08	-4.36	0.67%	-1.07%	1.64%	1.92		1.64%	1.64%		

Table 10 ... Event study results: Withdrawal Agreement published – FTSE 350 Oil & Gas with MSCI Oil & Gas

For this analysis in the single factor market model, the coefficient of determination is moderate at 51.15%. There can be no significant results determined on the effects of the announcement on the oil and gas industry of the UK neither in the short-term, nor in the medium-term. In comparison to the FTSE 100 the cumulative abnormal return of the oil and gas industry showed a positive 0.61% in the short-term and 1.26% in the medium-term.

4.3.3 FTSE 350 Telecom

DATE	FTSE 350 Telecom	MSCI Telecom	FTSE 350 Telecom CHANGE	MSCI Telecom CHANGE	FTSE 350 Telecom LN	MSCI Telecom LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
28.11.2018	3,739.85	149	17.31	0.39	0.46%	0.26%	0.41%	0.36		14.29%	26.21%	Intercept	-0.00157
27.11.2018	3,722.54	148.61	64.39	2.24	1.74%	1.52%	0.70%	0.61		13.88%	25.80%	Slope	0.78854
26.11.2018	3,658.15	146.37	211.05	2.36	5.94%	1.63%	4.82%	4.17	SIG	13.17%	25.09%	Standard error	0.01157
23.11.2018	3,447.10	144.01	66.22	-0.71	1.94%	-0.49%	2.48%	2.15	SIG	8.36%	20.28%	R-square	0.19516
22.11.2018	3,380.88	144.72	-129.15	0.00	-3.75%	0.00%	-3.59%	-3.11	SIG	5.87%	17.79%		
21.11.2018	3,510.03	144.72	94.22	0.86	2.72%	0.60%	2.41%	2.08	SIG	9.46%	14.20%		
20.11.2018	3,415.81	143.86	-50.29	-2.69	-1.46%	-1.85%	0.16%	0.14		7.06%	11.79%		
19.11.2018	3,466.10	146.55	52.30	1.04	1.52%	0.71%	1.12%	0.96		6.90%	11.63%		
16.11.2018	3,413.80	145.51	-43.09	0.95	-1.25%	0.66%	-1.61%	-1.40		5.78%	10.52%		
15.11.2018	3,456.89	144.56	-45.53	-0.73	-1.31%	-0.50%	-0.75%	-0.65		7.40%	8.90%		
14.11.2018	3,502.42	145.29	39.57	1.00	1.14%	0.69%	0.75%	0.65		8.15%	8.15%		
13.11.2018	3,462.85	144.29	240.09	0.55	7.19%	0.38%	7.04%	6.09	SIG	7.40%	7.40%		
12.11.2018	3,222.76	143.74	10.44	0.22	0.32%	0.15%	0.36%	0.31		0.36%	0.36%		

Table 11 ... Event study results: Withdrawal Agreement published – FTSE 350 Telecom with MSCI Telecom

With regards to the telecom industry, the calculated r-square value in this single factor market model again is low with only 19.52%. In total, there have been five dates detected for this event showing a significant effect on the

British telecom industry, whereby the one, on the day before the event has happened, shows the highest abnormal return for this event with 7.04%. Until now, this was the first time that there was a significant abnormal return detected in the pre-event window. Nevertheless, there are no significant dates in the short-term, but four significant events can be detected in the medium-term, on the fifth, sixth, seventh and eighth trading day after the event happened. Three of the significant days in the medium-term are days where the event had a positive impact and only one day with a negative one. The negative abnormal return on the sixth day is -3.59%, while on the fifth day the abnormal return is 2.41% and on day seven the abnormal return is positive at 2.48%. On the eight day after the event the second highest abnormal return with 4.82% can be detected. Also, the event had the highest cumulative abnormal returns with regards to the other indices, both in the short- and medium-term, with 6.9% and 14.29%. Additionally, the event study results in the highest measured absolute cumulative abnormal return underscoring the high amount of variety in abnormal returns this event seemed to create.

4.3.4 FTSE 350 Pharma

DATE	FTSE 350 Pharma	MSCI Pharma	FTSE 350 Pharma CHANGE	MSCI Pharma CHANGE	FTSE 350 Pharma LN	MSCI Pharma LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
28.11.2018	14,975.48	193.32	76.90	2.78	0.51%	1.45%	-0.26%	-0.29		-0.92%	9.54%	Intercept	0.00056
27.11.2018	14,898.58	190.54	-98.99	0.49	-0.66%	0.26%	-0.85%	-0.93		-0.66%	9.27%	Slope	0.49943
26.11.2018	14,997.57	190.05	-72.57	0.74	-0.48%	0.39%	-0.73%	-0.80		0.19%	8.43%	Standard error	0.00913
23.11.2018	15,070.14	189.31	168.04	0.54	1.12%	0.29%	0.92%	1.01		0.92%	7.69%	R-square	0.15810
22.11.2018	14,902.10	188.77	-153.75	0.00	-1.03%	0.00%	-1.08%	-1.19		0.00%	6.77%		
21.11.2018	15,055.85	188.77	-94.47	-1.41	-0.63%	-0.74%	-0.31%	-0.34		1.08%	5.69%		
20.11.2018	15,150.32	190.18	141.10	-1.36	0.94%	-0.71%	1.24%	1.35		1.39%	5.38%		
19.11.2018	15,009.22	191.54	13.11	-0.31	0.09%	-0.16%	0.11%	0.12		0.16%	4.14%		
16.11.2018	14,996.11	191.85	-149.91	1.38	-0.99%	0.72%	-1.41%	-1.55		0.04%	4.03%		
15.11.2018	15,146.02	190.47	69.86	0.64	0.46%	0.34%	0.24%	0.26		1.45%	2.62%		
14.11.2018	15,076.16	189.83	-158.08	-1.97	-1.04%	-1.03%	-0.58%	-0.64		1.22%	2.38%		
13.11.2018	15,234.24	191.8	55.67	-0.87	0.37%	-0.45%	0.54%	0.59		1.80%	1.80%		
12.11.2018	15,178.57	192.67	129.02	-1.80	0.85%	-0.93%	1.26%	1.38		1.26%	1.26%		

Table 12 ... Event study results: Withdrawal Agreement published – FTSE 350 Pharma with MSCI Pharma

In comparison to the other analyzed indices the single factor market model for the British pharma industry, shows the lowest coefficient of determination with only 15.81%. In addition, none of the days in the pre-event window, nor in the short- and medium-term have a day that can be detected to be significant. With regards to the overall direction of the event having an impact

on the British pharma industry it can be said that in the short-term, the cumulative abnormal return is positive at 0.16%, but in the medium-term got negative to -0.92%.

Overall, it can be seen that the event of agreeing and publishing the withdrawal agreement had mixed impacts with regards to the timeframes and the impacted indices. Thereby it could be seen that the FTSE 100 and the FTSE 350 Telecom, both showed significant results in the medium-term, whereby the telecom industry also showed one significant value in the pre-event window. The telecom industry, having both the highest cumulative abnormal return and the highest absolute cumulative abnormal return at 14.29% and 26.21%, experienced the highest impact amount in comparison to the other observed indices. Even though, the amount and the direction of the CAR varied across, the absCAR indicates that a larger variety of positive and negative abnormal returns could be detected within the observed time periods.

4.4 Brexit Extension to 31.10.2019

On the 10th of April 2019, the first extension of the Brexit has been granted to the United Kingdom until the 31st of October 2019. The pre-event timeframe which started two days before the event happened, starts on the 8th of April 2019. The short-term timeframe ranges until the 15th of April 2019 and the medium-term window until the 24th of April 2019. For the single factor market model, a one-year data range from the 5th of April 2018 until the 5th of April 2019 was chosen. In the following four categories, the impact of the announcement is highlighted on the four analyzed indices.

4.4.1 FTSE 100

DATE	FTSE 100	MSCI World	FTSE 100 CHANGE	MSCI World CHANGE	FTSE 100 LN	MSCI World LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
24.04.19	7,471.75	2,168.81	-51.32	-5.58	-0.68%	-0.26%	-0.55%	-0.83		-0.33%	2.20%	Intercept	0.00013
23.04.19	7,523.07	2,174.39	63.19	12.81	0.84%	0.59%	0.49%	0.74		0.22%	1.65%	Slope	0.57290
22.04.19	7,459.88	2,161.58	0.00	1.22	0.00%	0.06%	-0.04%	-0.07		-0.28%	1.16%	Standard error	0.00664
19.04.19	7,459.88	2,160.36	0.00	0.15	0.00%	0.01%	-0.02%	-0.02		-0.23%	1.12%	R-square	0.29391
18.04.19	7,459.88	2,160.21	-11.44	-0.73	-0.15%	-0.03%	-0.15%	-0.22		-0.21%	1.10%		
17.04.19	7,471.32	2,160.94	1.40	-2.14	0.02%	-0.10%	0.06%	0.09		-0.07%	0.95%		
16.04.19	7,469.92	2,163.08	33.05	1.94	0.44%	0.09%	0.38%	0.57		-0.13%	0.89%		
15.04.19	7,436.87	2,161.14	-0.19	1.75	0.00%	0.08%	-0.06%	-0.09		-0.51%	0.51%		
12.04.19	7,437.06	2,159.39	19.11	11.78	0.26%	0.55%	-0.07%	-0.10		-0.45%	0.45%		
11.04.19	7,417.95	2,147.61	-3.96	-0.38	-0.05%	-0.02%	-0.06%	-0.08		-0.38%	0.38%		
10.04.19	7,421.91	2,147.99	-3.66	4.79	-0.05%	0.22%	-0.19%	-0.29		-0.32%	0.32%		
09.04.19	7,425.57	2,143.20	-26.32	-9.70	-0.35%	-0.45%	-0.11%	-0.16		-0.13%	0.13%		
08.04.19	7,451.89	2,152.90	5.02	3.05	0.07%	0.14%	-0.03%	-0.04		-0.03%	0.03%		

Table 13 ... Event study results: Brexit Extension to 31.10.2019 – FTSE 100 with MSCI World

The coefficient of determination of the single factor market model is rather low at 29.39%. Overall, no significant abnormal returns can be detected of this event having a significant impact on the British economy neither in the short-, nor in the medium-term time window. The cumulative abnormal return is negative in the short-term at -0.51%, improves slightly in the medium-term, but stays negative at -0.33%. Additionally, it can be seen that during the event study period there was only a very low variety of positive and negative abnormal returns, meaning that the event did not impact the stocks of the underlying companies within the index much.

4.4.2 FTSE 350 Oil & Gas

DATE	FTSE 350 Oil & Gas	MSCI Oil & Gas	FTSE 350 Oil & Gas CHANGE	MSCI Oil & Gas CHANGE	FTSE 350 Oil & Gas LN	MSCI Oil & Gas LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
25.04.2019	9,273.48	421.83	-1.38	-0.57	-0.01%	-0.14%	0.10%	0.11		-0.33%	5.79%	Intercept	0.00010
24.04.2019	9,274.86	422.4	-188.73	-7.06	-2.01%	-1.66%	-0.49%	-0.55		-0.43%	5.69%	Slope	0.92491
23.04.2019	9,463.59	429.46	222.26	3.97	2.38%	0.93%	1.51%	1.68		0.06%	5.20%	Standard error	0.00900
22.04.2019	9,241.33	425.49	0.00	5.29	0.00%	1.25%	-1.17%	-1.30		-1.45%	3.69%	R-square	0.55108
18.04.2019	9,241.33	420.2	-63.40	-0.82	-0.68%	-0.19%	-0.51%	-0.57		-0.28%	2.52%		
17.04.2019	9,304.73	421.02	50.89	1.09	0.55%	0.26%	0.30%	0.33		0.23%	2.01%		
16.04.2019	9,253.84	419.93	-9.11	0.39	-0.10%	0.09%	-0.19%	-0.22		-0.07%	1.71%		
15.04.2019	9,262.95	419.54	-32.14	-1.89	-0.35%	-0.45%	0.06%	0.07		0.13%	1.52%		
12.04.2019	9,295.09	421.43	-19.93	0.67	-0.21%	0.16%	-0.37%	-0.41		0.07%	1.46%		
11.04.2019	9,315.02	420.76	-34.65	-0.26	-0.37%	-0.06%	-0.32%	-0.36		0.44%	1.09%		
10.04.2019	9,349.67	421.02	34.39	1.58	0.37%	0.38%	0.01%	0.01		0.76%	0.76%		
09.04.2019	9,315.28	419.44	-77.53	-3.92	-0.83%	-0.93%	0.02%	0.02		0.75%	0.75%		
08.04.2019	9,392.81	423.36	122.43	2.61	1.31%	0.62%	0.73%	0.81		0.73%	0.73%		

Table 14 ... Event study results: Brexit Extension to 31.10.2019 – FTSE 350 Oil & Gas with MSCI Oil & Gas

In this single factor market model, the coefficient of determination is moderately good at 55.11%. The significance testing of the abnormal returns does not show any significant days in neither of the three analyzed event

windows. Even though in the short-term, the cumulative abnormal return is slightly positive with 0.13%, in the medium-term it turns negative to -0.33%, which is the same negative response in terms of the numbers that could be detected in the FTSE 100 analysis for this event.

4.4.3 FTSE 350 Telecom

DATE	FTSE 350 Telecom	MSCI Telecom	FTSE 350 Telecom CHANGE	MSCI Telecom CHANGE	FTSE 350 Telecom LN	MSCI Telecom LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
25.04.2019	3,164.76	146.86	-4.88	-1.00	-0.15%	-0.68%	0.61%	0.47		2.28%	8.69%	Intercept	-0.00140
24.04.2019	3,169.64	147.86	-36.81	-1.91	-1.15%	-1.28%	0.17%	0.13		1.67%	8.08%	Slope	0.92131
23.04.2019	3,206.45	149.77	-18.81	-0.85	-0.58%	-0.57%	0.08%	0.06		1.50%	7.91%	Standard error	0.01307
22.04.2019	3,225.26	150.62	0.00	-0.02	0.00%	-0.01%	0.15%	0.12		1.42%	7.84%	R-square	0.20356
18.04.2019	3,225.26	150.64	-28.15	-0.03	-0.87%	-0.02%	-0.71%	-0.54		1.27%	7.68%		
17.04.2019	3,253.41	150.67	23.50	-1.25	0.72%	-0.83%	1.63%	1.24		1.98%	6.97%		
16.04.2019	3,229.91	151.92	2.86	1.00	0.09%	0.66%	-0.38%	-0.29		0.35%	5.35%		
15.04.2019	3,227.05	150.92	42.38	0.56	1.32%	0.37%	1.12%	0.86		0.73%	4.97%		
12.04.2019	3,184.67	150.36	51.85	0.60	1.64%	0.40%	1.41%	1.08		-0.39%	3.85%		
11.04.2019	3,132.82	149.76	-37.05	0.42	-1.18%	0.28%	-1.29%	-0.99		-1.80%	2.44%		
10.04.2019	3,169.87	149.34	-13.94	0.38	-0.44%	0.25%	-0.53%	-0.41		-0.51%	1.14%		
09.04.2019	3,183.81	148.96	-1.43	-0.36	-0.04%	-0.24%	0.32%	0.24		0.03%	0.61%		
08.04.2019	3,185.24	149.32	-17.67	-0.20	-0.55%	-0.13%	-0.29%	-0.22		-0.29%	0.29%		

Table 15 ... Event study results: Brexit Extension to 31.10.2019 – FTSE 350 Telecom with MSCI Telecom

The r-square value for this market model of this events effect on the telecom industry is relatively low with only 20.36%. Again, in the analysis, no significant abnormal returns can be found for this industry. Both the short-term and medium-term cumulative abnormal returns are positive with 0.73% and 2.28%. In comparison to the other indices however, it can be seen that the absolute cumulative abnormal return is higher, showing more variety of abnormal returns within the respective time periods.

4.4.4 FTSE 350 Pharma

DATE	FTSE 350 Pharma	MSCI Pharma	FTSE 350 Pharma CHANGE	MSCI Pharma CHANGE	FTSE 350 Pharma LN	MSCI Pharma LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
25.04.2019	14,680.52	187.55	36.06	1.41	0.25%	0.75%	-0.15%	-0.16		-2.23%	6.19%	Intercept	0.00055
24.04.2019	14,644.46	186.14	-83.35	-0.46	-0.57%	-0.25%	-0.51%	-0.54		-2.08%	6.04%	Slope	0.45053
23.04.2019	14,727.81	186.6	273.65	2.17	1.88%	1.17%	1.29%	1.37		-1.57%	5.53%	Standard error	0.00946
22.04.2019	14,454.16	184.43	0.00	0.01	0.00%	0.01%	-0.06%	-0.06		-2.86%	4.23%	R-square	0.12190
18.04.2019	14,454.16	184.42	-197.84	-1.94	-1.36%	-1.05%	-0.94%	-1.00		-2.81%	4.18%		
17.04.2019	14,652.00	186.36	-191.91	-4.15	-1.30%	-2.20%	-0.36%	-0.39		-1.86%	3.23%		
16.04.2019	14,843.91	190.51	41.95	-1.64	0.28%	-0.86%	0.61%	0.65		-1.50%	2.87%		
15.04.2019	14,801.96	192.15	7.45	0.01	0.05%	0.01%	-0.01%	-0.01		-2.11%	2.26%		
12.04.2019	14,794.51	192.14	-91.01	-1.43	-0.61%	-0.74%	-0.33%	-0.35		-2.11%	2.25%		
11.04.2019	14,885.52	193.57	-171.82	-1.67	-1.15%	-0.86%	-0.82%	-0.86		-1.77%	1.91%		
10.04.2019	15,057.34	195.24	-106.16	-0.02	-0.70%	-0.01%	-0.75%	-0.80		-0.96%	1.10%		
09.04.2019	15,163.50	195.26	-66.43	-0.95	-0.44%	-0.49%	-0.27%	-0.29		-0.20%	0.34%		
08.04.2019	15,229.93	196.21	29.73	0.30	0.20%	0.15%	0.07%	0.08		0.07%	0.07%		

Table 16 ... Event study results: Brexit Extension to 31.10.2019 – FTSE 350 Pharma with MSCI Pharma

The single factor market model of the pharma industry for this event, has had the lowest coefficient of determination of 12.19%. Like, all the other analyses for this event, no significant result can be detected. With regards, to the overall direction of the impact, it can be seen that the cumulative abnormal return is negative in the short-term with -2.11% and also negative in the medium-term with -2.23%.

Overall, there was not a single significant abnormal return with regards to the normal returns of the MSCI indices that could be detected for the Brexit extension announcement neither in the short- nor in the medium-term. Except for the telecom industry all other indices showed a slight negative cumulative abnormal return over the medium-term. However, it is worth mentioning that except for the oil and gas industry it can be argued that the calculated normal market returns may not be reliable, as the respective OLS only yielded considerably low r-square values. In comparison to the British industries, the British economy described by the FTSE 100 showed the smallest impact in terms of positive and negative abnormal returns with only very minor absolute cumulative abnormal returns.

4.5 BREXIT Extension to 31.01.2020

A second extension of the Brexit was granted on the 28th of October 2019, until the 31st of January 2020. The pre-event time window started on the 24th of October 2019, which is two days before the event has happened. The short-term time window was set to the 31st of October 2019 and the medium-term until the 11th of November 2019. The data range for this single factor market model included data from one year, which span from the 23rd of October 2018 until the 23rd of October 2019. The effects of this event on the British economy and the three important UK industries will be analyzed in the following subsections.

4.5.1 FTSE 100

DATE	FTSE 100	MSCI World	FTSE 100 CHANGE	MSCI World CHANGE	FTSE 100 LN	MSCI World LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
11.11.19	7,328.54	2,266.36	-30.84	-2.47	-0.42%	-0.11%	-0.35%	-0.56		-0.53%	5.06%	Intercept	-0.00005
08.11.19	7,359.38	2,268.83	-47.03	2.14	-0.64%	0.09%	-0.69%	-1.09		-0.18%	4.71%	Slope	0.58686
07.11.19	7,406.41	2,266.69	9.76	5.32	0.13%	0.23%	0.00%	0.00		0.51%	4.02%	Standard error	0.00633
06.11.19	7,396.65	2,261.37	8.57	2.11	0.12%	0.09%	0.07%	0.10		0.51%	4.02%	R-square	0.35093
05.11.19	7,388.08	2,259.26	18.39	-2.19	0.25%	-0.10%	0.31%	0.49		0.44%	3.95%		
04.11.19	7,369.69	2,261.45	67.27	9.38	0.92%	0.42%	0.68%	1.07		0.13%	3.64%		
01.11.19	7,302.42	2,252.07	54.04	18.54	0.74%	0.83%	0.26%	0.41		-0.55%	2.97%		
31.10.19	7,248.38	2,233.53	-82.40	-3.79	-1.13%	-0.17%	-1.03%	-1.62		-0.81%	2.70%		
30.10.19	7,330.78	2,237.32	24.52	4.87	0.34%	0.22%	0.21%	0.33		0.22%	1.68%		
29.10.19	7,306.26	2,232.45	-25.02	1.05	-0.34%	0.05%	-0.36%	-0.58		0.00%	1.47%		
28.10.19	7,331.28	2,231.40	6.81	8.65	0.09%	0.39%	-0.13%	-0.21		0.37%	1.10%		
25.10.19	7,324.47	2,222.75	-3.78	7.11	-0.05%	0.32%	-0.23%	-0.37		0.50%	0.97%		
24.10.19	7,328.25	2,215.64	67.51	7.36	0.93%	0.33%	0.73%	1.16		0.73%	0.73%		

Table 17 ... Event study results: Brexit Extension to 31.01.2020 – FTSE 100 with MSCI World

The coefficient of determination of this analysis is medium to weak at only 35.09%. In none of the days before the event or after the event in the short-term and medium-term time window a significant abnormal return can be detected. However, with regards to the overall direction of the impact it can be said that a negative response can be seen in the short-term with a negative cumulative abnormal return of -0.81% and in the medium-term with -0.53%.

4.5.2 FTSE 350 Oil & Gas

DATE	FTSE 350 Oil & Gas	MSCI Oil & Gas	FTSE 350 Oil & Gas CHANGE	MSCI Oil & Gas CHANGE	FTSE 350 Oil & Gas LN	MSCI Oil & Gas LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
11.11.2019	8,530.18	399.33	-32.54	-1.49	-0.38%	-0.37%	-0.06%	-0.07		-1.23%	9.22%	Intercept	-0.00009
08.11.2019	8,562.72	400.82	-40.64	-1.09	-0.47%	-0.27%	-0.24%	-0.27		-1.18%	9.16%	Slope	0.84636
07.11.2019	8,603.36	401.91	3.80	4.62	0.04%	1.16%	-0.93%	-1.06		-0.94%	8.93%	Standard error	0.00875
06.11.2019	8,599.56	397.29	6.96	-4.86	0.08%	-1.22%	1.12%	1.28		-0.02%	8.00%	R-square	0.52287
05.11.2019	8,592.60	402.15	81.44	2.53	0.95%	0.63%	0.43%	0.49		-1.14%	6.88%		
04.11.2019	8,511.16	399.62	198.34	9.21	2.36%	2.33%	0.39%	0.45		-1.56%	6.45%		
01.11.2019	8,312.82	390.41	120.38	7.27	1.46%	1.88%	-0.12%	-0.14		-1.96%	6.06%		
31.10.2019	8,192.44	383.14	-300.57	-4.43	-3.60%	-1.15%	-2.62%	-3.00	SIG	-1.83%	5.94%		
30.10.2019	8,493.01	387.57	30.44	-3.81	0.36%	-0.98%	1.20%	1.37		0.79%	3.32%		
29.10.2019	8,462.57	391.38	-104.74	-0.26	-1.23%	-0.07%	-1.17%	-1.33		-0.41%	2.12%		
28.10.2019	8,567.31	391.64	5.63	-1.21	0.07%	-0.31%	0.34%	0.38		0.76%	0.95%		
25.10.2019	8,561.68	392.85	28.03	2.01	0.33%	0.51%	-0.10%	-0.11		0.42%	0.62%		
24.10.2019	8,533.65	390.84	52.68	0.49	0.62%	0.13%	0.52%	0.60		0.52%	0.52%		

Table 18 ... Event study results: Brexit Extension to 31.01.2020 – FTSE 350 Oil & Gas with MSCI Oil & Gas

In this analysis of the single factor market model, the r-square value is mediocre at 52.29%. In the short-term one significant abnormal return can be detected on the third trading day after the event. On this significant day the abnormal return is -2.62%, which suggests that the event had a negative impact on the oil and gas industry of the United Kingdom as the worldwide oil and gas market shows a less negative return. Also, on the day directly after the

announcement, the British oil and gas index shows a negative return of -1.23% which however did not prove to be significant as the abnormal return was not high enough. Overall, also with regards to this index, it can be seen that the one significant abnormal return was negative, which alongside with a cumulative abnormal return of -1.83% in the short-term and -1.23% in the medium-term, suggests that the event had an overall negative impact.

4.5.3 FTSE 350 Telecom

DATE	FTSE 350 Telecom	MSCI Telecom	FTSE 350 Telecom CHANGE	MSCI Telecom CHANGE	FTSE 350 Telecom LN	MSCI Telecom LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
11.11.2019	3,614.85	164.37	-41.80	0.11	-1.15%	0.07%	-1.21%	-0.86		-1.44%	7.32%	Intercept	-0.00009
08.11.2019	3,656.65	164.26	-23.48	-0.69	-0.64%	-0.42%	-0.22%	-0.16		-0.24%	6.12%	Slope	0.97585
07.11.2019	3,680.13	164.95	21.63	0.57	0.59%	0.35%	0.26%	0.19		-0.02%	5.90%	Standard error	0.01408
06.11.2019	3,658.50	164.38	9.31	0.19	0.25%	0.12%	0.15%	0.11		-0.28%	5.64%	R-square	0.18482
05.11.2019	3,649.19	164.19	37.19	0.79	1.02%	0.48%	0.56%	0.40		-0.43%	5.48%		
04.11.2019	3,612.00	163.4	39.37	-0.27	1.10%	-0.17%	1.27%	0.90		-0.99%	4.92%		
01.11.2019	3,572.63	163.67	23.85	0.58	0.67%	0.36%	0.33%	0.24		-2.26%	3.66%		
31.10.2019	3,548.78	163.09	-4.04	0.69	-0.11%	0.42%	-0.52%	-0.37		-2.59%	3.32%		
30.10.2019	3,552.82	162.4	-12.83	0.67	-0.36%	0.41%	-0.75%	-0.54		-2.07%	2.80%		
29.10.2019	3,565.65	161.73	-42.39	-0.83	-1.18%	-0.51%	-0.67%	-0.48		-1.32%	2.05%		
28.10.2019	3,608.04	162.56	-8.28	1.31	-0.23%	0.81%	-1.01%	-0.72		-0.64%	1.38%		
25.10.2019	3,616.32	161.25	-9.97	-0.51	-0.28%	-0.32%	0.04%	0.03		0.37%	0.37%		
24.10.2019	3,626.29	161.76	-30.87	-1.94	-0.85%	-1.19%	0.32%	0.23		0.32%	0.32%		

Table 19 ... Event study results: Brexit Extension to 31.01.2020 – FTSE 350 Telecom with MSCI Telecom

The coefficient of determination for the telecom industry with regards to the respective estimation period is considerably weak with only 18.48%. In all the days analyzed with regards to the influence of the event, no significant abnormal return can be found in the respective index, which represents the telecom industry of the United Kingdom. However, it is worth noting that in the short-term, the cumulative abnormal return is negative with -2.59% and in the medium-term it is only negative with -1.44%. This suggests that the initial impact of the event resulted in a higher negative abnormal return and that the negative impact started to lay off in the medium-term.

4.5.4 FTSE 350 Pharma

DATE	FTSE 350 Pharma	MSCI Pharma	FTSE 350 Pharma CHANGE	MSCI Pharma CHANGE	FTSE 350 Pharma LN	MSCI Pharma LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
11.11.2019	17,072.09	201.69	-124.60	-0.13	-0.73%	-0.06%	-0.73%	-0.72		0.97%	11.59%	Intercept	0.00042
08.11.2019	17,196.69	201.82	44.37	1.89	0.26%	0.94%	-0.30%	-0.29		1.71%	10.85%	Slope	0.54317
07.11.2019	17,152.32	199.93	-66.18	-0.60	-0.39%	-0.30%	-0.26%	-0.26		2.00%	10.56%	Standard error	0.01026
06.11.2019	17,218.50	200.53	-57.64	0.41	-0.33%	0.20%	-0.49%	-0.48		2.27%	10.29%	R-square	0.15535
05.11.2019	17,276.14	200.12	-249.76	-1.84	-1.44%	-0.92%	-0.98%	-0.96		2.76%	9.81%		
04.11.2019	17,525.90	201.96	-9.31	-0.27	-0.05%	-0.13%	-0.02%	-0.02		3.74%	8.83%		
01.11.2019	17,535.21	202.23	-75.77	0.72	-0.43%	0.36%	-0.67%	-0.65		3.76%	8.80%		
31.10.2019	17,610.98	201.51	-152.95	0.12	-0.86%	0.06%	-0.94%	-0.92		4.43%	8.14%		
30.10.2019	17,763.93	201.39	424.70	1.96	2.42%	0.98%	1.85%	1.80		5.37%	7.20%		
29.10.2019	17,339.23	199.43	-48.73	1.40	-0.28%	0.70%	-0.71%	-0.69		3.52%	5.35%		
28.10.2019	17,387.96	198.03	236.59	1.48	1.37%	0.75%	0.92%	0.90		4.23%	4.64%		
25.10.2019	17,151.37	196.55	7.08	0.75	0.04%	0.38%	-0.21%	-0.20		3.31%	3.72%		
24.10.2019	17,144.29	195.8	626.32	0.59	3.72%	0.30%	3.52%	3.43	SIG	3.52%	3.52%		

Table 20 ... Event study results: Brexit Extension to 31.01.2020 – FTSE 350 Pharma with MSCI Pharma

In this single factor market model, the fit of the coefficient of determination is the lowest compared to the other indices for this event with only 15.53%. One significant abnormal return can be detected two days before the event happened, with an abnormal return of 3.52%. The days after the event, no significant abnormal return can be detected neither in the short-, nor medium-term timeframe. However, in comparison to the others, the event resulted in a positive cumulative abnormal return. In the short-term timeframe, the cumulative abnormal return was positive at 4.43%, but decreased to 0.97% in the medium-term timeframe. The British pharma industry index shows considerably high positive returns on the actual event day, two days after the event and two days before the event, which can also be seen as the absCAR is higher in comparison to the other indices.

In general, it could be seen that the individual analyses of this event resulted in two significant abnormal returns in the observed British oil and gas and the pharma industry, whereby one was in the pre-event window and the other one in the short-term post-event window. With regards to the absolute cumulative abnormal return the British pharma index showed the highest fluctuations in abnormal returns. Additionally, the FTSE 350 Pharma, which had the smallest r-square value, was the only index that indicating that the event had a positive impact, as all other indices experienced negative cumulative abnormal returns both in the short- and the medium-term.

4.6 Announcement Brexit will take place on 31.01.2020

The announcement that the Brexit will take place on 31st of January 2020, has been shared with the public on the 12th of December 2019. The pre-event time window started two days before the day the announcement has been shared with the public. The short-term time window ranged to the 17th of December 2019 and the medium-term time window until the 26th of December 2019. In the single factor market model, the time period included a one-year time period starting from the 7th of December 2018 until the 9th of December 2019. An analysis of the effect of the announcement on the four chosen indices can be found in detail.

4.6.1 FTSE 100

DATE	FTSE 100	MSCI World	FTSE 100 CHANGE	MSCI World CHANGE	FTSE 100 LN	MSCI World LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
26.12.19	7,632.24	2,360.21	0.00	8.99	0.00%	0.38%	-0.24%	-0.41		3.55%	4.91%	Intercept	-0.00006
25.12.19	7,632.24	2,351.22	0.00	-0.62	0.00%	-0.03%	0.02%	0.04		3.79%	4.66%	Slope	0.64996
24.12.19	7,632.24	2,351.84	8.65	1.09	0.11%	0.05%	0.09%	0.15		3.77%	4.64%	Standard error	0.00590
23.12.19	7,623.59	2,350.75	41.11	0.88	0.54%	0.04%	0.52%	0.89		3.68%	4.55%	R-square	0.38129
20.12.19	7,582.48	2,349.87	8.66	9.22	0.11%	0.39%	-0.14%	-0.23		3.16%	4.03%		
19.12.19	7,573.82	2,340.65	33.07	7.37	0.44%	0.32%	0.24%	0.40		3.29%	3.89%		
18.12.19	7,540.75	2,333.28	15.47	-3.34	0.21%	-0.14%	0.30%	0.52		3.05%	3.66%		
17.12.19	7,525.28	2,336.62	6.23	-0.83	0.08%	-0.04%	0.11%	0.19		2.75%	3.35%		
16.12.19	7,519.05	2,337.45	165.61	17.72	2.23%	0.76%	1.74%	2.95	SIG	2.64%	3.24%		
13.12.19	7,353.44	2,319.73	79.97	10.37	1.09%	0.45%	0.81%	1.37		0.90%	1.50%		
12.12.19	7,273.47	2,309.36	57.22	14.34	0.79%	0.62%	0.39%	0.66		0.09%	0.69%		
11.12.19	7,216.25	2,295.02	2.49	5.35	0.03%	0.23%	-0.11%	-0.19		-0.30%	0.30%		
10.12.19	7,213.76	2,289.67	-20.14	-2.91	-0.28%	-0.13%	-0.19%	-0.32		-0.19%	0.19%		

Table 21... Event study results: Announcement Brexit will take place on 31.01.2020 – FTSE 100 with MSCI World

With regards to the overall model fit, it can be said that with an r-square value of 38.13%, it can be classified as a low medium fit. In the short-term, two days after the event has happened a significant abnormal return of 1.74% can be detected. However, it is worth mentioning that the event has no significant influence on the abnormal return in the medium-term. The general direction of the abnormal return caused by the event was positive as the cumulative abnormal returns were both positive in the short- and medium term, with 2.75% and 3.55%.

4.6.2 FTSE 350 Oil & Gas

DATE	FTSE 350 Oil & Gas	MSCI Oil & Gas	FTSE 350 Oil & Gas CHANGE	MSCI Oil & Gas CHANGE	FTSE 350 Oil & Gas LN	MSCI Oil & Gas LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
27.12.2019	8,211.64	404.95	-41.90	-1.48	-0.51%	-0.36%	-0.18%	-0.22		1.41%	6.99%	Intercept	-0.00026
26.12.2019	8,253.54	406.43	0.00	0.21	0.00%	0.05%	-0.02%	-0.02		1.59%	6.81%	Slope	0.83107
24.12.2019	8,253.54	406.22	31.89	0.36	0.39%	0.09%	0.34%	0.42		1.61%	6.79%	Standard error	0.00817
23.12.2019	8,221.65	405.86	89.26	3.17	1.09%	0.78%	0.47%	0.57		1.27%	6.45%	R-square	0.50531
20.12.2019	8,132.39	402.69	-81.24	1.61	-0.99%	0.40%	-1.30%	-1.59		0.80%	5.99%		
19.12.2019	8,213.63	401.08	81.37	1.09	1.00%	0.27%	0.80%	0.97		2.10%	4.69%		
18.12.2019	8,132.26	399.99	40.46	1.28	0.50%	0.32%	0.26%	0.32		1.31%	3.89%		
17.12.2019	8,091.80	398.71	210.29	2.71	2.63%	0.68%	2.09%	2.56	SIG	1.05%	3.63%		
16.12.2019	7,881.51	396	85.06	4.42	1.09%	1.12%	0.18%	0.22		-1.05%	1.54%		
13.12.2019	7,796.45	391.58	-108.03	-2.42	-1.38%	-0.62%	-0.84%	-1.03		-1.22%	1.36%		
12.12.2019	7,904.48	394	83.26	4.79	1.06%	1.22%	0.07%	0.08		-0.39%	0.52%		
11.12.2019	7,821.22	389.21	-53.91	-1.69	-0.69%	-0.43%	-0.30%	-0.37		-0.45%	0.45%		
10.12.2019	7,875.13	390.9	-13.41	0.05	-0.17%	0.01%	-0.15%	-0.19		-0.15%	0.15%		

Table 22 ... Event study results: Announcement Brexit will take place on 31.01.2020 – FTSE 350 Oil & Gas with MSCI Oil & Gas

The coefficient of determination of this events' single factor market model is mediocre at 50.53%. Three days after the event got published a significant abnormal return can be detected in the short-term, which implicates that the event had a positive influence on the British oil and gas industry by showing an abnormal return of 2.09%. In the medium-term, no significant abnormal return can be detected. Both in the short-term and medium-term the cumulative abnormal return was slightly positive. However, it is worth noting that on the day directly after the event, the observed index had a negative abnormal return in comparison to the overall positive impact.

4.6.3 FTSE 350 Telecom

DATE	FTSE 350 Telecom	MSCI Telecom	FTSE 350 Telecom CHANGE	MSCI Telecom CHANGE	FTSE 350 Telecom LN	MSCI Telecom LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
27.12.2019	3,430.58	165.24	15.64	0.38	0.46%	0.23%	0.30%	0.23		4.27%	7.15%	Intercept	-0.00077
26.12.2019	3,414.94	164.86	0.00	0.35	0.00%	0.21%	-0.14%	-0.11		3.98%	6.86%	Slope	1.02859
24.12.2019	3,414.94	164.51	-0.28	-0.30	-0.01%	-0.18%	0.26%	0.20		4.12%	6.71%	Standard error	0.01299
23.12.2019	3,415.22	164.81	-6.02	-0.74	-0.18%	-0.45%	0.36%	0.28		3.86%	6.46%	R-square	0.18934
20.12.2019	3,421.24	165.55	-11.92	1.02	-0.35%	0.62%	-0.91%	-0.70		3.50%	6.10%		
19.12.2019	3,433.16	164.53	15.34	0.65	0.45%	0.40%	0.12%	0.09		4.41%	5.19%		
18.12.2019	3,417.82	163.88	27.44	-0.12	0.81%	-0.07%	0.96%	0.74		4.29%	5.07%		
17.12.2019	3,390.38	164	20.04	0.21	0.59%	0.13%	0.54%	0.41		3.33%	4.11%		
16.12.2019	3,370.34	163.79	46.17	1.19	1.38%	0.73%	0.71%	0.54		2.79%	3.58%		
13.12.2019	3,324.17	162.6	44.50	0.03	1.35%	0.02%	1.41%	1.08		2.08%	2.87%		
12.12.2019	3,279.67	162.57	16.52	0.15	0.50%	0.09%	0.49%	0.38		0.68%	1.46%		
11.12.2019	3,263.15	162.42	18.57	0.10	0.57%	0.06%	0.58%	0.45		0.19%	0.98%		
10.12.2019	3,244.58	162.32	-23.52	-0.40	-0.72%	-0.25%	-0.39%	-0.30		-0.39%	0.39%		

Table 23 ... Event study results: Announcement Brexit will take place on 31.01.2020 – FTSE 350 Telecom with MSCI Telecom

The coefficient of determination of this single factor market model of this event on the telecom industry is low at only 18.93%. Additionally, neither in

the short-, nor in the medium-term a significant abnormal return can be discovered. However, similar to the other observed indices the cumulative abnormal return is positive again with 3.33% in the short-term and 4.27% in the medium-term.

4.6.4 FTSE 350 Pharma

DATE	FTSE 350 Pharma	MSCI Pharma	FTSE 350 Pharma CHANGE	MSCI Pharma CHANGE	FTSE 350 Pharma LN	MSCI Pharma LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
27.12.2019	18,188.79	218.1	44.28	0.23	0.24%	0.11%	0.13%	0.13		3.31%	8.18%	Intercept	0.00049
26.12.2019	18,144.51	217.87	0.00	-0.05	0.00%	-0.02%	-0.03%	-0.03		3.18%	8.05%	Slope	0.60155
24.12.2019	18,144.51	217.92	-23.90	0.01	-0.13%	0.00%	-0.18%	-0.18		3.21%	8.02%	Standard error	0.01001
23.12.2019	18,168.41	217.91	-61.94	0.31	-0.34%	0.14%	-0.47%	-0.47		3.39%	7.84%	R-square	0.17297
20.12.2019	18,230.35	217.6	246.91	1.81	1.36%	0.84%	0.81%	0.81		3.87%	7.36%		
19.12.2019	17,983.44	215.79	243.82	1.36	1.37%	0.63%	0.94%	0.94		3.05%	6.55%		
18.12.2019	17,739.62	214.43	119.45	-0.48	0.68%	-0.22%	0.76%	0.76		2.12%	5.61%		
17.12.2019	17,620.17	214.91	129.66	0.22	0.74%	0.10%	0.63%	0.63		1.36%	4.85%		
16.12.2019	17,490.51	214.69	399.76	2.02	2.31%	0.95%	1.69%	1.69		0.73%	4.22%		
13.12.2019	17,090.75	212.67	-146.70	0.22	-0.85%	0.10%	-0.97%	-0.96		-0.97%	2.53%		
12.12.2019	17,237.45	212.45	-79.49	0.96	-0.46%	0.45%	-0.78%	-0.78		0.00%	1.56%		
11.12.2019	17,316.94	211.49	80.37	0.20	0.47%	0.09%	0.36%	0.36		0.78%	0.78%		
10.12.2019	17,236.57	211.29	129.06	0.99	0.75%	0.47%	0.42%	0.42		0.42%	0.42%		

Table 24 ... Event study results: Announcement Brexit will take place on 31.01.2020 – FTSE 350 Pharma with MSCI Pharma

The corresponding r-square value for this event is low again at 17.30%. No significant abnormal return is detected, not in the short- and medium-term. For both timeframes the cumulative abnormal return is positive similar to the other indices. Thereby, in the short run it is 1.36% and, in the medium run, it is even 3.31%. In comparison to the other indices the British pharma industry showed the highest absolute cumulative abnormal return suggesting that it had the most abnormal returns in terms of their amount.

In general, it could be seen that the event analysis of the public announcement that the Brexit will take place on the 31st of January 2020, suggests that both in the short and in the medium run a positive impact can be measured with regards to the cumulative abnormal return. Thereby, the FTSE 100 and FTSE 350 Oil & Gas showed both a positive significant abnormal return in the short-term, whereby there was not a single significant abnormal return in the medium-term. Overall, with regards to the absolute cumulative abnormal return it could be seen that the variety of abnormal returns was mediocre across all indices.

4.7 Brexit Day

On the 31st of January 2020, the United Kingdom left the European Union with a transition period. The per-event time window started two days before the event happened. The short-term timeframe ranged until the 5th of February 2020 and the medium-term timeframe until the 14th of February 2020. The estimation period for the single factor market model was one year and included the data between the 28th of January 2019 till the 28th of January 2020.

4.7.1 FTSE 100

DATE	FTSE 100	MSCI World	FTSE 100 CHANGE	MSCI World CHANGE	FTSE 100 LN	MSCI World LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
14.02.2020	7,409.13	2,431.37	-42.90	1.48	-0.58%	0.06%	-0.61%	-1.16		-2.74%	5.13%	Intercept	-0.00017
13.02.2020	7,452.03	2,429.89	-82.34	-5.06	-1.10%	-0.21%	-0.91%	-1.74		-2.13%	4.52%	Slope	0.81888
12.02.2020	7,534.37	2,434.95	34.93	13.69	0.46%	0.56%	0.02%	0.04		-1.22%	3.61%	Standard error	0.00525
11.02.2020	7,499.44	2,421.26	52.56	8.16	0.70%	0.34%	0.44%	0.85		-1.24%	3.59%	R-square	0.47154
10.02.2020	7,446.88	2,413.10	-19.82	8.35	-0.27%	0.35%	-0.53%	-1.01		-1.69%	3.14%		
07.02.2020	7,466.70	2,404.75	-38.09	-11.73	-0.51%	-0.49%	-0.09%	-0.18		-1.15%	2.61%		
06.02.2020	7,504.79	2,416.48	22.31	11.52	0.30%	0.48%	-0.08%	-0.15		-1.06%	2.52%		
05.02.2020	7,482.48	2,404.96	42.66	21.66	0.57%	0.90%	-0.15%	-0.29		-0.98%	2.44%		
04.02.2020	7,439.82	2,383.30	113.51	31.85	1.54%	1.35%	0.45%	0.86		-0.83%	2.29%		
03.02.2020	7,326.31	2,351.45	40.30	9.04	0.55%	0.39%	0.25%	0.48		-1.29%	1.84%		
31.01.2020	7,286.01	2,342.41	-95.95	-29.60	-1.31%	-1.26%	-0.26%	-0.50		-1.54%	1.58%		
30.01.2020	7,381.96	2,372.01	-101.61	-1.51	-1.37%	-0.06%	-1.30%	-2.47	SIG	-1.28%	1.32%		
29.01.2020	7,483.57	2,373.52	2.88	1.00	0.04%	0.04%	0.02%	0.04		0.02%	0.02%		

Table 25 ... Event study results: Brexit Day – FTSE 100 with MSCI World

The coefficient of determination of this single factor market model is only medium at 47.15%. One day before the event happened, in the pre-event time window, a significant influence of the event on the British economy can be detected. The abnormal return on this day is -1.30%, which implicates that the event had a negative impact on the British economy already prior to the actual event. This might be explained as the market may already be fearing any declines in asset prices due to the upcoming event triggering sell-events, which will push the prices down. Also, on the actual Brexit day, a negative return of the FTSE 100 can be seen, however it did not proof to be significant as the general market measured by the MSCI World also had a similar negative day. It might be argued that the actual Brexit event being an event with such global importance, actually influencing both the MSCI World and the FTSE 100 on the same day. In the short-term and medium-term timeframe after the event, no

significant influence on the abnormal return can be detected. However, it can be seen that the Brexit event resulted in a negative impact on the British economy as the cumulative abnormal returns are both negative in the short- and medium-term, with -0.98% and -2.74%.

4.7.2 FTSE 350 Oil & Gas

DATE	FTSE 350 Oil & Gas	MSCI Oil & Gas	FTSE 350 Oil & Gas CHANGE	MSCI Oil & Gas CHANGE	FTSE 350 Oil & Gas LN	MSCI Oil & Gas LN	AR	t-stat	sig? >1.96	CAR	absCAR	Single factor market model	
14.02.2020	7,240.45	375.9	-60.76	-1.54	-0.84%	-0.41%	-0.43%	-0.59		-6.37%	11.12%	Intercept	-0.00021
13.02.2020	7,301.21	377.44	-248.62	-2.07	-3.35%	-0.55%	-2.82%	-3.84	SIG	-5.93%	10.69%	Slope	0.93485
12.02.2020	7,549.83	379.51	93.65	3.99	1.25%	1.06%	0.28%	0.38		-3.12%	7.87%	Standard error	0.00734
11.02.2020	7,456.18	375.52	70.37	3.49	0.95%	0.93%	0.10%	0.13		-3.40%	7.59%	R-square	0.57066
10.02.2020	7,385.81	372.03	-83.35	-2.14	-1.12%	-0.57%	-0.57%	-0.77		-3.49%	7.49%		
07.02.2020	7,469.16	374.17	-63.31	-2.87	-0.84%	-0.76%	-0.11%	-0.15		-2.93%	6.93%		
06.02.2020	7,532.47	377.04	-90.58	-2.71	-1.20%	-0.72%	-0.51%	-0.69		-2.82%	6.82%		
05.02.2020	7,623.05	379.75	131.77	10.00	1.74%	2.67%	-0.73%	-1.00		-2.31%	6.31%		
04.02.2020	7,491.28	369.75	187.65	2.85	2.54%	0.77%	1.83%	2.50	SIG	-1.58%	5.58%		
03.02.2020	7,303.63	366.9	-102.71	-4.26	-1.40%	-1.15%	-0.30%	-0.40		-3.42%	3.75%		
31.01.2020	7,406.34	371.16	-166.42	-9.52	-2.22%	-2.53%	0.17%	0.23		-3.12%	3.45%		
30.01.2020	7,572.76	380.68	-266.47	-1.81	-3.46%	-0.47%	-2.99%	-4.08	SIG	-3.29%	3.29%		
29.01.2020	7,839.23	382.49	-77.28	-2.75	-0.98%	-0.72%	-0.29%	-0.40		-0.29%	0.29%		

Table 26 ... Event study results: Brexit Day – FTSE 350 Oil & Gas with MSCI Oil & Gas

In this single factor market model, the r-square value was mediocre at 57.07%. In all three timeframes, the pre-event, short-term and medium-term timeframe one significant abnormal return can be detected. On the day before the event happened, a negative abnormal return can be seen with -2.99%, which implicates that the event also had a negative influence on the British oil and gas industry. Also, two days after the Brexit day, a significant positive abnormal return of 1.83% can be detected, which implicates a positive influence on the oil and gas industry on this day. Furthermore, also in the medium-term a significant abnormal return can be detected nine trading days after the event got released. However, the abnormal return is negative again with -2.82%, which gives the implication that the event had a negative impact on the British oil and gas industry in the medium-term. Additionally, the cumulative abnormal returns are negative both in the short- and medium-term with -2.31% and -6.37%.

4.7.3 FTSE 350 Telecom

DATE	FTSE 350 Telecom	MSCI Telecom	FTSE 350 Telecom CHANGE	MSCI Telecom CHANGE	FTSE 350 Telecom LN	MSCI Telecom LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
14.02.2020	3,405.62	167.64	-38.64	0.07	-1.13%	0.04%	-1.17%	-0.93		-5.28%	15.72%	Intercept	-0.00001
13.02.2020	3,444.26	167.57	-18.66	-0.46	-0.54%	-0.27%	-0.26%	-0.21		-4.11%	14.55%	Slope	1.01902
12.02.2020	3,462.92	168.03	51.60	1.53	1.50%	0.91%	0.57%	0.45		-3.85%	14.29%	Standard error	0.01259
11.02.2020	3,411.32	166.5	7.19	0.23	0.21%	0.14%	0.07%	0.06		-4.42%	13.72%	R-square	0.17041
10.02.2020	3,404.13	166.27	-68.14	-0.15	-1.98%	-0.09%	-1.89%	-1.50		-4.49%	13.65%		
07.02.2020	3,472.27	166.42	44.39	1.27	1.29%	0.77%	0.51%	0.40		-2.60%	11.76%		
06.02.2020	3,427.88	165.15	91.27	2.09	2.70%	1.27%	1.40%	1.11		-3.11%	11.26%		
05.02.2020	3,336.61	163.06	-94.38	1.02	-2.79%	0.63%	-3.43%	-2.72	SIG	-4.51%	9.86%		
04.02.2020	3,430.99	162.04	9.97	0.91	0.29%	0.56%	-0.28%	-0.22		-1.08%	6.43%		
03.02.2020	3,421.02	161.13	32.13	-1.48	0.94%	-0.91%	1.88%	1.49		-0.80%	6.15%		
31.01.2020	3,388.89	162.61	-23.99	-0.27	-0.71%	-0.17%	-0.54%	-0.43		-2.68%	4.27%		
30.01.2020	3,412.88	162.88	-115.62	-0.63	-3.33%	-0.39%	-2.94%	-2.33	SIG	-2.14%	3.73%		
29.01.2020	3,528.50	163.51	-22.66	-2.32	-0.64%	-1.41%	0.80%	0.63		0.80%	0.80%		

Table 27 ... Event study results: Brexit Day – FTSE 350 Telecom with MSCI Telecom

In this single factor market model, the coefficient of determination is considerably low at 17.04%. Both in the pre-event and the short-term post-event window, one day with a significant abnormal return can be detected. One day before the event got released a significant abnormal return of -2.94% can be detected. This implies that on this day, the event had a negative impact on the British telecom industry. In the short-term timeframe three trading days after the event a significant abnormal return of -3.43% is discovered, which again implies a negative impact on this day. Similarly, in both the short-term and medium-term, the cumulative abnormal returns are negative at -4.51% and -5.28%. Thereby, it is worth noting that the British telecom industry shows the highest absolute cumulative abnormal returns for this event among the observed indices.

4.7.4 FTSE 350 Pharma

DATE	FTSE 350 Pharma	MSCI Pharma	FTSE 350 Pharma CHANGE	MSCI Pharma CHANGE	FTSE 350 Pharma LN	MSCI Pharma LN	AR	t-stat	sig? >1.96	CAR	absCAR	Sinlge factor market model	
14.02.2020	16,951.14	221.13	-447.89	-0.70	-2.61%	-0.32%	-2.43%	-2.56	SIG	-7.72%	9.40%	Intercept	0.00064
13.02.2020	17,399.03	221.83	-57.71	-1.44	-0.33%	-0.65%	0.09%	0.10		-5.29%	6.96%	slope	0.75577
12.02.2020	17,456.74	223.27	-125.11	-0.80	-0.71%	-0.36%	-0.51%	-0.53		-5.39%	6.87%	Standard error	0.00952
11.02.2020	17,581.85	224.07	-85.70	0.67	-0.49%	0.30%	-0.78%	-0.82		-4.88%	6.36%	r-square	0.21784
10.02.2020	17,667.55	223.4	105.13	0.76	0.60%	0.34%	0.28%	0.29		-4.10%	5.58%		
07.02.2020	17,562.42	222.64	-36.31	-0.65	-0.21%	-0.29%	-0.05%	-0.05		-4.38%	5.31%		
06.02.2020	17,598.73	223.29	-100.57	1.14	-0.57%	0.51%	-1.02%	-1.07		-4.33%	5.26%		
05.02.2020	17,699.30	222.15	-177.64	3.12	-1.00%	1.41%	-2.13%	-2.24	SIG	-3.31%	4.24%		
04.02.2020	17,876.94	219.03	166.52	2.90	0.94%	1.33%	-0.14%	-0.14		-1.17%	2.11%		
03.02.2020	17,710.42	216.13	106.48	1.59	0.60%	0.74%	-0.02%	-0.02		-1.04%	1.97%		
31.01.2020	17,603.94	214.54	-151.35	-1.82	-0.86%	-0.84%	-0.28%	-0.30		-1.02%	1.95%		
30.01.2020	17,755.29	216.36	-322.07	-1.89	-1.80%	-0.87%	-1.20%	-1.27		-0.74%	1.67%		
29.01.2020	18,077.36	218.25	147.33	0.83	0.82%	0.38%	0.47%	0.49		0.47%	0.47%		

Table 28 ... Event study results: Brexit Day – FTSE 350 Pharma with MSCI Pharma

The single factor market model has a low coefficient of determination of 21.78%. With regards to the short-term, only three days after the event has happened a significant abnormal return can be detected. It is negative at -2.13%, which implies that on this day, the event had a negative influence on the pharma industry of the UK. Also, in the medium-term, the event showed a significant negative impact on the pharma industry with an abnormal return of -2.43% on the last day of the medium-term. Similar to the others, the cumulative abnormal return is negative with -3.31% in the short-term and -7.72% in the medium-term. Even though the British pharma index has a negative return of -1.8% on the day before the Brexit, in comparison to the other analyzed indices it does not result in a significant abnormal return.

Overall, it is worth to mention that all four observed indices had at least one significant abnormal return. Thereby, only the British pharma industry index had no significant result in the pre-event window suggesting that the expectation of the Brexit taking place caused the underlying assets to be negatively impacted. It could be detected that across all observed indices all showed a negative cumulative abnormal return not only in the short-term, but also in the medium-term. Additionally, also significant results could be found in the short-term post-event window across all industries and for two out of the three indices even significant results in the medium-term post-event window. The only index which did not show any significant abnormal return after the event happened was the FTSE 100.

4.8 Analysis Summary

In this section of the analysis the holistic overview of the most important insights gained through the individual event analyses that have been presented in more detail above, will be discussed. In Table 29, an overview of the individual significance tests can be seen for every event, every index and every event time window. The number of colored boxes within a table cell represents the amount of significant abnormal returns within the certain event

window. This visual representation allows to quickly get an overview of which events had how many significant abnormal returns in which specific event timeframe.

EVENT STUDY SIGNIFICANCE OVERVIEW	British economy	British industries		
	FTSE 100	Oil & Gas	Telecom	Pharma
UK Referendum on Brexit 23.06.2016	■	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■
Article 50 triggered 29.03.2017				
Withdrawal Agreement published 14.11.2018	■ ■		■ ■ ■ ■ ■ ■ ■ ■	
Brexit Extension to 31.10.2019 10.04.2019				
Brexit Extension to 31.01.2020 28.10.2019		■		■
Announcement of Brexit on 31.01.2020 12.12.2019	■	■		
Brexit Day 31.01.2020	■	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■

Legend:

- Medium-term
- Short-term
- Event
- Pre-event

Table 29 ... Event study significance overview

Overall, it can be seen that certain events showed significant abnormal returns across all analyzed indices and some events did not result in any significant abnormal returns. Thereby, the UK referendum on the Brexit and the actual Brexit day showed significant abnormal returns across all indices in at least one analyzed timeframe. The Brexit related event when the Article 50 was triggered and the first Brexit extension to the 31st of October 2019 did not show any significant result at all. The published withdrawal agreement only resulted in significant abnormal returns for the FTSE 100 and the FTSE 350 Telecom, whereby the latter one even showed the highest number of significant events. Overall, it could be seen that there was not a single significant result on the day the event took place.

In order to take a closer look at the significant results, Table 30 shows an overview of the abnormal returns with the respective t-stat values. Thereby it is worth mentioning again that a t-stat value, of 1.96 was the reference value in order to be significant. The higher the t-stat, the higher the significance value, meaning that the chance of the observed event happening randomly is lower than 5%. Across all events, it can be seen that the FTSE 100 always showed the smallest significant amount of abnormal returns for the respective

event when compared to the individual industries. Additionally, it can be detected that overall, the respective t-stat values are considerably higher than 1.96, which means that the level of random error is even further below 5%.

EVENT STUDY SIG AR OVERVIEW (incl. t-stat)	British economy	British industries		
	FTSE 100	Oil & Gas	Telecom	Pharma
UK Referendum on Brexit 23.06.2016	2.22% (2.97)	3.01% (2.48) 2.82% (2.32) 3.66% (3.01)	2.50% (2.49) -5.11% (-5.10) 4.94% (4.93)	2.00% (1.96) 5.70% (5.59)
Article 50 triggered 29.03.2017				
Withdrawal Agreement published 14.11.2018	-1.24% (-2.02) 1.27% (2.07)		4.82% (4.17) 2.48% (2.15) -3.59% (-3.11) 2.41% (2.08) 7.04% (6.09)	
Brexit Extension to 31.10.2019 10.04.2019				
Brexit Extension to 31.01.2020 28.10.2019		-2.62% (-3.00)		3.52% (3.43)
Announcement of Brexit on 31.01.2020 12.12.2019	1.74% (2.95)	2.09% (2.56)		
Brexit Day 31.01.2020	-1.30% (-2.47)	-2.82% (-3.84) 1.83% (2.50) -2.99% (-4.08)	-3.43% (-2.72) -2.94% (-2.33)	-2.43% (-2.56) -2.13% (-2.24)



Table 30 ... Event study significant abnormal return overview including t-stat values

Evaluating the results of the individual event study tests with regards to their statistical significance, the respective hypotheses can be answered. Therefore, in Appendix 4 the full overview of the individual tested hypotheses can be retrieved. In this hypotheses-overview every single hypothesis for every event and index is listed with the respective indication if the null hypothesis has to be retained or if the alternative hypothesis can be accepted. As already mentioned in the event study timeframe section of the methodology part, the pre-event window is part of the short-term period and hence the significant pre-event window results are included in the short-term period.

With regards to the overall effect direction a certain event showed on the British economy and its industries, Table 31 gives a comprehensive overview of the individual cumulative abnormal returns. Thereby, it can be seen that the actual Brexit day event resulted in negative cumulative abnormal returns across all indices and timeframes. There was no other event that resulted in only negative cumulative abnormal returns. The UK referendum on the Brexit and the announcement that the actual Brexit will take place on the 31st of

January 2020 resulted both in only positive cumulative abnormal returns, suggesting that these events had a positive impact in the short- and medium-term. The other events showed mixed results with regards to the direction of the impact. When looking for highly diverging results within this table it can be seen that the pharma industry showed very high cumulative abnormal returns on the UK referendum day and that the telecom industry showed particularly high numbers when the withdrawal agreement was published. Further investigation would be needed to find out more about the instances of these high numbers.

EVENT STUDY CAR OVERVIEW	British economy		British industries					
	FTSE 100		Oil & Gas		Telecom		Pharma	
	Short-term	Medium-term	Short-term	Medium-term	Short-term	Medium-term	Short-term	Medium-term
UK Referendum on Brexit 23.06.2016	3.27%	6.52%	6.48%	13.5%	0.77%	2.36%	8.07%	13.61%
Article 50 triggered 29.03.2017	-1.02%	0.03%	-1.59%	-0.38%	-1.26%	-1.64%	-0.85%	-2.87%
Withdrawal Agreement published 14.11.2018	0.1%	-0.23%	0.61%	1.26%	6.9%	14.29%	0.16%	-0.92%
Brexit Extension to 31.10.2019 10.04.2019	-0.51%	-0.33%	0.13%	-0.33%	0.73%	2.28%	-2.11%	-2.23%
Brexit Extension to 31.01.2020 28.10.2019	-0.81%	-0.53%	-1.83%	-1.23%	-2.59%	-1.44%	4.43%	0.97%
Announcement of Brexit on 31.01.2020 12.12.2019	2.75%	3.55%	1.05%	1.41%	3.33%	4.27%	1.36%	3.31%
Brexit Day 31.01.2020	-0.98%	-2.74%	-2.31%	-6.37%	-4.51%	-5.28%	-3.31%	-7.72%

Table 31 ... Event study cumulative abnormal return overview

Lastly, Table 32 shows the absolute cumulative abnormal returns across all events, indices and observed timeframes. Taking a closer look at this table, allows to get a general feeling of the severity an event showed in terms of abnormal returns varying within the observed timeframe. On the first sight, it can be seen that the British industries always showed higher absolute cumulative abnormal returns with regards to the short- and medium-term with only one minor exception where the short-term absolute cumulative abnormal return was 0.16% lower than the one of the FTSE 100. As already mentioned, this might be explained by the FTSE 100 representing the British economy being more diversified than the individual industries. Additionally, it can be seen that the UK referendum on the Brexit showed the highest absolute cumulative abnormal returns across all other events. Only the published withdrawal agreement showed a higher medium-term result for the British telecom industry. Additionally, it can be seen that the actual Brexit day also

resulted in considerably high absolute cumulative abnormal returns across all indices.

EVENT STUDY absCAR OVERVIEW	British economy		British industries					
	FTSE 100		Oil & Gas		Telecom		Pharma	
	Short-term	Medium-term	Short-term	Medium-term	Short-term	Medium-term	Short-term	Medium-term
UK Referendum on Brexit 23.06.2016	4.03%	10.93%	8.4%	19.21%	14.69%	21.19%	8.68%	15.01%
Article 50 triggered 29.03.2017	2.01%	4.14%	2.31%	5.85%	2.03%	4.65%	1.85%	5.19%
Withdrawal Agreement published 14.11.2018	1.47%	6.09%	4.1%	9.61%	11.63%	26.21%	4.14%	9.54%
Brexit Extension to 31.10.2019 10.04.2019	0.51%	2.2%	1.52%	5.79%	4.97%	8.69%	2.26%	6.19%
Brexit Extension to 31.01.2020 28.10.2019	2.7%	5.06%	5.94%	9.22%	3.32%	7.32%	8.14%	11.59%
Announcement of Brexit on 31.01.2020 12.12.2019	3.35%	4.91%	3.63%	6.99%	4.11%	7.15%	4.85%	8.18%
Brexit Day 31.01.2020	2.44%	5.13%	6.31%	11.12%	9.86%	15.72%	4.24%	9.40%

Table 32 ... Event study absolute cumulative abnormal return overview

5 Conclusion

Within this last part of the thesis, the individual results of the various analyses will be brought together in order to give a more comprehensive meaning on the presented research question. Therefore, the key takeaways from the individual event studies will be highlighted along with a summary of the applied limitations giving ideas for future research.

Overall, when answering the research question on what short- and medium-term impacts the Brexit news announcements and events had on the British economy and its industries, it can be seen that there have been significant results that suggest there have been statistically significant impacts. Thereby, from the published list of key events provided by the UK House of Commons Library, seven major events and news announcements have been selected to be investigated with event studies in order to attain insights about the abnormal return caused by the observed event in the short- and the medium-term. Thereby, the results of the event study showed that the UK referendum on the Brexit and the actual Brexit day both showed statistically significant results in the short-term for all observed indices representing the British economy and its currently three biggest industries. Also, in the medium-term these two events showed significant abnormal returns in two out of the three

observed industries. The recognized impact could have also been seen, when analyzing the cumulative abnormal returns and the absolute cumulative abnormal returns as for these two events the numbers are notably higher in comparison to the other events. However, it is worth noting that the event of the UK referendum resulted in pure positive short- and medium-term results, whereby the actual Brexit day event only resulted in negative cumulative abnormal returns in the respective timeframes.

With regards to the other events, only the announcement that the Article 50 has been triggered and the first Brexit extension to the 31st of October 2019 showed no significant results neither in the short- nor the medium-term. The other three events resulted at least once in a significant event impact for two of the four observed indices. Thereby it is worth mentioning that the British telecom industry had one significant day of abnormal returns in the short-term in addition to four significant ones in the medium-term for the published withdrawal agreement and also had the highest cumulative and absolute cumulative abnormal returns that have been observed in the medium-term. With regards to these three events, it could be seen that the FTSE 100 showed only significant results for two of the events, but the industries showed at least one significant event within all the three events. In general, it could be seen that the British economy represented by the FTSE 100 seemed to be less impacted in comparison to the British industries.

Nevertheless, it is important to keep in mind that this thesis has limitations with regards to the research methodology as simplifications and assumptions had to be done in order to fit the scope of this thesis and being able to perform the event studies to generate conclusion from them. This includes that other events might have happened during the observed periods or other internal and external factors could have had an influence on individual underlying companies and subsequently on the indices. Additionally, possible overlaps could be present as some companies within the British indices can also be part

of the MSCI indices, which could have an impact on the observed abnormal returns. Lastly, also possible significant moves within the intraday data could increase the knowledge about the significance of the observed events with regards to different timeframes. These limitations are subject to be further investigated and could increase the knowledge about building upon the analysis and the significant results that could be found with regards to the short- and medium-term implications of the Brexit on the British economy and its industries.

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Appendices

Appendix 1: Article 50

CONSOLIDATED VERSION OF THE TREATY ON EUROPEAN UNION

TITLE VI FINAL PROVISIONS

Article 50

1. Any Member State may decide to withdraw from the Union in accordance with its own constitutional requirements.
2. A Member State which decides to withdraw shall notify the European Council of its intention. In the light of the guidelines provided by the European Council, the Union shall negotiate and conclude an agreement with that State, setting out the arrangements for its withdrawal, taking account of the framework for its future relationship with the Union. That agreement shall be negotiated in accordance with Article 218(3) of the Treaty on the Functioning of the European Union. It shall be concluded on behalf of the Union by the Council, acting by a qualified majority, after obtaining the consent of the European Parliament.
3. The Treaties shall cease to apply to the State in question from the date of entry into force of the withdrawal agreement or, failing that, two years after the notification referred to in paragraph 2, unless the European Council, in agreement with the Member State concerned, unanimously decides to extend this period.
4. For the purposes of paragraphs 2 and 3, the member of the European Council or of the Council representing the withdrawing Member State shall not participate in the discussions of the European Council or Council or in decisions concerning it.

A qualified majority shall be defined in accordance with Article 238(3)(b) of the Treaty on the Functioning of the European Union.

5. If a State which has withdrawn from the Union asks to rejoin, its request shall be subject to the procedure referred to in Article 49.

Appendix 2: Hypotheses Overview

Hypotheses Overview			
UK Referendum on Brexit - 23.06.2016	British economy	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British economy.
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British economy.
		Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British economy.
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British economy.
	Oil and gas industry	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British oil and gas industry.
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British oil and gas industry.
		Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British oil and gas industry.
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British oil and gas industry.
	Telecom industry	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British telecom industry.
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British telecom industry.
		Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British telecom industry.
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British telecom industry.
Pharma industry	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British pharma industry.	
		H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British pharma industry.	
	Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British pharma industry.	
		H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British pharma industry.	

Hypotheses Overview			
Article 50 triggered - 29.03.2017	British economy	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British economy. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British economy.
		Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British economy. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British economy.
	Oil and gas industry	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British oil and gas industry. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British oil and gas industry.
		Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British oil and gas industry. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British oil and gas industry.
	Telecom industry	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British telecom industry. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British telecom industry.
		Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British telecom industry. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British telecom industry.
	Pharma industry	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British pharma industry. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British pharma industry.
		Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British pharma industry. H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British pharma industry.

Hypotheses Overview			
Withdrawal Agreement published - 14.11.2018	British economy	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British economy.
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British economy.
		Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British economy.
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British economy.
	Oil and gas industry	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British oil and gas industry.
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British oil and gas industry.
		Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British oil and gas industry.
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British oil and gas industry.
	Telecom industry	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British telecom industry.
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British telecom industry.
		Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British telecom industry.
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British telecom industry.
Pharma industry	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British pharma industry.	
		H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British pharma industry.	
	Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British pharma industry.	
		H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British pharma industry.	

Hypotheses Overview			
Brexit Extension to 31.10.2019 - 10.04.2019	British economy	Short-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant short-term impact on the British economy. H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant short-term impact on the British economy.
		Medium-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British economy.
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British economy.
		Oil and gas industry	Short-term
	Medium-term		H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British oil and gas industry.
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British oil and gas industry.
	Telecom industry		Short-term
		Medium-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British telecom industry.
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British telecom industry.
		Pharma industry	Short-term
	Medium-term		H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British pharma industry.
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British pharma industry.

Hypotheses Overview			
Brexit Extension to 31.01.2020 - 28.10.2019	British economy	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British economy. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British economy.
		Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British economy. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British economy.
	Oil and gas industry	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British oil and gas industry. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British oil and gas industry.
		Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British oil and gas industry. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British oil and gas industry.
	Telecom industry	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British telecom industry. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British telecom industry.
		Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British telecom industry. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British telecom industry.
	Pharma industry	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British pharma industry. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British pharma industry.
		Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British pharma industry. H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British pharma industry.

Hypotheses Overview			
Announcement of Brexit on 31.01.2020 - 12.12.2019	British economy	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British economy. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British economy.
		Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British economy. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British economy.
	Oil and gas industry	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British oil and gas industry. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British oil and gas industry.
		Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British oil and gas industry. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British oil and gas industry.
	Telecom industry	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British telecom industry. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British telecom industry.
		Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British telecom industry. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British telecom industry.
	Pharma industry	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British pharma industry. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British pharma industry.
		Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British pharma industry. H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British pharma industry.

Hypotheses Overview			
Brexit Day - 31.01.2020	British economy	Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British economy. H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British economy.
		Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British economy. H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British economy.
		Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British oil and gas industry. H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British oil and gas industry.
		Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British oil and gas industry. H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British oil and gas industry.
	Telecom industry	Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British telecom industry. H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British telecom industry.
		Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British telecom industry. H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British telecom industry.
		Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British pharma industry. H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British pharma industry.
		Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British pharma industry. H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British pharma industry.

Appendix 3: Key Events

UK House of Commons Library list of Brexit key events

Date	Event description
17.12.15	The European Union Referendum Act receives Royal Assent, providing for a referendum on the UK's future membership of the EU.
22.02.16	The Prime Minister announces the EU referendum date – 23 June 2016.
23.06.16	UK holds referendum on its membership of the EU, with the majority of voters choosing to leave the EU (51.9% of the vote versus 48.1% voting to remain).
24.06.16	Prime Minister David Cameron announces his intention to resign.
13.07.16	Theresa May becomes the new UK Prime Minister.
02.10.16	In her Party Conference speech, Theresa May announces a 'Great Repeal Bill' and confirms Article 50 will be triggered before the end of March 2017.
03.11.16	High Court gives its judgment in the Gina Miller case, finding in favour of the claimants. The Government announces it will appeal against the decision.
17.01.17	Prime Minister gives her Lancaster House speech, setting out the Government's 'Plan for Britain' and the priorities that the UK will use to negotiate Brexit.
24.01.17	Supreme Court rejects the Government's appeal of the Gina Miller case.
16.01.17	Government publishes European Union (Notification of Withdrawal) Bill.
02.02.17	Government publishes its Brexit White Paper, formally setting out its strategy for the UK to leave the EU.
16.03.17	European Union (Notification of Withdrawal) Act received Royal Assent.
29.03.17	Prime Minister triggers Article 50 of the Treaty on European Union.
30.03.17	Government publishes the Great Repeal Bill White Paper.
18.04.17	Prime Minister calls a General Election – to be held on 8 June 2017.
08.06.17	General Election results in a hung Parliament, with the Conservatives winning the most seats and Theresa May forming a government.
19.06.17	First round of UK-EU exit negotiations begin.
21.06.17	State Opening of Parliament – Queen's Speech includes a 'Great Repeal Bill'.
13.07.17	Government introduces the European Union (Withdrawal) Bill, commonly referred to as the 'Great Repeal Bill'.
12.09.17	EU Withdrawal Bill passes Second Reading in the House of Commons.
22.09.17	Prime Minister delivers her key Brexit speech in Florence, setting out the UK's position on moving the Brexit talks forward.
19.10.17	European Council meeting to assess progress on the first phase of Brexit negotiations.
13.11.17	Government outlines plans for a Withdrawal Agreement and Implementation Bill.
08.12.17	UK and EU publish a Joint Report on progress made during Phase 1 of negotiations. This concludes Phase 1 of negotiations and both sides move to Phase 2.
11.12.17	Prime Minister updates Parliament on Brexit negotiations.
18.01.18	The European Union (Withdrawal) Bill has its First Reading in the House of Lords.
02.03.18	Prime Minister gives a speech at Mansion House on the UK's future economic partnership with the European Union.
14.03.18	The European Parliament endorses a resolution laying out a possible association agreement framework for future EU-UK relations after Brexit.
19.03.18	The amended Draft Withdrawal Agreement is published.
16.05.18	The European Union (Withdrawal) Bill finishes its House of Lords stages and goes into parliamentary ping pong.
26.06.18	The European Union (Withdrawal) Bill receives Royal Assent and becomes an Act of Parliament: the European Union (Withdrawal) Act.
06.07.18	The Cabinet meets at Chequers to agree a collective position for the future Brexit negotiations with the EU.
09.07.18	David Davis resigns as Secretary of State for Exiting the European Union and is replaced by Dominic Raab.
24.07.18	Government publishes White Paper on future UK-EU relations.
23.08.18	The government publishes the first collection of technical notices providing guidance on how to prepare for a no-deal Brexit.

19.09.18	EU leaders hold an informal summit in Salzburg.
29.10.18	Budget Day, the last Budget before the UK leaves the EU.
14.11.18	The Withdrawal Agreement is agreed and published.
15.11.18	Brexit Secretary resigns as Secretary of State for Exiting the European Union and is replaced by Stephen Barclay the following day.
25.11.18	At a special meeting of the European Council, EU27 leaders endorse the Withdrawal Agreement and approve the political declaration on future EU-UK relations.
04.12.18	MPs begin the first of five days of Brexit debates, leading up to the 'Meaningful Vote' on 11 December.
05.12.18	Government publishes the Attorney General's legal advice to Cabinet on the Protocol to the Withdrawal Agreement on Ireland and Northern Ireland.
10.12.18	CJEU issues its judgment on the Wightman case, finding unilateral revocation of Article 50 TEU is a sovereign right for any Member State to pursue. Later, the Prime Minister pulls tomorrow's planned final vote on her Brexit deal.
11.12.18	Theresa May wins a vote of confidence in her leadership of the Conservative Party.
08.01.19	Report Stage and Third Reading of Finance (No. 3) Bill: in a defeat for the Prime Minister, MPs approve an amendment limiting the Government's financial powers in the event of a no-deal Brexit.
09.01.19	As five days of Brexit debates begin – leading to a 'Meaningful Vote' on 15 January – an amendment to the business motion is passed, giving the Prime Minister only three days to present a 'Plan B' Brexit plan if she loses meaningful vote. The deadline was originally 21 days.
15.01.19	The Prime Minister loses the 'Meaningful Vote' and the Leader of the Opposition tables a motion of no confidence in the Government.
16.01.19	The Prime Minister wins a vote of confidence in the Government.
21.01.19	Theresa May presents the government's 'Plan B' Brexit deal.
29.01.19	MPs debate the Prime Minister's 'Plan B' deal, which is then approved following two amendments.
14.02.19	The government's Brexit plan suffers a defeat in the House of Commons.
26.02.19	The Prime Minister promises MPs a vote on ruling out a no-deal Brexit or delaying Brexit if she loses the second 'meaningful vote' next month.
12.03.19	The Prime Minister loses the 'Meaningful Vote 2'.
13.03.19	In a defeat for the Prime Minister, MPs vote to rule out a 'no-deal Brexit'.
14.03.19	MPs approve the amended government's motion, instructing the government to seek permission from the EU to extend Article 50.
20.03.19	The Prime Minister writes to European Council President Donald Tusk, asking to extend Article 50 until 30 June 2019.
21.03.19	Following a meeting of the European Council, EU27 leaders agree to grant an extension comprising two possible dates: 22 May 2019, should the Withdrawal Agreement gain approval from MPs next week; or 12 April 2019, should the Withdrawal Agreement not be approved by the House of Commons.
27.03.19	The Commons debates and votes on eight indicative votes, in an attempt to find a Brexit plan that wins the support of the majority of MPs. All options are defeated.
29.03.19	The Prime Minister loses the 'Meaningful Vote 3'.
01.04.19	In the second day of indicative votes, all four of the selected options are defeated.
02.04.19	The Prime Minister announces she will seek a further extension to the Article 50 process and offers to sit down with the Leader of the Opposition, to finalise a deal that will win the support of MPs.
05.04.19	Theresa May formally writes to Donald Tusk, requesting a further extension to the Article 50 process to the end of June 2019.
10.04.19	The European Council meets. The UK and EU27 agree to extend Article 50 until 31 October 2019.
21.05.19	The Prime Minister unveils her new Brexit deal.
23.05.19	The UK votes in the European Parliament elections.
23.07.19	Boris Johnson wins the Conservative Party leadership race.
24.07.19	Boris Johnson formally takes over as Prime Minister.

25.07.19	Prime Minister Johnson makes a statement in the House of Commons and commits to the October date for Brexit and – while hoping for a renegotiation of the Withdrawal Agreement – refuses to rule out the possibility of a 'no-deal' Brexit.
04.09.19	With the Commons passing Hilary Benn's European Union (Withdrawal) (No. 6) Bill, the Prime Minister moves a motion to hold an early General Election. The motion is defeated.
09.09.19	The Benn bill becomes law: the European Union (Withdrawal) (No. 2) Act 2019 and parliament prorogues.
24.09.19	The Supreme Court passes a unanimous judgment that the decision to prorogue Parliament was unlawful. The Speaker of the House of Commons announces that the House will sit again the next day.
03.10.19	The Prime Minister delivers a statement to the Commons, outlining the Government's proposals for a new Brexit deal.
08.10.19	The Government publishes the No-Deal Readiness Report, detailing the UK's preparedness ahead of Brexit on 31 October.
19.10.19	A rare Saturday sitting of Parliament. The Prime Minister presents his new Brexit deal, but is defeated when the Letwin amendment is passed. The PM later writes to Donald Tusk, in accordance with the Benn Act, to ask for a Brexit extension.
21.10.19	The European Union (Withdrawal Agreement) Bill is introduced to Parliament.
22.10.19	The EU (Withdrawal Agreement) Bill passes its second reading, but the programme motion setting out the timetable is defeated. The PM pauses the legislation.
28.10.19	EU Ambassadors agree to a Brexit extension to 31 January 2020. The Prime Minister confirms the UK's agreement to this extension.
30.10.19	The Government introduces the Early Parliamentary General Election Bill, which sets the date for a General Election to take place on 12 December. The Bill completes its Commons stages.
12.12.19	General Election results in Conservative Party majority. The Prime Minister pledges "to get Brexit done" by 31 January 2020.
19.12.19	Government publishes the European Union (Withdrawal Agreement) Bill.
31.01.20	Brexit Day.

Appendix 4: Tested Hypotheses Overview

Tested Hypotheses Overview				Retained / Accepted
UK Referendum on Brexit - 23.06.2016	British economy	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British economy.	
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British economy.	X
		Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British economy.	X
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British economy.	
	Oil and gas industry	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British oil and gas industry.	
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British oil and gas industry.	X
		Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British oil and gas industry.	
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British oil and gas industry.	X
	Telecom industry	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British telecom industry.	
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British telecom industry.	X
		Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British telecom industry.	X
			H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British telecom industry.	
Pharma industry	Short-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant short-term impact on the British pharma industry.		
		H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant short-term impact on the British pharma industry.	X	
	Medium-term	H0: The UK Referendum on the Brexit on the 23rd of June 2016 had no significant medium-term impact on the British pharma industry.		
		H1: The UK Referendum on the Brexit on the 23rd of June 2016 had a significant medium-term impact on the British pharma industry.	X	

Tested Hypotheses Overview				Retained / Accepted
Article 50 triggered - 29.03.2017	British economy	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British economy.	X
			H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British economy.	
		Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British economy.	X
			H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British economy.	
	Oil and gas industry	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British oil and gas industry.	X
			H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British oil and gas industry.	
		Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British oil and gas industry.	X
			H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British oil and gas industry.	
	Telecom industry	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British telecom industry.	X
			H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British telecom industry.	
		Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British telecom industry.	X
			H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British telecom industry.	
Pharma industry	Short-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant short-term impact on the British pharma industry.	X	
		H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant short-term impact on the British pharma industry.		
	Medium-term	H0: The triggering event of the Article 50 on the 29th of March 2017 had no significant medium-term impact on the British pharma industry.	X	
		H1: The triggering event of the Article 50 on the 29th of March 2017 had a significant medium-term impact on the British pharma industry.		

Tested Hypotheses Overview				Retained / Accepted
Withdrawal Agreement published - 14.11.2018	British economy	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British economy.	X
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British economy.	
		Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British economy.	
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British economy.	X
	Oil and gas industry	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British oil and gas industry.	X
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British oil and gas industry.	
		Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British oil and gas industry.	X
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British oil and gas industry.	
	Telecom industry	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British telecom industry.	
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British telecom industry.	X
		Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British telecom industry.	
			H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British telecom industry.	X
Pharma industry	Short-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant short-term impact on the British pharma industry.	X	
		H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant short-term impact on the British pharma industry.		
	Medium-term	H0: The publication of the agreed withdrawal agreement on the 14th of November 2018 had no significant medium-term impact on the British pharma industry.	X	
		H1: The publication of the agreed withdrawal agreement on the 14th of November 2018 had a significant medium-term impact on the British pharma industry.		

Tested Hypotheses Overview			Retained / Accepted	
Brexit Extension to 31.10.2019 - 10.04.2019	British economy	Short-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant short-term impact on the British economy.	X
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant short-term impact on the British economy.	
		Medium-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British economy.	X
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British economy.	
	Oil and gas industry	Short-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant short-term impact on the British oil and gas industry.	X
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant short-term impact on the British oil and gas industry.	
		Medium-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British oil and gas industry.	X
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British oil and gas industry.	
	Telecom industry	Short-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant short-term impact on the British telecom industry.	X
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant short-term impact on the British telecom industry.	
		Medium-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British telecom industry.	X
			H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British telecom industry.	
Pharma industry	Short-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant short-term impact on the British pharma industry.	X	
		H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant short-term impact on the British pharma industry.		
	Medium-term	H0: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had no significant medium-term impact on the British pharma industry.	X	
		H1: The extension of the Brexit until the 31st of October 2019 announced on the 10th of April 2019 had a significant medium-term impact on the British pharma industry.		

Tested Hypotheses Overview				Retained / Accepted
Brexit Extension to 31.01.2020 - 28.10.2019	British economy	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British economy.	X
			H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British economy.	
		Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British economy.	X
			H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British economy.	
	Oil and gas industry	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British oil and gas industry.	
			H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British oil and gas industry.	X
		Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British oil and gas industry.	X
			H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British oil and gas industry.	
	Telecom industry	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British telecom industry.	X
			H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British telecom industry.	
		Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British telecom industry.	X
			H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British telecom industry.	
Pharma industry	Short-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant short-term impact on the British pharma industry.		
		H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant short-term impact on the British pharma industry.	X	
	Medium-term	H0: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had no significant medium-term impact on the British pharma industry.	X	
		H1: The extension of the Brexit until the 31st of January 2020 announced on the 28th of October 2019 had a significant medium-term impact on the British pharma industry.		

Tested Hypotheses Overview			Retained / Accepted	
Announcement of Brexit on 31.01.2020 - 12.12.2019	British economy	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British economy.	
			H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British economy.	X
		Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British economy.	X
			H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British economy.	
	Oil and gas industry	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British oil and gas industry.	
			H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British oil and gas industry.	X
		Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British oil and gas industry.	X
			H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British oil and gas industry.	
	Telecom industry	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British telecom industry.	X
			H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British telecom industry.	
		Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British telecom industry.	X
			H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British telecom industry.	
Pharma industry	Short-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant short-term impact on the British pharma industry.	X	
		H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant short-term impact on the British pharma industry.		
	Medium-term	H0: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had no significant medium-term impact on the British pharma industry.	X	
		H1: The announcement on the 12th of December 2019 publishing that the Brexit will take place on the 31st of January 2020 had a significant medium-term impact on the British pharma industry.		

Tested Hypotheses Overview			Retained / Accepted	
Brexit Day - 31.01.2020	British economy	Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British economy.	
			H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British economy.	X
		Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British economy.	X
			H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British economy.	
	Oil and gas industry	Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British oil and gas industry.	
			H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British oil and gas industry.	X
		Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British oil and gas industry.	
			H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British oil and gas industry.	X
	Telecom industry	Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British telecom industry.	
			H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British telecom industry.	X
		Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British telecom industry.	X
			H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British telecom industry.	
Pharma industry	Short-term	H0: The Brexit day on the 31st of January 2020 had no significant short-term impact on the British pharma industry.		
		H1: The Brexit day on the 31st of January 2020 had a significant short-term impact on the British pharma industry.	X	
	Medium-term	H0: The Brexit day on the 31st of January 2020 had no significant medium-term impact on the British pharma industry.		
		H1: The Brexit day on the 31st of January 2020 had a significant medium-term impact on the British pharma industry.	X	