Norwegian University
of Life Sciences

Master's Thesis 2020   30 ECTS
The School of Economics and Business

Major political events and announcement and the effect on the exchange rate: The case of Brexit.

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Masters in Economics: Specialisation in Financial and Commodity Market Analysis

Acknowledgement

I would like to thank Prof. Roberto Garcia for his supervision throughout the writing of this project. Your understanding in macroeconomics is immense and has helped me understand how other factors in the economy affect exchange rates.

I would like to thank Ida being there for me and for helping me keep up my motivation in conducting this project, including helping me understand what I was writing by making me explain things to you, most importantly - ensuring it made sense. Dad and Janet - I would also like to thank you for your support throughout all the years of my education. Lastly, thank you to my friends for checking in on me and supporting me through the final few weeks of this project.

Thank you!

Abstract

Brexit has been a major "spur of the moment" decision, especially considering that David Cameron solely decided to have a referendum just to be re-elected as Prime Minister in the United Kingdom. Never in his dreams would he have thought that over half of all eligible voters would vote in favour of leaving the European Union. Hence, the objective of this thesis is to analyse whether certain events during the Brexit timeline have an impact on the exchange rate, and furthermore - to what extent. Using the market model of event analysis, there were some central dates that are noteworthy to highlight such as, the referendum result day and Article 50 being triggered. However, it cannot be concluded that the exchange rate was not affected by other dates, time before and after a big event also have a great impact, which this analysis will examine further. Much of the research might illustrate that the specific event-timing does not necessarily affect the exchange rate, it however also shows how important it is to analyse a greater scope of data points.

Table of Contents

List of tables

List of figures

Chapter 1: Introduction

1.1 Statement of problem

Since the result of the referendum on the 23rd June 2016, there has been a lot of uncertainty about what will happen to certain aspects of the United Kingdom's (UK) economy when they leave the European Union (EU) come 31st December 2020. Will the EU and UK be able to reach a hard or soft agreement, and will the border between Ireland and Northern Ireland change, or will other member states of the UK decide to hold their own referendums' about re-joining the EU? The whole impact of Brexit is not known and will not be understood until it has been successfully implanted throughout society in years to come. Other member states of the EU may be tracking the UK's withdrawal, and could potentially use it as precedent in the future for their own case.

The result of the referendum has caused both sides (for and against EU) to show passion for politics and decisions made across the different countries in the UK, such engagement in political matters has not been seen for many years. Protests have taken place outside the Parliament and Downing Street on numerous occasions, as well as "Yes" and "No" voters clashing at these movements (Forsdike 2019). There have also been several celebrities and high profile citizens from either side of the vote expressing their concerns for the future of the country, along with downplaying and debating the opposition.

Much is and will be impacted by Brexit, and this thesis will analyse the impact Brexit has had on the Pound Sterling (GBP). The strength of the pound reflects the strength of the UK's macroeconomy including expectations and uncertainties. It affects trade between businesses, trade between other countries, foreign investment, traders of the currency, and it affects citizens and residents when they would like to travel abroad or take part in any transactions that involves a foreign currency. Everyone is in some way affected by a change in the value of the pound.

This paper will concentrate on, and answer questions related to how and if the pound has decreased whenever there is a major announcement or event in the Brexit timeline. Table 1 depicts the major dates and what specifically happened on that day since the referendum result. Since Brexit is the first of its kind, there is not much research conducted on how these types of political events have - and will affect the exchange rate. The information about how Brexit will affect the foreign exchange market internally comes from different government announcements concerning the impact on certain sectors. With each new announcement or general election, the currency gets affected, which also brings more uncertainty. Thus, knowing how the markets react to these announcements may help Brexit negotiators convey better policies to help secure the future of the UK.

Is the pound more sensitive to general elections? Have announcements about Brexit continued to affect the exchange rates? Measuring the impact Brexit has on the overall market could be large and complex. For example, are the general elections within the Brexit timeline similar to normal elections that usually take place every 5 years, or are they special cases and in return, could possibly the market react more vigorously?

1.2 Objectives

The main objective of this study is to explore how the Foreign Exchange Market is affected by major political announcements and decisions. Specifically, the paper will assess how the pound has been affect by Brexit against a basket of currencies in relation to the pound. Within this basket, currencies include the Euro, Canadian Dollar, Norwegian Krone, Swiss Franc and the Chinese Yuan. To be able to do this analysis and create comparisons between different currencies, creating a "currency basket" was the preferred approach. It was a great deal for the UK to eventually make the decision to "leave", and in retrospect this has had a large impact on the home-economy. Leaving decisions of this nature in the hands of the public may not be in the country's best interest. Although it must be noted that for democracy to continue to work, the wishes of the public also need to be considered. The data used in the analysis is from 2015 until February 2020, where the UK officially left the EU.

1.3 Organisation of the Thesis

This thesis aims to show how and if the exchange rate is affected by political announcements and events in relation to Brexit. Chapter 2 introduces the background of how the UK joined EU, and its historical struggles throughout the 47 years of membership. In section 2.2, I then give a brief overview of the events in the Brexit timeline listed in table 1 to get an outline of how troublesome leaving the EU has been for the UK. The last section in Chapter 2 focuses on the relationship between the British Pound to a basket of currencies that is already in circulation.

Chapter 3 elaborates further on economic theory related to currencies and large socio-economic events. More to the point it explores the relationship between exchange rates and the Purchasing Power Parity (PPP), Interest Rate-Parity, and how expectations, risk and uncertainty can affect the exchange rate. In the last section of Chapter 3, I review relevant studies that cover discussions related to how exchange rates may be affected by political events and policies. Another aspect that is explained within this section is how and if stocks and commodities are also being affected through political choices.

In Chapter 4, I outline the model and method used to analyse the data. The first section of Chapter 4 highlights the type of data used, and how a basket of currencies was created. The second part then explains how this basket of currencies will be exploited and analysed in conjunction with the data from an already established basket mentioned in chapter 2. Chapter 5 presents the results from the analysis conducted through explaining the hypothesis used to test the Abnormal Returns, along with highlighting the difference between the actual returns and estimated returns from the specific event in question.

Finally, Chapter 6 will summarise the work produced throughout the thesis, along with concluding if the analysis produced has given clear evidence on how the exchange rate has been affected by political decisions. I also conclude that further research may be needed to expand this analysis further, such as a qualitative analysis of the events or in-depth interviews of participants affected by large currency deviations.

Chapter 2: Background

During this section of the paper, I will be explaining the background on the brief but detailed history of Brexit, such as certain aspects of UK/EU politics before, during and after the referendum. I will also be explaining the relationship between the GBP and a basket of currencies.

2.1 History British politics relating to the EU

The UK joined the EU in 1973, 16 years after the formation of the European Union, but even then, there was scepticism about joining (Hutton 2020). Two years after joining, a referendum was held on whether the UK should continue in the EU. The result ended up with 67% voting to stay. Tensions were again high some 9 years after the referendum, where the then Prime Minister (PM) tried to reduce payments the British made from 20% of the EEC (European Economic Community) budget to 12% (Pruitt 2019). However, it was not just the UK's scepticism about joining the EU, French President Charles de Gaulle originally vetoed their application inciting the UK would always be closer to the US than the EU (Pruitt 2019).

Even though most problems with the EU came through the Conservative Party in power, Labour governments and PM's have also had their fair share of problems. During the late 90's and Tony Blairs' reign as PM (who was/is pro-EU), the UK still had problems. In 1997, the EU banned any beef coming from the UK due to "mad cows" disease, which lasted until 1999 where the ban was lifted with strong restrictions. Again, France continued to react negatively and kept its own ban on beef imports from Britain for many more years (Pruitt 2019). Just a year later, the ban in place on British chocolate was also lifted after a 27 year battle, although a few countries were still unhappy with how this chocolate was described as "chocolate" and not "household milk chocolate" (due to more milk being used) (Pruitt 2019).

In 2007, tensions grew once again between the UK and the EU after member nations had completed negotiating the debatable Lisbon Treaty. New Labour PM Gordon Brown then

controversially missed the televised ceremony where the other 26 member nations signed the treaty. He was heavily criticised for missing this important moment in the EU, although he later signed the document (Pruitt 2019). After 2008, having just come through the financial crisis where the UK and other leading EU members bailed out failing countries, the British public became uneasy, believing they was being put 2nd, behind others in the EU. In 2010 a Conservative-Liberal Democrat coalition won, and David Cameron became the youngest UK PM in 200 years. Within a year, controversy strikes again when Cameron became the first PM to veto an EU treaty (Pruitt 2019). In a speech given a few years later, Cameron stated that he would re-negotiate the UK's membership in the EU if he was to regain power and conservatives win with a majority vote.

During the lead up to the next general election, support began to rise rapidly for the anti-EU party, UKIP (United Kingdom Independence Party) led by Nigel Farage with many citing the reasons being economic unrest in the eurozone and the "migrant crisis" (Pruitt 2019). Cameron wanted to protect the financial sector during these times of unrest and once negotiations had been concluded, he announced the referendum, thinking the UK would still be in the EU after the result. As many of us know, his judgment was mistaken, and criticisms flooded in that he did not campaign enough in comparison to the "Leave" campaigners. Hence, the result within the UK did not come as a big of a surprise in comparison to other country's expectations.

2.2 Politics of Brexit since 2016

In table 1 below, I have conducted what I believe to be key dates in the Brexit timeline and the type of event that happened. Later I will further narrow this down and analyse how/if the exchange rates have been impacted.

Date of announcement/election	Type of announcement/election
24th June 2016	Referendum result and David Cameron Resigns and PM
13th July 2016	Theresa May Elected as new Pm
29th March 2017	Article 50 triggered
8th April 2017	General Election announced
May 2017	European commission publishes negotiating directives
8th June 2017	Snap General Election results
8th December 2017	Irish Backstop agreed
19th March 2018	UK and EU first draft (no agreement)
6th July 2018	Chequers agreement finalised
21st September 2018	EU rejects the Chequers agreement
14th November 2018	Brexit withdrawal agreement published
25th November 2018	27 EU states endorse agreement
15th January 2019	Meaningful vote on agreement held, government defeated
12th March 2019	2nd meaningful vote lost
14th March 2019	Article 50 motion to extend passes.
21st March 2019	Brexit delay announced
10th April 2019	Extended for a second time
24th May 2019	Theresa May announces she will resign
24th July 2019	Boris Johnson announced as PM
4th September 2019	Benn Bill passed
28th October 2019	3rd extension agreed
12/13th December 2019	General election
23rd January 2020	UK's EU withdrawal bill becomes law
29th January 2020	EU parliament approve Brexit divorce deal
31st January 2020	UK officially leaves the EU (23:00 GMT).

Table 1. List of major announcements and dates of Brexit (Sandford 2020).

As previously stated, the 23rd June 2016 was a pivotal day for not just the UK, but also the EU. This is the first time any country within the EU has gone as far as to hold a referendum

on wanting the leave the EU. Therefore, on results day - the day after, it came as a huge shock for most of Europe, as well as 48% of the voting population in the UK. Theresa May being elected as the new prime minister of the UK was momentous day in the history of British politics. First, being only the second woman as PM, but also, she was not elected in by the public vote, instead she was voted in by members of her Conservative Party. As part of May's leadership manifesto, she promised that no matter what happens, she will trigger Article 50 on the 29th March 2017, officially kicking off the UK's withdrawal from the EU (Sandford 2020).

However, as the time between being elected as PM, Theresa May did not fully believe she had the support of fellow party members or the public. Thus, she announced on the 8th April 2017, there will be a general election to prove she has the support of her party, along with members of the public. In the coming weeks and months, the European commission outlined and publishes their negotiating directives for future terms between the UK and EU. Two months after the announcement of the general election, on 8th June 2017, the results were in. May did not win the full support of the public as there was a hung parliament and had to find the support of another party in order to be the forerunner in EU negotiations (Sandford 2020). This party was the "Democratic Unionist Part" (DUP) in Northern Ireland.

Later in the year, the UK and EU came to an agreement that Northern Ireland would continue to be in the EU, until an agreement could be agreed upon on how the border between Ireland and N. Ireland would be. This in general would technically have kept the UK in the EU and was one of the main talking points for many of the general public, and politicians, especially the DUP. As one can imagine, it caused a large amount of tension in the general public, especially those who wanted out of the EU completely (Campbell 2020). Therefore, this became a constant talking point between representatives over the coming years.

March 2018 negotiations began to intensify as both parties were due to give their first drafts towards the future agreements. The UK handed over their draft, and after some

deliberating, the EU unanimously voted against. Come September and the British Parliament has agreed on how they want the relationship in the future, the "Chequers Agreement". Once again, the EU rejected this notion meaning the UK had to go back and sit down in parliament and discuss where to go next. Just two months later, after some back and forth between the EU and the UK, both parties come to an agreement with all 27 EU member states endorsing the agreement (Sandford 2020).

However, after the new year, in January 2019 a meaningful vote in the UK parliament to try and convince other parties that this was the best deal possible was held. The government lost causing the Brexit negotiators to go back to the drawing board to discuss the next moves. Two months of further on and more negotiations, the second meaningful vote was put forward in parliament, government again defeated. Theresa May then had to request an extension for Article 50 which was announced on 21st March 2019. Originally the government asked for a 30-day extension as they only had to fine tune some agreements with the EU. This again did not go to plan and May had to ask the EU for a 2nd extension on the 10th April. This was accepted and Article 50 was once again extended (Laas og Jaansalu 2019).

21st May proved another pivotal date in the Brexit timeline and British politics. Theresa May announces that she would step down as PM after trying to negotiate the best deal possible, only for it to be voted down at every chance (Woodcock 2019). Two months later, on the 24th July 2019, and after vigorous rounds of voting inside the Conservative Party, Boris Johnson was named as the new Prime minister. The third PM since June 2016. Almost immediately, Johnson requested the EU to be rid of the Irish Backstop in the agreement, the EU rejected. There are many in the UK who support Johnson, having been Mayor of London for many years, but since his rise to PM, he is most noted for wanted the UK to leave the EU no matter what, with or without a deal on the 31st October 2019. This was made clear when Johnson suspended parliament for 5 weeks from August 28th, leaving little to no time to attempt to renegotiate a deal (Kuenssberg 2019).

However, in September 2019, there were several votes in parliament over the course of a week. Most notably, the Benn Bill got passed, meaning Boris Johnson now had to ask for an extension of Brexit if he and his negotiators are unable to agree on a deal with the EU before 31st October 2019. No deal was able to be agreed, and come 28th October, Mr Johnson agreed to another extension for the UK, until the 31st January 2020. During this drama surround the PM, he decided to invoke another general election in December 2019, to again show that he has the will of the public to get a deal done, and the backing of his party. This time, the general election proved to be pivotal for the conservatives where they ended up winning with a majority vote, and therefore could go ahead with their plan for getting the UK out of the EU (Eardley 2019).

The final three dates in the table belong to the withdrawal agreement becoming law in the UK, the EU accepting the "divorce agreement", and finally the day in which the UK officially left the EU at 23:00 GMT. The UK was meant to leave the EU in 2018, and then have a two year transition period to adapt to new regulations as well as creating new trade agreements between the two parties, we can see this divorce of a country and the rest of the EU was much harder on than expected (Ellyatt 2020). However, it must also be noted that this is the first of its kind and is therefore now a precedent for future members who would like to follow the UK. On the other hand, many EU members may well be looking at how complicated this process has been and time consuming, that they may now not want to follow suit.

2.3 Relationship of GBP to a basket of currencies

Later in the analysis section of this paper, I will be analysing how GBP has reacted to a basket of currencies. The basket of currencies will not include the US Dollar or the Japanese Yen as there is too much white noise surrounding the US election and Donald Trump, along with the US and China trade war which will affect the Dollar. The negative interest rates and monetary policy in Japans situation makes it an unsuitable currency for this comparison basket. The analysis of the current relationship between the pound and a basket of currencies will be in chapter 4, but first I will look at how the pound has been reacting to a different basket of currencies where the it includes currencies belonging to the UK's most important

trading partners. Figure 1 below shows the exchange rate for GBP against a basket of currencies since 2015.

Figure 1. Historical exchange rate for the Pound against a basket of currencies (Pound Sterling Live, 2020)

Before the referendum took place in 2016, the GBP had been slowly decreasing over time. On 5th August 2015, it peaked at 118.31, and again later in the same year at 117.25, and from then onwards, it began to decrease at a rapid pace. In February 2016 (20th), then Prime minister David Cameron announced the date for the referendum, and immediately the price decrease by nearly 1 point. For the next few months the exchange rate fluctuated between 105.00 and 108.00 until the day of the referendum. From the 23rd June 2016 and the day after (24th), the rate plummeted by over 6 points, from 107.98 to 101.59 (nearly 6%) in one day due to the shock referendum result, and it continued to decrease over the coming weeks and months. On October 10th, 2016, the price had hit the lowest rate in many years (91.05). Since then, the pound has been fluctuating between 90.00 and 99.00 and not being able to recover to the rate it had before the referendum (Live 2020).

The relationship between the pound and this basket of currencies has never been as low as it is now. When first created in October 1983, it started at 142.62 and immediate began to decrease except in July 1985 where it reached its peak rate of 143.50. Between 1986 and the middle of 1992, the pound varied between 132.35 and 125.10 before decreasing by over 20.00 during the next few months. For the next four years (until September 1996), the pound

remains relatively stable before having a dramatic increase, which lasted roughly eleven years. The end of this stable increase happened to be due to the financial crisis in 2008, although the pound began to decrease substantially from July 2007. In just over one year, the pound decreased from 131.00 to 95.27, a 27.27% reduction. Apart from in early 2014 until late 2015, the pound has not been able to recover to the rate before the financial crisis (Live 2020).

From looking at the history of this relationship between the pound and the basket of currencies, it can be said that apart from major financial or political events, the pound remains stable. However, when these events do happen, such as the financial crisis, or the referendum, then the rate in which the pound decreases is higher and faster than when there the pound increases. It takes a shorter time to have a dramatic decrease in comparison to a dramatic increase.

2.4 Impacts of Brexit on the economy

Current analysis on the impact of Brexit so far has led analysts to believe that the pound sterling will devalue by about 20% (Welfens 2017). The effects of this decrease of the pound will potentially force the inflation rate to increase and could then lead to the sterling not being wanted as a reserve currency. This in turn can affect every day working members of the public (Welfens 2017). With the uncertainty surrounding how leaving the EU will affect the British economy, most of the analysis performed so far has shown the economy has not grown at the rate it had, before the vote.

GDP growth has slowed down from where it used to be the highest growth rate before the referendum, to now the lowest growth rate out of the G7 countries (De Lyon and Dhingra 2019). Costs have also increased due to a decrease in the sterling where immediately after the vote, the pound decreased in many currencies, which in turn was the largest devaluation since the 1970's (De Lyon and Dhingra 2019). A weaker pound would therefore increase the price of imports, and as stated above, would mean an increase in costs, especially those that are essential to everyday life, such as food.

However, analysts have also stated that with the value of the pound down, other countries might find it beneficial to buy from the UK, which in turn boosts UK businesses who sell their products abroad (Tetlow and Stojanovic 2018). Politicians have also announced this will benefit the UK economy, although only time will tell how and if this impact will be largely negative (or positive) or only slightly.

In (Broadbent 2017) Bank of England speech on Brexit and the Pound, he states that just a devaluation in the currency will not affect the UK economy alone. Instead, trade will be one of the main areas of the economy that will have the biggest impact on everyday people, as well as large business and financial institutions. Broadbent (2017) also states that predicting how the currency market will react to the UK not being in the EU will help shape the future of the country.

Chapter 3: Theory

In this section, I will be discussing the theory behind Exchange rates, as well as the different types of regimes, reviewing how they are/can be implemented by the monetary policy makers. Section 3.1 will explain exchange rates, 3.1.1 exchanges rates and Purchasing Power Parity, 3.1.2 exchange rates and Interest Rate Parity and, 3.1.3 exchange rates and expectations, risk and uncertainty.

3.1 Exchange Rates

The exchange rate is the value of one country's currency against another country's currency (Chen 2020). Essentially, this shows how much £1 would be in for example Euros. Exchange rates can have a large effect on all areas of an economy. It affects employment opportunities, wages, prices of goods and services, levels of production, and trade (Isard 1995). Since the 1970's, exchange rates have somewhat changed, from countries keeping their currencies fixed with narrow ranges, to now a more flexible exchange rate arrangement (Isard 1995). There are however different policies associated with these exchange rates. A government, or the policy makers in charge of the monetary policies can decide between regimes, for example, a fixed or free-floating regime (López and Perrotini 2006).

3.1.1 Exchange rates and Purchasing Power Parity

As mentioned previously, the exchange rate is essential in all parts of the economy, namely when it comes to trade and the cost of goods. In terms of the cost of goods, all products should cost the same around the world, in different currencies. However, this is not the case, as some products in other countries are cheaper in comparison to others. This then leads to exchanges rates and the theory of Purchasing Power Parity (PPP).

The theory of how the price of one good in country A, should be equal to that of country B, C, D etc. is called PPP (Rogoff 1996). If the price of these goods were then converted into a common currency, they should cost the same. The cost of a common good for example, an iPhone, within certain countries should be equal, meaning the price of a good in one

country should work out to be the same cost in another, once the price has been converted into a common currency. Providing that there are no transaction costs, shipping costs and other factors in the economy, then under these conditions, this theory should hold (the law of one price) (Rogoff 1996).

The nominal exchange rate (the price of a currency in terms of another) is readily available or observable, but the real exchange rate gives one a sense of relative purchasing power of a currency over time (Rogoff 1996). It could be used to determine whether a currency is as strong as its counterpart (i.e., greater purchasing power) and if prices are of the same. For example, the nominal exchange rate of GBP to Krone as of 17th February 2020, £1 is equal to 12.04NOK (Norwegian Kroner). An iPhone 11 128giggabite costs £779.00 (i.e., 779*12.04). However, in this case the phone costs 9,090.00NOK, meaning it is cheaper to buy the phone in NOK. In this example, the real exchange rate is £1 is equal to 11.38NOK (1*9,090/799).

The PPP is defined as being able to buy the same amount of goods in one country and currency, for the same price in another currency (Rogoff 1996). PPP and real exchange rates are not the only way to compare, as one could be better off using another currency compared to for example the local currency. While PPP establishes the relationship between the exchange rate and prices, allowing one to make comparisons of goods and services across markets, it ignores the relationship between the exchange rate and interest rates.

3.1.2 Exchange rates and interest rate-parity

The theory of interest rate parity refers to all currencies expecting the rate of return to be the same (Krugman, Obstfeld and Melitz 2012). Essentially, it is the relationship between interest rates and exchange rates. In order for Interest Rate Parity to hold, returns on deposits of two currencies are expected to be equal when converted into a common currency (Krugman, Obstfeld and Melitz 2012). For example, if the interest rate of country A is higher than that of country B, people would prefer to hold their deposits in country A as the expected returns will be higher. Thus, holders of deposits in country B will try to sell their deposits and

buy deposits in country A. In turn, this causes an excess supply of country B's deposits, as well as excess demand in country A's deposits (Krugman, Obstfeld and Melitz 2012). Therefore, when there is no excess demand or supply (in equilibrium), the condition of interest rate parity holds.

Many currencies can follow another currencies trend in increasing (decreasing) of price. For example, since Brexit, most currencies have decreased in price. Therefore, there must be some sort of correlation between each currency. Stockman (1980) states there is a correlation between currencies and trade, meaning there must be a correlation between the two currencies. Stockman (1980) also states governments can affect the currency market, or their own currency by implementing different policies.

Although some currencies are influenced by others, Stanley (2018) mentions governments may also decide to set the price of their exchange rate against another. An example being China, who until 1994 wanted to protect their local production, then decided to set their rate against the dollar. This implies that China wanted to become an "international currency" and being used by many in international transactions. Therefore, these "international currencies" should be closely related since 1994 (Stanley, 2018).

Among Interest Rate Parity, there are two groups, covered (CIP) and uncovered interest rate parity (UIP). CIP means the interest between two identical assets except for currency should be equal to the forward premium in the currency market (Bolous and Swanson 1994). If these conditions are met, there should be no way to receive a risk-free profit (arbitrage) and states that the currency market is efficient. UIP on the other hand, refers to the difference in interest rates between two countries, and that they should equal the relative change in currency foreign exchange rates during the same period (Hayes 2019).

3.1.3 Exchange rates expectations, risk and uncertainty

Exchange rate expectations, risk and uncertainty all interlink with each other. Expectations on whether a currency will be strong (or weak) in the coming days, weeks, months or even years can lead to great risk in terms of trade, general shopping or whether to invest your money in a certain currency (Stockman 1980). This also leads onto uncertainty. Nobody knows what will happen in the future and a financial crash, or natural disaster can have major economic impacts and can lead to price uncertainty on goods and services. Therefore, a general election, or major referendum such as Brexit amplifies and triggers all three of these (Kabiru, Ochieng and Kinyua 2015).

Kabiru, et al., (2015) states that an election, such as a general election, can influence a countries financial market, in this case the foreign exchange market. In their analysis on whether general elections have an influence on the stock market, they concluded the market reacts positively, or negatively depending on the type of the election. A normal (general) election (every 5 years) will therefore have a different impact on the market in comparison to one before the 5 years are up, such as the referendum. Thus, it is harder for analysts predicting certain outcomes to be completely correct.

Uncertainty can also drive down direct foreign investment. With many big firms, such as Deloitte who have many offices around the world, investing in foreign countries is an important part of their strategy (Cushman 1988). Being able to directly invest in foreign markets helps generate profits, as well as potentially helping that countries economy. However, with an uncertain exchange rate (depending how the company does business), a potential for an undefined future, may come to the forefront of the companies uncertainties. The labour force, cost of goods and other services, and finally output prices will influence the way a company intends to invest in this foreign country (Cushman 1988).

3.2 Literature Review

Over the years, there have been may research papers, books and articles covering different aspects of the exchange rates. Most famously, exchange rate determination

developed by Mundell-Fleming stated that the exchange rate should be determined by just trade, or the supply and demand market (Taylor 1995). However, as the years passed and others began studying the bases of exchange rates, many believe that trade was not the only factor that determines the exchange rates. Other analysis produced throughout the years have since proved that this is not the only factor. One being that political announcements or events, can have a determining factor on the exchange rate.

It can be said that in terms of trading on the foreign exchange market, policy consequences from elections or other premeditated announcements can be easily anticipated (Freeman, Hays and Stix 1999). Along with this, traders can also adjust for changes in the election and future outcomes. This is due to them being able to retrieve information or predict information that will be given in say, the news the next day. However, traders will not always be able to retrieve the correct information, and will also be "surprised" by some news, and are possibly unable to correctly predict all outcomes (Freeman, Hays and Stix 1999).

A study conducted in 2000 showed how the impact of both expected news and unexpected news affected the Italian currency (Lira) (Fornari, et al. 2000). The study is about how these types of news affected the financial market between 1994 and 1996, when the Lira re-entered the European Exchange Rate Mechanism (ERM). The data used throughout the analysis is daily observations. This has been opposed by many, given the fact that news can be very short lived and potentially only lasting a few hours. However, after reviewing past papers such as Balduzzi et al, (1998), they decided to use daily data, as the effect from intra-daily to daily remained the same (5 out of 10 times). "Unexpected news" is defined as the time of release could be uncertain, and "expected news release" is scheduled.

The model used in the study is the multivariate Garch model, where the dependent variables were Lira rate, the yield on Italian long-term government bonds and the mark-dollar exchange rate (Fornari, et al. 2000). Their findings for their multivariate estimates were that the conditional mean and variance for the mark-dollar/lira-mark/government bond yield

were not statistically significant. To conclude their study, they determined that news had a impact on the volatility in the Lira exchange rate as well as the interest rates (Fornari, et al. 2000). However, after testing for seasonality, they suggested that once this is accounted for, the impact of news on the Lira is not fluctuating as before.

Political events and announcements can end up having a profound effect on a country exchange rate. Many predicted that Donald Trump being in power would have a negative affect for the USD, and initially it did (Gamaliy, et al. 2018). Gamily, et al. (2018) found the Euro/USD rate jumped by 300 points (negatively for USD), although they found this was only temporary and the market only reacted to it as a shock. Along with this study of the Presidential election, they also done a short analysis on the effect of the pound due to Brexit, and found that predictions were not as negative as first estimated (Gamaliy, et al. 2018).

Expectations about how the currency market will react, therefore come to the forefront. An article written by Coombs (2016) confirmed that in general, most expectations about how the market will react to these events will be over exaggerated and will affect the economy negatively. Instead, it is more likely that the economy will be negatively impacted for a short period of time, such as seen from the financial crisis in 2008, to then "restart" and therefore positively regenerate over time (Coombs 2016).

However, it is not just the political event which can affect the market, but also the people who are involved with this event. For example, in the lead up to a general election, the party who is the current favourite to win, may cause the exchange rate to have a positive effect. Although they may also cause the market to react negatively depending on their suggested regime (Coombs 2016).

3.2.1 Political Uncertainty
In the last ten to fifteen years, many countries have been under political unrest with their economies facing political uncertainty, such as Greece, Spain, Ireland and Portugal in the

EU. This was in parts due to the financial crisis in 2008, where many of these countries relied on tourism to help boost their economies (Pastor and Veronesi 2013). In Pastor and Veronesi (2011) paper, their main points relate to how uncertainty in a country's political agender tends to affect the financial market, although it may help other country's stocks gain. For example, when the EU first announced that they would bail out Greece in the wake of the financial crisis, both stocks in Germany and France, as well as the S&P 500 increased almost immediately (Pastor and Veronesi 2013). Their main question relates to "*How does uncertainty about future government actions affect market prices*?".

Data in their study dates from January 1985 until December 2010 and consists of news articles that mention uncertainty and the role of policy for the United states, although it is also extended out to the Eurozone for the Eurozone crisis. Within their plotted time series data, they noted that during presidential elections, and major shocks such as the terror attack in the US - 9/11, their data spikes, proving that during political unrest, stocks and exchange rates will have a negative decrease, along with investment lowering (Pastor and Veronesi 2013). Further proving this theory, their model predicted that uncertainty is in general greater during weaker economic conditions, such as a recession.

Chapter 4: Data and Methods

The data used in this paper was retrieved directly from the Bank of England website database, and is therefore secondary data (England, Daily spot exchange rates against Sterling 2020). The data contains daily observations from the Sterling against the Euro, Yuan, Norwegian Krone, Canadian Dollar and the Swiss Franc as well as the Sterling Exchange Rate Index (SERI). SERI data includes both the USD and Japanese Yen, along with many of the other main trading partners of the UK. A simple correlation of prices and the logarithmic (log) returns will also be conducted to prove that if SERI moves a certain way, then so will the newly created currency basket.

4.1 Creating a Basket of Currencies

To analyse the data, I created a basket of currencies for these exchange rates, not including SERI which is used as an index to compare results. To create this basket, I based it specifically on the trade between these countries and the UK (total imports and exports) and called it "Trade Weighted Currency Index" (TWCI). The weights of each country therefore depended on how much trade happens between the countries, with the Euro having 81.46%, Canadian Dollar 2.39%, Yuan 8.45%, NOK 3.64% and the Swiss Franc 4.06%. This remained constant throughout the analysis and was based on total trade in 2018 (Scruton 2020). Once finalised, I had to complete the trade weighted currency index by multiplying each spot rate by the weights, using the following formula:

$$\text{TWCI} = \left(\frac{E_{CADt-1}}{E_{CADt}}\right)^{Wcad} * \left(\frac{E_{Eurot-1}}{E_{Eurot}}\right)^{WEuro} * \left(\frac{E_{Yuant-1}}{E_{Yuant}}\right)^{WYuan} * \left(\frac{E_{NOKt-1}}{E_{NOKt}}\right)^{WNOK} * \left(\frac{E_{Sfranct-1}}{E_{Sframc\ t}}\right)^{WSfranc} * 100 \ (1)$$

Where E_{CADt-1} refers to the exchange rate for the Canadian Dollar at t-1 and E_{CADt} is the exchange rate which remains constant throughout. $Wcad$ refers to the weight of the Canadian Dollar, which again will remain constant. Once all is conducted, the result is the multiplied by 100 to give the final exchange rate of the basket for a given day. At *t* the figure stands at 100.00. Before conducting the full event analysis, looking at the price trends since 2015 and the

returns, as well as descriptive statistics is a good way to understand however and if Brexit has had an effect.

Returns	TWCI	SERI
Mean	-0.003%	0.00%
Median	-0.0013%	0.00%
Maximum	2.62%	3.08%
Minimum	-5.79%	-6.80%
Std. Dev	0.01	0.005249
Skewness	-1.066389	-1.51513
Excess Kurtosis	13.5361	23.18063
Jaque-bera	7251751	62367502
Observations	1296	1296

Table 2 showing the descriptive statistics for TWCI and SERI daily returns.

Looking at table 2, we see the daily descriptive statistics for TWCI and SERI. The average returns from the two data sets is -0.003% and 0.00% respectively. The range for TWCI is 8.41% by taking the difference between the minimum value and maximum. For SERI, the range is 9.88%. Daily standard deviation is 0.01 and 0.005 respectively. A negative skewness for both TWCI and SERI shows the left tail will be longer, and indicates the mean and median is less than the mode in the dataset. Both datasets have a relatively high excess kurtosis with TWCI resulting in 13.53 and SERI 23.18 for a total of 1296 observations.
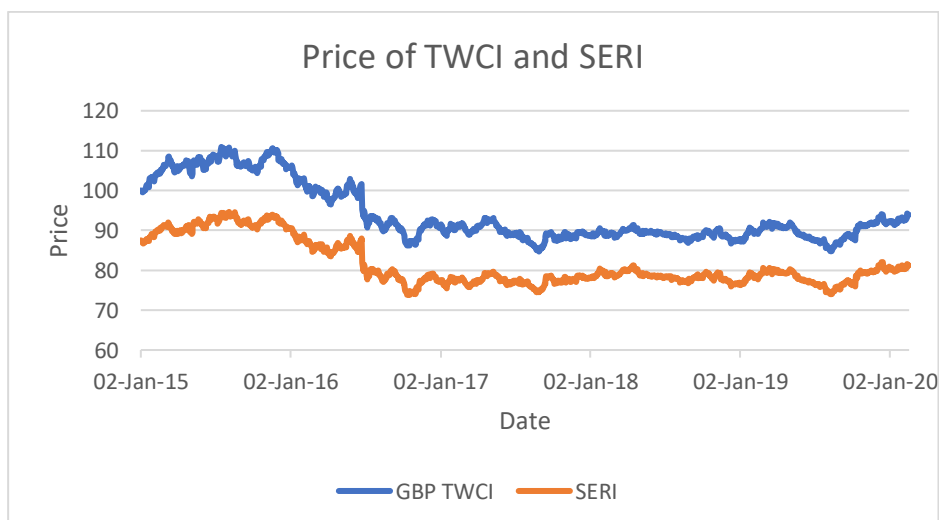
Figure 2. Daily price of the newly created TWCI and SERI from January 2015 to February 2020. Data was retrieved from the Bank of England databases (Bank of England, 2020).

Looking at the price development of both indexes since January 2015, we can see both follow almost the exact same trend. As stated previously, price for TWCI begins at 100, as this is viewed in the data as the "base day", which indicates when my data timeline starts. Over the first year, both TWCI and SERI both increase steadily, before in 2016, prices begin to decrease. From 23rd June 2016 the prices for the indexes decreased substantially, and this will be due to Brexit. Figure 3 below shows the logarithmic returns for the indexes. Much like the prices of the two, the log returns also follow identical trends, with one large negative return on 24th June 2016. This was on the date of the referendum result day where the exchange rate dropped and caused a -5.79% downfall for TWCI and -6.80% for SERI.

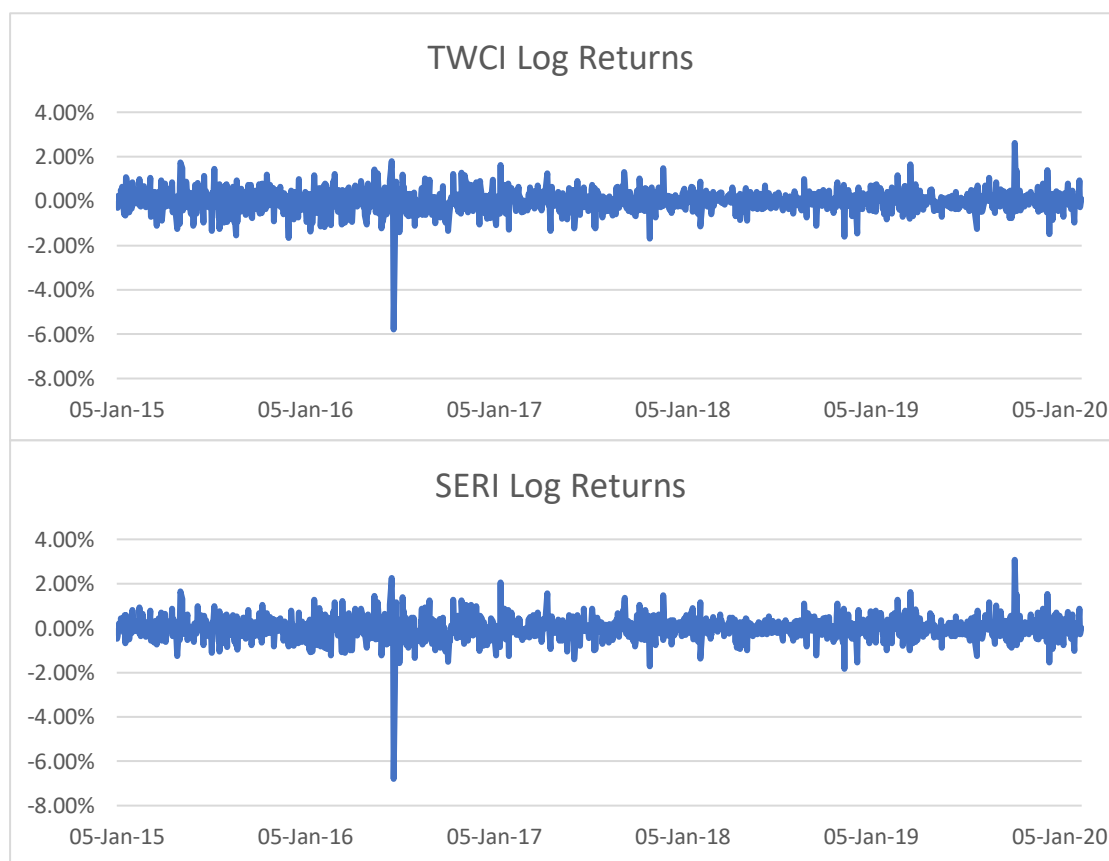*Figure 3. The returns of the TWCI and SERI from January 2015 to February 2020. Data is retrieved from the Bank of England (Bank of England, 2020).*

4.2 Event Analysis Method

For this event analysis, I used the Market Model where I calculate the expected returns E(r), where E (r) = $\propto_i + \beta_i R_{M,t}$ (2), the abnormal returns (AR), the cumulative abnormal returns (CAR) where:

$$CAR(t_1, t_2) = \sum_{t=t1}^{t2} ARi, t (3),$$

and then test the significance of AR against the standard error of the estimation window length. To be able to define the estimation window, I researched when this event/announcement was first mentioned in the news, and therefore used that as a start date. The actual length of the window I would be analysing is up to three days before the event actually took place. Thus, the end of the estimation window is also 3 days before the day of the event. The market model is therefore defined as:

$$AR_{i,t} = R_{i,t} - \left(\propto_i + \beta_i R_{M,t}\right) (4) \text{ (MÜLLER 2020)}$$

Where $AR_{i,t}$ is the abnormal return on that given day of the event, $R_{i,t}$ is the actual return on the day, $\propto_i$ is the intercept of the estimation window, β_i is the slope of the estimation window and $R_{M,t}$ is the returns of the market (SERI) on that given day of the event. To be able to test for significance, I use the result of (4) and divide it by the standard error of the estimation window:

$$AR\ t - test = \frac{AR_{i,t}}{SE} (5) \text{ (MÜLLER 2020)}$$

where SE is the standard error for the window and $AR_{i,t}$ is the abnormal returns.

The event window for all analysis conducted is three days before events. However, the estimation window length varies depending on when the announcement of the event was first mentioned in the news. Along with the estimation window, I compute the t-test up to five days before the event day, along with five days after - to be able to fully show whether there have been positive (or negative) change. The final part of the analysis will be a percentage change from the first date of the data (2nd January 2015), to the final date of the data (17th February 2020) to conclude whether Brexit has had an impact on the exchange rate.

Chapter 5: Results

This section of the paper I will present the results from my findings of the analysis conducted. The purpose is to test whether on a specific event date, such as the day of the referendum result, had a significant impact on the exchange rate by comparing the test statistic against the 5% critical value. All intercept, slope, R-squared and standard errors are recorded in a table (Appendix A).

5.1 Correlation

I start my investigation by finding the correlation between the prices, as well as the returns of the two indexes. Table 3 below shows the correlation of prices between TWCI and SERI, and as we can see, they have a high strong relationship (0.9897). This is as expected as previously shown in Figure 2 where prices followed the trend throughout the time.

Correlation of prices	GBP TWCI	SERI
TWCI	1	
SERI	0.9897	1

Table 3. Correlation of prices between TWCI and SERI from January 2015 to 17th February 2020

As with Table 3, the table below shows how highly correlated the two indexes are. To further prove how correlated these indexes are, I have created a scatter plot as show in Figure 4.

Correlation of returns	TWCI Log Returns	Log Returns
TWCI Log Returns	1	
SERI Log Returns	0.9395	1

Table 4. Correlation between the logarithmic returns of the TWCI and SERI indexes.
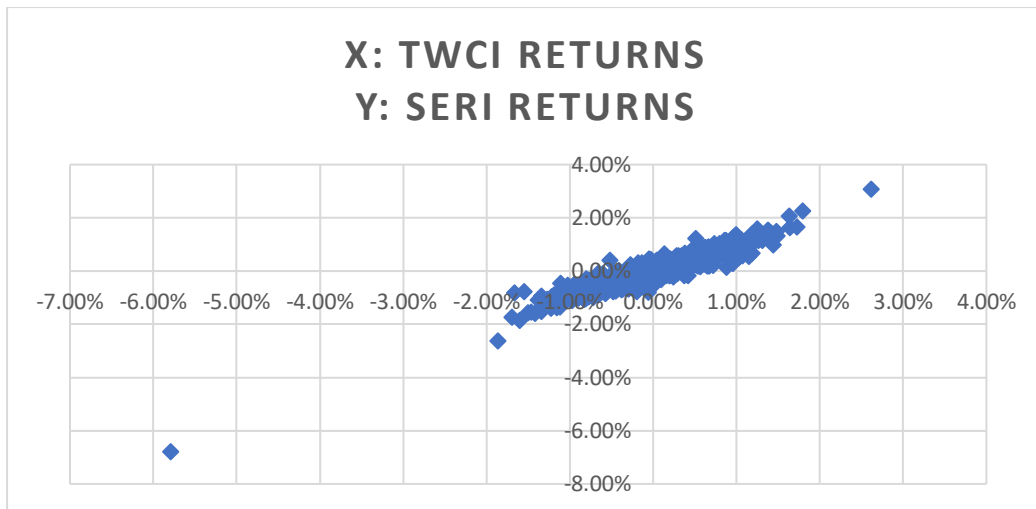
Figure 4. Scatter plot showing the correlation between TWCI (x axis) and SERI (y axis).

Looking at this scatter plot, it shows a near perfect correlation. However, it does show one major outlier at -5.79%, -6.80%, which after investigation, is the date of the referendum result on 24th June 2016. With a small data set, it could be important to overview outliers, to better understand impacts on a day to day basis, and the significance it might have on the overall event timeline.

5.2 Event results

5.2.1 Referendum result day

To start the main analysis of this paper, I start by analysing the referendum result day, 24th June 2016, and not the day of voting as the results came out the day after voting happened. For this event I used an 83-day estimation window length, with the estimation window ending 3 days prior to the event day. The intercept, slope, R-squared and standard error is shown in Table 5 for this estimation window.

Intercept	Slope	R^2	Standard Error
0.00002	0.89804	0.90082	0.00190

Table 5. showing the estimation window length intercept, slope, R-squared and standard error. The length of window is 83 days.

Table 6 below shows the test results, where actual returns on the event day were 0.35% higher than the estimated returns, meaning abnormal returns of 0.35%. To test for significance, I used the abnormal returns t-test where:

$$H_0: AR_{i,t} = 0$$

$$H_1: AR_{i,t} \neq 0$$

In this case, we fail to reject the null hypothesis on the event day as the test statistic is less than the critical value of 1.989 at the 5% significance level. This may come as a surprise to some; however, the market may not have reacted in time to fully show the effect on the event day, along with the result coming as a surprise to many. Looking at the day of voting (23rd), we would have rejected the null hypothesis, which had a test statistic above the critical value. On the 27th June, we can say that the market has now reacted to news of the UK leaving the EU and would reject the null hypothesis again, and on the 28th June, it can be said normality has resumed.

Date	Actual returns	Estimated returns	Abnormal returns	Cumulative AR	Abnormal Returns t-test
22/06/2016	0.07%	0.05%	0.03%	0.48%	0.132
23/06/2016	-0.52%	0.36%	-0.88%	-0.40%	-4.616
24/06/2016	-5.96%	-6.32%	0.35%	-0.04%	1.866
27/06/2016	-1.88%	-2.40%	0.51%	0.47%	2.700
28/06/2016	0.66%	0.82%	-0.16%	0.31%	-0.842

Table 6 showing the actual returns, E (r), abnormal returns, CAR and the AR t-test results over a five-day period including 24/06/2020 (Appendix A).

5.2.2 Article 50 triggered

In the table below, the event in question was when Article 50 was triggered by Theresa May, the then Prime minister of the UK on 29th March 2017. As we can see from the table, actual returns were higher (0.09%) than estimated returns (-0.28%). This in turn caused for abnormal returns of 0.37%. This could show that the market was expecting this event to happen, and therefore did not react. I test this against the same hypothesis: -

$$H_0: AR_{i,t} = 0$$

$$H_1: AR_{i,t} \neq 0$$

The critical value in question this time is 1.960 as the degrees of freedom is over 100. As we can see by the highlighted row in yellow, we reject the null hypothesis as 1.965 is greater than 1.960. The abnormal returns were divided on the standard error of 0.00189. The estimation window length in this case was 122 days, with a 3-day window as explained earlier. The intercept, slope and R-squared were 0.00007, 0.88533 and 0.86740 respectively. Article 50 was a huge moment in British politics, as it officially triggered the leaving EU process. This is shown in the table below (Table 7) and therefore cannot be explained as a shock that the market should react negatively.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
27-Mar-17	-0.07%	0.16%	-0.22%	-0.34%	-1.184
28-Mar-17	-0.18%	-0.17%	-0.01%	-0.35%	-0.072
29-Mar-17	**0.09%**	**-0.28%**	**0.37%**	**0.02%**	**1.965**
30-Mar-17	0.70%	0.62%	0.08%	0.10%	0.404
31-Mar-17	0.45%	0.33%	0.12%	0.22%	0.620

Table 7 showing the actual returns, E (r), abnormal returns, CAR and the AR t-test results over 10 days prior and 10 days after the event (Appendix B).

5.2.3 First "snap" general election

The next event is the first "snap general election" result day in 2017 as shown in Table 8. For these results, a 39-day estimation window length was used since this was when the election was first announced by Theresa May. On this day, again highlighted in yellow, the actual returns were -1.22%, with the estimated returns -1.38%, causing abnormal returns to be 0.16%. Against the same hypothesis, we would fail to reject the null hypothesis at the 5% significance critical value 2.024 due to the absolute value of the test statistic being 1.048. Abnormal returns were divided upon the standard error of 0.00150. The intercept and slope were -0.00034 and 0.96438. The negative actual and estimated returns show that both

markets reacted negatively to the fact that Theresa May won, although this can be countered by the fact that the Conservative Party had to set up an alliance with DUP to win.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
07-Jun-17	0.49%	0.48%	0.01%	0.26%	0.080
08-Jun-17	0.10%	0.10%	-0.01%	0.26%	-0.035
09-Jun-17	**-1.22%**	**-1.38%**	**0.16%**	**0.41%**	**1.048**
12-Jun-17	-0.61%	-0.66%	0.05%	0.47%	0.353
13-Jun-17	0.35%	0.34%	0.01%	0.48%	0.062

Table 8 showing the actual returns, E (r), abnormal returns, CAR and the AR t-test results over 10 days prior and 10 days after the event for the first snap general election in 2017.

5.2.4 First UK-EU draft agreement

Table 9 shows the results for when the EU rejected the UK's draft agreement on 19th March 2018. The intercept for this analysis is -0.00045, with the slope 0.94641, and standard error 0.00184. The actual returns on the event day was 0.39%, with the estimated returns calculated at 0.53%, resulting in -0.14% abnormal returns. I failed to reject the null hypothesis,

$$H_0: AR_{i,t} = 0,$$

due to the test statistic being lower than the 5% critical value of 2.306 (-0.762). During this estimation I used a 9-day window length, as I was unable to find when the agreement was first announced in the news. During this window, we could say that actual returns has reacted to the news positively, due to the increase, although estimated returns for the event are shown to be higher.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
15-Mar-18	0.31%	0.19%	0.12%	0.39%	0.647
16-Mar-18	0.16%	-0.02%	0.19%	0.57%	1.011
19-Mar-18	**0.39%**	**0.53%**	**-0.14%**	**0.43%**	**-0.762**
20-Mar-18	0.30%	0.09%	0.20%	0.63%	1.095
21-Mar-18	0.37%	0.30%	0.07%	0.70%	0.372

Table 9 showing the actual returns, E (r), abnormal returns, CAR and the AR t-test results over 10 days prior and 10 days after the event for the UK and EU on the first draft agreement (rejected).

5.2.5 Rejection of the Chequer's Agreement

Table 10 below has a 52- day estimation window length resulting in -0.00013 intercept, 0.82347 slope and a standard error of 0.00126. The event taking place at the time is the rejection of the Chequer's Agreement from the EU to the UK. As we can see, the exchange rate had a highly negative reaction to the news of the agreement, although the t-test proves otherwise. The table shows actual returns decreasing by -1.11% while estimated returns is calculated to be -1.02%. Abnormal returns therefore are equal to -0.08%. The t-stat in this case is -0.672 which is below the 5% significance critical value of 2.008, meaning we would fail to reject the null hypothesis $H_0: AR_{i,t} = 0$. On the other hand, the day before the event, the t-stat is greater than the critical value, meaning the null hypothesis would be rejected, stating that potentially predicting the rejection coming the day before had more of an impact than the actual announcement of the rejection.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
19-Sep-18	0.28%	0.04%	0.25%	0.33%	1.953
20-Sep-18	-0.01%	0.26%	-0.27%	0.06%	-2.140
21-Sep-18	-1.11%	-1.02%	-0.08%	-0.02%	-0.672
24-Sep-18	0.10%	0.12%	-0.02%	-0.04%	-0.193
25-Sep-18	0.23%	0.21%	0.02%	-0.02%	0.177

Table 10 showing the actual returns, E (r), abnormal returns, CAR and the AR t-test results over 10 days prior and 10 days after the event for the TWCI on the event day when the chequers agreement was denied.

5.2.6 First publicised withdrawal agreement between UK and EU

Table 11 features the draft withdrawal agreement from the UK to EU which was for the first time made public. Actual returns were negative (-0.32%), however, the estimated returns for this portfolio, comes in lower at -0.05%, causing a negative 0.27% abnormal return. For the estimation window length, it was 18-days. The 5% critical value is 2.145, meaning under the null hypothesis previously stated, we will reject $H_0: AR_{i,t} = 0$ as the t-statistic is greater than this value. In terms of the intercept, slope and the standard error used to be able to conduct the test, they resulted in 0.00035, 0.79247, and 0.00106 respectively. For the next two days after the event, the market continued to react negatively, potentially showing how undesirable the agreement was between the EU and UK.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
12-Nov-18	-0.30%	-0.51%	0.21%	0.39%	2.023
13-Nov-18	0.74%	0.73%	0.01%	0.40%	0.132
14-Nov-18	**-0.32%**	**-0.05%**	**-0.27%**	**0.13%**	**-2.540**
15-Nov-18	-1.60%	-1.43%	-0.17%	-0.04%	-1.647
16-Nov-18	-0.17%	0.06%	-0.23%	-0.27%	-2.144

Table 11 showing how the exchange rate differed on 14th November 2018 for the event of the draft withdrawal agreement being published publicly.

5.2.7 First meaningful vote

In table 12 below, there is negative returns for actual and estimated returns for the first meaningful vote in Parliament. However, estimated returns have a larger negative result, causing abnormal returns to register at 0.13%. During this analysis, the estimated window length is 28-days, meaning an intercept of -0.00024, slope of 0.89563, and the standard error of 0.00142. Testing this against the critical value of 2.052, I fail to reject the null hypothesis due to the test statistic resulting in a lower figure than the critical value. For all the values recorded in the table, I would fail to reject the null hypothesis. The negative impact of the returns on the day, means this vote did not sit well with politicians and traders of the currency, especially considering the rate was incrementally increase in days leading up, as well as after.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
11-Jan-19	0.71%	0.46%	0.25%	0.12%	1.769
14-Jan-19	0.67%	0.69%	-0.02%	0.10%	-0.133
15-Jan-19	**-0.49%**	**-0.62%**	**0.13%**	**0.23%**	**0.903**
16-Jan-19	0.77%	0.53%	0.24%	0.47%	1.681
17-Jan-19	0.48%	0.44%	0.04%	0.51%	0.252

Table 12 showing how the exchange rate differed on the 15th January 2019 (the first meaningful vote in parliament).

5.2.8 Second Brexit delay

In the table below is shows the returns and t-test for when Brexit was delayed for the second time. Looking at the table, it shows a positive increase from the previous day of 0.48% actual returns. Estimated returns were slightly lower at 0.43%, causing 0.05% abnormal

returns. When conducting the t-test using the standard error of 0.00099, we would fail to reject the null hypothesis at the 5% critical level. In this case, the critical value is 2.201 meaning no date in this table is greater. This second Brexit delay was an expected announcement, which could prove why the market reacted positively.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
08-Apr-19	-0.06%	0.14%	-0.20%	-0.41%	-2.024
09-Apr-19	-0.07%	-0.07%	0.01%	-0.40%	0.051
10-Apr-19	0.48%	0.43%	0.05%	-0.36%	0.459
11-Apr-19	-0.19%	-0.07%	-0.12%	-0.48%	-1.215
12-Apr-19	-0.20%	-0.05%	-0.15%	-0.63%	-1.521

Table 13 showing the results of the event analysis on the 10th April 2019, the day when the 2nd Brexit day was announced.

5.2.9 The Benn Bill

The 4th September 2019 was a pivotal date in the British parliament where several key votes took place, in this case, the Benn Bill was passed. This meant that the UK was not allowed to leave the EU on 31st December 2019 with a "No Deal", but instead meant they had to ask the EU for another extension. Looking at Table 14, actual returns on the result day were 0.26%. Considering SERI, estimated returns were 0.35%, causing a negative 0.09% in abnormal returns. Looking at the test statistic, on the event day, we fail to reject the null hypothesis stated earlier as it is below the critical value of 2.365. A positive return for both actual and estimated returns in the day before, and the day after the event, could mean the vote was positive for both politicians and businesses, as it meant no matter what happens, the UK needs a deal before leaving the EU.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
02-Sep-19	-0.54%	-0.59%	0.05%	0.05%	0.709
03-Sep-19	0.34%	0.28%	0.06%	0.11%	0.746
04-Sep-19	0.26%	0.35%	-0.09%	0.02%	-1.145
05-Sep-19	0.84%	0.93%	-0.08%	-0.06%	-1.076
06-Sep-19	-0.12%	-0.13%	0.01%	-0.05%	0.109

Table 14 showing when the Benn Bill was passed in the British Parliament.

5.2.10 Second general election, final withdrawal bill and official "leave"

Table 15 below shows the final four events undertaken. It includes the third Brexit extension in relation to the Benn Bill, the second General Election, which Boris Johnson won, the final withdrawal bill published and agreed upon by the EU, and finally, the day in which the UK officially left the EU. Actual returns for the third extension (28th October 2019) were 0.21% and estimated 0.14%, resulting in 0.07% abnormal returns. For the second general election in December 2019, returns were 1.38% with abnormal coming in at 1.26%, meaning abnormal returns equalled 0.12%.

January was the time when the UK were finally going to be leaving the EU after many years of negotiating and changes of leadership. The final withdrawal bill turned out to have next to no impact on the exchange rate with 0.05% actual returns, and estimated returns 0.04%. Abnormal returns after rounding, resulted in 0.00%. in terms of testing the abnormal results using the t-test, for all, we would fail to reject the null hypothesis at the 5% critical values. The value for the third extension, the second general election, the final withdrawal bill and the official leave date were 2.120, 2.064, 2.365, and 2.120 respectively.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
24-Oct-19	-0.17%	-0.18%	0.00%	0.15%	0.033
25-Oct-19	0.03%	-0.03%	0.05%	0.20%	0.514
28-Oct-19	**0.21%**	**0.14%**	**0.07%**	**0.27%**	**0.679**
29-Oct-19	0.12%	0.19%	-0.07%	0.20%	-0.681
30-Oct-19	-0.25%	-0.23%	-0.01%	0.19%	-0.127
11-Dec-19	-0.05%	0.05%	-0.10%	-0.10%	-1.242
12-Dec-19	-0.51%	-0.49%	-0.02%	-0.12%	-0.235
13-Dec-19	**1.38%**	**1.26%**	**0.12%**	**0.00%**	**1.589**
16-Dec-19	-0.20%	-0.02%	-0.17%	-0.17%	-2.247
17-Dec-19	-1.50%	-1.26%	-0.25%	-0.42%	-3.213
21-Jan-20	0.39%	0.44%	-0.06%	-0.06%	-0.576
22-Jan-20	0.80%	0.69%	0.11%	0.06%	1.148
23-Jan-20	**0.05%**	**0.04%**	**0.00%**	**0.06%**	**0.019**
24-Jan-20	-0.20%	-0.22%	0.02%	0.08%	0.250
27-Jan-20	0.01%	0.03%	-0.03%	0.06%	-0.266
29-Jan-20	0.21%	0.18%	0.04%	0.31%	0.415
30-Jan-20	0.47%	0.54%	-0.08%	0.24%	-0.814
31-Jan-20	**0.23%**	**0.36%**	**-0.14%**	**0.10%**	**-1.471**

03-Feb-20	-0.98%	-0.86%	-0.12%	-0.02%	-1.308
04-Feb-20	0.16%	0.12%	0.04%	0.01%	0.374

Table 15 showing the final 4 events including 2 days before and after the event day.

Chapter 6: Conclusion

Throughout this thesis, the main goal has been to determine whether the exchange rate is affected by political events and announcements. To be able to do this, a basket of currencies in relation to the pound was created not involving the USD or JPY. Once the currency basked was created, data from another basket was collected to be used to analyse the effect on the exchange rate. This basket included all of whom the British stated to be their biggest trading partners around the world (over 30 counties).

In nearly all the studies conducted, there was only two event days in which the null hypothesis was rejected at the 5% critical value. These were when Article 50 was triggered by Theresa May, and when the draft withdrawal was published in November 2018, but was ultimately not agreed upon. When the EU withdrawal bill officially became law in the UK on 23rd January 2020, there was effectively no change in the exchange rate compared to the day before. This was proven by the 0.00% abnormal returns.

With two of the event days rejecting the null hypothesis it shows that the higher the abnormal returns, the more likely this will have a greater impact on the exchange rate. This is an important observation, because it shows that in some cases, the type of event, such as an expected event, Article 50 being triggered (even though it was announced it would happen on that day) can still have an impact on the rate. Therefore, even though expectations can be estimated to a certain degree, the overall impact of this announcement cannot be fully determined and can therefore result in a larger effect on the exchange rate. In turn, further analysis is needed to prove that these announcements do impact the exchange rate.

Conducting the analysis proved more difficult than expected, as determining the correct event day was challenging. For example, on the referendum day, there had not been much movement in terms of actual returns from the previous day. Therefore, I chose to use the day where all votes had been counted as the event day, and It showed a tremendous

amount of movement in actual returns and estimated returns. For some events analysts could estimate the direct impact on exchange rate, whilst other events could create anticipation both before and after the event – and therefore be unknown and hard to analyse. This resulted to an extended event timespan, for example the second general election had a great impact on currency rates - even two days after the event. This happened throughout my analysis and proved that on some days other dates could be more impactful.

For future attempts on event analysis on the exchange rate and Brexit, a more thorough investigation into the data point and events is needed. The news published about the events are proven to have a great impact on exchange rates, especially how they are unannounced and if they are expected or not. The analysis could be extended and examined in further detail from a qualitative approach and in return garner a more precise result overall. It would also be interesting to research the outcome of Brexit when the UK has fully left the EU. This type of study would be able to give a better understanding of "lessons learned" in the aftermath, as leaving the EU is a "one of a kind" type of event.

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Appendices

Event Name	Event date	Intercept	Slope	R^2	Standard error
Referendum Result day	24-Jun-16	0.00002	0.89803514	0.90082108	0.00190139
Article 50	29-Mar-17	0.00007	0.88532739	0.86739624	0.00189413
First Snap election	09-Jun-17	-0.00034	0.96438338	0.900171	0.00150095
UK and EU draft agreement	19-Mar-18	-0.00045	0.94640759	0.66290766	0.00184285
Chequerers agreement decline	21-Sep-18	-0.00013	0.82347	0.81891	0.00126
Agreement and EU reject	14-Nov-18	0.00035	0.79247	0.91460	0.00106
Meaningful vote	15-Jan-19	-0.00023595	0.89563086	0.89280389	0.00141815
Second Delay	10-Apr-19	0.00026483	0.92872243	0.98298648	0.00099477
Benn Bill	04-Sep-19	0.00031895	0.87593533	0.96771911	0.00077261
General Election 2	13-Dec-19	0.00014	0.81485	0.93541	0.00077
Withdrawal Bill	23-Jan-20	0.00021152	0.89414038	0.92708499	0.00098439
Officially Leave	31-Jan-20	0.0002422	0.86236093	0.93086657	0.00093778

This table represents the intercepts, slope, R-squared and standard error from the analysis undertaken for the given event days and dates.

Appendix B: Full returns table and graph for referendum result day

This table and the figure below represent the actual returns, estimated returns and abnormal returns for the event day of 24th June 2016, the referendum result day.

Date	Actual returns	Estimated returns	Abnormal returns	CAR	AR t-test
10/06/2016	-0.61%	-0.66%	0.05%	0.05%	0.253
13/06/2016	-0.40%	-0.29%	-0.11%	-0.06%	-0.561
14/06/2016	-0.36%	-0.61%	0.25%	0.19%	1.312
15/06/2016	0.28%	0.37%	-0.10%	0.09%	-0.513
16/06/2016	0.03%	-0.39%	0.42%	0.51%	2.211
17/06/2016	0.90%	0.95%	-0.05%	0.46%	-0.269
20/06/2016	1.78%	2.00%	-0.22%	0.25%	-1.132
21/06/2016	0.37%	0.17%	0.21%	0.45%	1.089
22/06/2016	0.07%	0.05%	0.03%	0.48%	0.132
23/06/2016	-0.52%	0.36%	-0.88%	-0.40%	-4.616
24/06/2016	-5.96%	-6.32%	0.35%	-0.04%	1.866
27/06/2016	-1.88%	-2.40%	0.51%	0.47%	2.700
28/06/2016	0.66%	0.82%	-0.16%	0.31%	-0.842
29/06/2016	0.86%	1.04%	-0.18%	0.13%	-0.953
30/06/2016	-0.84%	-0.93%	0.09%	0.22%	0.457
01/07/2016	-1.22%	-0.95%	-0.28%	-0.06%	-1.466
04/07/2016	-0.10%	0.10%	-0.20%	-0.26%	-1.060
05/07/2016	-1.43%	-1.43%	0.00%	-0.27%	-0.010
06/07/2016	-0.81%	-0.94%	0.13%	-0.14%	0.674
07/07/2016	0.33%	0.29%	0.03%	-0.11%	0.167
08/07/2016	0.56%	0.35%	0.22%	0.11%	1.136

Chart showing the actual returns, estimated returns and abnormal returns on the referendum result day
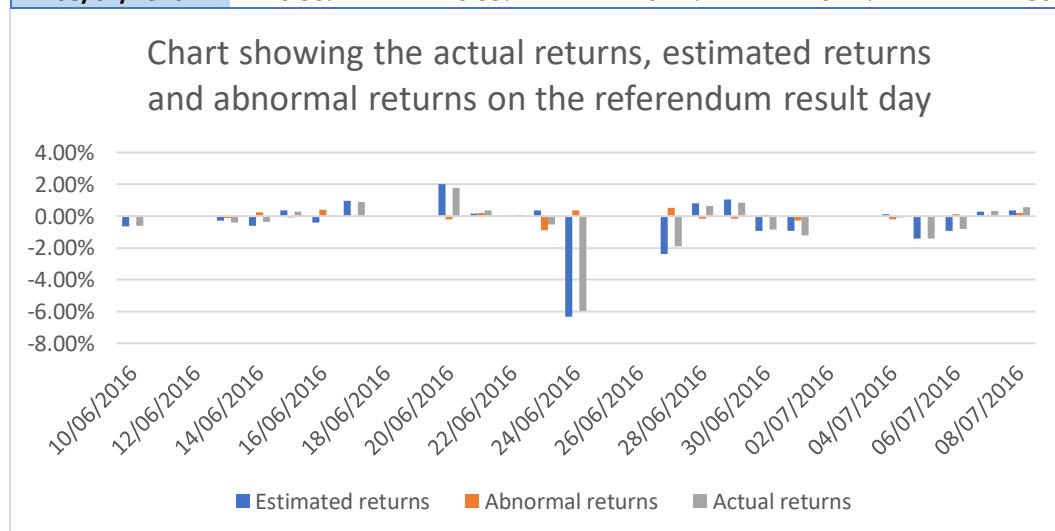
Figure 5 showing the returns calculated for a 21-day period for the referendum result day.

41