

THE IMPACT OF BREXIT NEWS AND THE ECB'S
ANNOUNCEMENTS ON ASSET PRICES: THEORY, EMPIRICAL
FINDINGS AND POLICY IMPLICATIONS

A dissertation

submitted to

the Schumpeter School of Business and Economics
of the University of Wuppertal

in partial fulfillment of the requirements for the degree

doctor rerum oeconomicarum

(Doktor der Wirtschaftswissenschaft)

by

Arthur Korus

Resident in Wuppertal

Student ID: 1362775

Chairman of the Doctoral Candidate Admissions Board:

Prof. Dr. Ulrich Braukmann

Dean of the Faculty of Management and Economics:

Prof. Dr. Nils Crasselt

Supervisor: Prof. Dr. Paul Welfens

Co-advisor: Prof. Dr. André Betzer

Wuppertal, January 2020

The PhD thesis can be quoted as follows:

urn:nbn:de:hbz:468-20200609-113011-0

[<http://nbn-resolving.de/urn/resolver.pl?urn=urn%3Anbn%3Ade%3A468-20200609-113011-0>]

DOI: 10.25926/hnff-7149

[<https://doi.org/10.25926/hnff-7149>]

Acknowledgements

At this point I would like to thank all family members, friends and staff members of the European Institute for International Economic Relations who accompanied and supported me during my dissertation.

I would especially like to thank my first supervisor, Professor Dr. Paul J.J. Welfens. His ideas on the formulation of research questions and his feedback on my scientific work have contributed significantly to the success of this dissertation. Furthermore, I am indebted to Professor Dr. Paul J.J. Welfens for many valuable suggestions and comments. I am very grateful that Professor Dr. Paul J.J. Welfens gave me the chance to participate on several projects at the European Institute for International Economic Relations (EIIW), such as for the Hans Böckler Foundation and for the Deutsche Bundesbank.

Furthermore, I would like to thank my co-advisor Professor Dr. Andre Betzer for his valuable support especially with regard to the third paper of this dissertation. I would also like to thank the staff of Professor Dr. Andre Betzer for their very helpful support during the preparation of this dissertation. My sincere thanks go to Dr. Dmitry Bazhutov and Samed Krüger for their comments and data support.

I would also like to thank all my friends for their support, also outside the university. Special thanks go to Kati Janiszczak, Vladimir Udalov, Niyaz Valitov, Fabian Baier, Samir Kadiric, Tobias Zander, Kaan Celebi, Christina Wiens, Tian Xiong, Jens Perret, Christian Dienes, Hung Lai, Nikolas Leichner, Christoph Laut, and Juan Kress as well as to all members of the EIIW. I am also grateful to David Hanrahan and Valeryia Siarheyeva for their technical support.

Most importantly, I would like to thank my family for supporting me mentally and emotionally throughout writing of this dissertation.

Wuppertal, January 2020

Arthur Korus

Contents

LIST OF FIGURES	IV
LIST OF TABLES	V
1 INTRODUCTION.....	1
1.1 BASIC PERSPECTIVES ON NEWS AND FINANCIAL MARKET DYNAMICS	1
1.2 OVERVIEW	9
1.3 REFERENCES	12
2 THE IMPACT OF BREXIT NEWS ON BRITISH POUND EXCHANGE RATES	15
2.1 INTRODUCTION.....	15
2.2 DATA DESCRIPTION AND EVENTS	18
2.3 THE IMPACT OF BREXIT ON FOREIGN EXCHANGE RETURNS.....	22
2.3.1 <i>Event Study Methodology</i>	22
2.3.2 <i>Results for the Returns</i>	24
2.3.2.1 Spot Exchange Rate of the British Pound against the Euro.....	24
2.3.2.2 Spot Exchange Rate of the British Pound against the US Dollar	31
2.4 THE IMPACT OF BREXIT ON VOLATILITIES OF FOREIGN EXCHANGE RETURNS.....	37
2.4.1 <i>Econometric Model</i>	37
2.4.2 <i>Results for the Volatility</i>	39
2.4.2.1 Spot Exchange Rate of the British Pound against the Euro.....	39
2.4.2.2 Spot Exchange Rate of the British Pound against the USD.....	42
2.5 CONCLUSION	45
2.6 REFERENCES	47
2.7 APPENDIX.....	49
3 THE EFFECTS OF BREXIT ON CREDIT SPREADS: EVIDENCE FROM UK AND EUROZONE CORPORATE BOND MARKETS.....	52
3.1 INTRODUCTION.....	52
3.2 THEORETICAL BACKGROUND AND RELATED LITERATURE	55
3.3 DATA DESCRIPTION	60

3.4	ECONOMETRIC ANALYSIS	62
3.4.1	<i>Event Study Methodology</i>	62
3.4.2	<i>Estimation Results</i>	66
3.4.3	<i>Additional Brexit-related Events</i>	76
3.5	TIME-VARYING ASPECTS.....	79
3.6	CONCLUSION.....	88
3.7	REFERENCES	91
3.8	APPENDIX.....	94
4	SPILOVER EFFECTS FROM THE ECB'S UNCONVENTIONAL MONETARY POLICIES: THE CASE OF DENMARK, NORWAY AND SWEDEN	95
4.1	INTRODUCTION.....	95
4.2	LITERATURE REVIEW	97
4.3	THE ECB'S UNCONVENTIONAL MONETARY POLICY MEASURES	100
4.4	TRANSMISSION CHANNELS.....	102
4.5	HYPOTHESES	105
4.6	EVENT STUDY METHODOLOGY AND EMPIRICAL RESULTS.....	108
4.6.1	<i>Event Study Methodolgy</i>	108
4.6.2	<i>Spillovers of ECB's Unconventional Monetary Policies</i>	110
4.6.3	<i>Spillovers of Systematic Unconventional Monetary Policies</i>	113
4.7	CONCLUSION.....	120
4.8	REFERENCES	122
5	POLICY IMPLICATIONS AND CAVEATS.....	124
5.1	POLICY IMPLICATIONS	124
5.2	LIMITATIONS AND OPTIONS FOR FUTURE RESEARCH	128
5.3	REFERENCES	130

List of Figures

Figure 1.1: Framework of the thesis	8
Figure 2.1: Spot Exchange Rate of the British Pound against the Euro (British Pounds per Unit of Foreign Currency)	21
Figure 3.1: An Overview of Credit Spreads	61
Figure B.1: Market Volume, UK Corporate Bond Market (Overall Economy, Daily Data, January 2013 – March 2018).....	94
Figure B.2: Market Volume, EA Corporate Bond Market (Overall Economy, Daily Data, January 2013 – March 2018).....	94

List of Tables

Table 2.1: Descriptive Statistics	18
Table 2.2: Event Days from Walker (2018) and Financial Times Headlines	19
Table 2.3: Impact of Brexit Events on the Spot Exchange Rate of the British Pound against the Euro (1-day Window)	25
Table 2.4: Impact of Bad and Good Brexit News on the Spot Exchange Rate of the British Pound against the Euro (1-day Window)	26
Table 2.5: Impact of Bad Brexit News on the Spot Exchange Rate of the British Pound against the Euro (4-day Window).....	28
Table 2.6: Impact of Good Brexit News on the Spot Exchange Rate of the British Pound against the Euro (4-day Window).....	30
Table 2.7: Impact of Brexit Events on the Spot Exchange Rate of the British Pound against the US Dollar (1-day Window).....	32
Table 2.8: Impact of Bad and Good Brexit News on the Spot Exchange Rate of the British Pound against the US dollar (1-day Window).....	33
Table 2.9: Impact of Bad Brexit News on the Spot Exchange Rate of the British Pound against the US Dollar (4-day Window).....	34
Table 2.10: Impact of Good Brexit News on the Spot Exchange Rate of the British Pound against the US Dollar (4-day Window).....	36
Table 2.11: Impact of Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the Euro	39
Table 2.12: Impact of Bad Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the Euro	41
Table 2.13: Impact of Good Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the Euro	41
Table 2.14: Impact of Good and Bad Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the Euro	42
Table 2.15: Impact of Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the US Dollar	43

Table 2.16: Impact of Bad Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the US Dollar	43
Table 2.17: Impact of Good Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the US dollar.....	44
Table 2.18: Impact of Good and Bad Brexit News on the Variance of the Spot Exchange Rate of the British Pound against the US Dollar	44
Table A.1: Wording (Bad Brexit News)	49
Table A.2: Wording (Good Brexit News).....	49
Table A.3: Impact of Bad and Good Brexit News, excluding the Brexit Referendum, on the Spot Exchange Rate of the British Pound against the Euro (1-day window)	50
Table A.4: Impact of Bad and Good Brexit News, excluding the Brexit Referendum, on the Spot Exchange Rate of the British Pound against the US Dollar (1-day Window)	51
Table 3.1: Explanatory Variables and Expected Signs	66
Table 3.2: The Impact of the Brexit Referendum on UK Credit Spreads (Overall Economy)	67
Table 3.3: The Impact of the Brexit Referendum on UK Credit Spreads (Financial Sector).....	69
Table 3.4: The Impact of the Brexit Referendum on UK Credit Spreads (Non-Financial Sector)	70
Table 3.5: The Impact of the Brexit Referendum on EA Credit Spreads (Overall Economy).....	72
Table 3.6: The Impact of the Brexit Referendum on EA Credit Spreads (Financial Sector)	74
Table 3.7: The Impact of the Brexit Referendum on EA Credit Spreads (Non-Financial Sector).....	75
Table 3.8: The Impact of Other Brexit-related Events on UK Credit Spreads (Overall Economy)	77
Table 3.9: The Impact of Other Brexit-related Events on EA Credit Spreads (Overall Economy)	78
Table 3.10: UK Credit Spreads Overall Economy	81
Table 3.11: UK Credit Spreads Financials.....	83
Table 3.12: UK Credit Spreads Non-Financials	84
Table 3.13: EA Credit Spreads Overall Economy	85
Table 3.14: EA Credit Spreads Financials	86
Table 3.15: EA Credit Spreads Non-Financials.....	87
Table 4.1: Impact of ECB’s announcements of unconventional monetary policy measures (regression without surprise, all events)	110

Table 4.2: Impact of ECB’s announcements of unconventional monetary policy measures (regression with surprise, all events)	112
Table 4.3: Impact of ECB’s announcements of unconventional monetary policy measures (regression without surprise, SMP)	114
Table 4.4: Impact of ECB’s announcements of unconventional monetary policy measures (regression without surprise, OMT)	115
Table 4.5: Impact of ECB’s announcements of unconventional monetary	117
Table 4.6: Impact of ECB’s announcements of unconventional monetary	118
Table 4.7: Impact of ECB’s announcements of unconventional monetary policy measures (regression without surprise, FWG statements).....	119

1 Introduction

1.1 Basic Perspectives on News and Financial Market Dynamics

It is essential to understand how financial variables, such as stock prices, bond prices and exchange rates, react to various announcements available to the public. The aim is to understand the determination of asset prices (Neely and Dey, 2011) because financial market developments – including foreign exchange market dynamics – are highly relevant for short-term and medium-term economic developments in market economies. Thus, there is a broad interest to understand price dynamics in financial markets from a theoretical and empirical perspective; and possibly also to draw lessons for policymakers interested to avoid excessive volatility and liquidity problems. In this context the role of information and news, respectively, has drawn increasing attention over the past decades in the Economics research community and specific new policy events such as Quantitative Easing (QE) as well as political shocks – such as the British EU referendum of 2016 with its Brexit majority – lend themselves as interesting events that could be analyzed with respect to financial market dynamics. This is the broader background of modern research on Western financial market dynamics in recent years that is of particular relevance for OECD countries; and possibly other countries as well. Event methodology-based analysis is a rather recent strand of the Economics research literature, but it increasingly has accumulated highly influential research. Thus it is crucial to understand the relevant research contributions on which the subsequent analysis is focused, including own new contributions to the literature, namely Brexit related news dynamics on UK and Eurozone financial markets as well as financial market effects for Nordic countries from the ECB's unconventional monetary policy.

According to the efficient market hypothesis (Fama, 1970) asset prices should react directly and quickly to relevant breaking news items or the surprise component of any firm or institutional announcement. Hence, only the unanticipated component of announcements should have an impact on financial variables. However, the efficient market hypothesis has been criticized by proponents of behavioral finance (Shiller, 2003). The literature focuses on the impact of news on financial variables over very short time intervals so that one can assume that the news item itself is the main driver of changes with regard to the pricing of financial assets. So far, the effects of various types of news have been analysed in the literature. News items can be subdivided into at least three groups according to the following typology: macroeconomic

news, monetary policy news and political news. Macroeconomic and monetary policy announcements are mostly scheduled (Neely and Day, 2011). In contrast to that political news are mostly not scheduled.

The impact of macroeconomic news announcements on exchange rates, stock markets, and bond markets has been extensively studied in the literature. Data on macroeconomic news are collected via surveys which contain forecasted and actual values of macroeconomic variables. Typically, the news content of the macroeconomic announcement is calculated as the deviation of the actual data release from the median forecast. Hence, the literature studies the impact of unexpected changes in macroeconomic variables on financial assets. Almeida et al. (1998) study the impact of macroeconomic news announcements stemming from Germany and the US on the DEM/US exchange rate. For the US, they use the Employment Report, Trade figures, Producer Price Index (PPI) and Consumer Price Index (CPI) announcements, Retail Sales, Durable Goods Orders, Consumer Confidence figures, Leading Indicators, the National Association of Purchasing Manager (NAPM) survey, and the Industrial Production and Capacity Utilization announcements. For Germany, they use the CPI, Industrial Output, M3, Industrial Orders, PPI, Retail Sales, the Trade Balance, Unemployment, and the Wholesale Price Index. They find that the impact of US macroeconomic announcements was much stronger than the effects of German announcements on the DEM/US exchange rate, respectively.

Andersen et al. (2003) study the impact of macroeconomic news announcements on several US dollar exchange rates. They study the effects of US and German news announcements on both the conditional mean and the conditional volatility. They show that announcement surprises produce conditional mean jumps. Their findings indicate that US dollar exchange rates react quickly to macroeconomic news announcements. Hence, their results suggest that movements of US dollar exchange rates are linked to fundamentals. Furthermore, they find that what could be classified as “bad” news items are associated with a depreciation of the US dollar against major currencies, while “good” news items lead to an appreciation of the US dollar. Moreover, their empirical findings show that bad news has a greater impact on the exchange rate than good news. Galati and Ho (2003) elaborate on the impact of macroeconomic news on the spot exchange rate of the US dollar against the euro. They find that the US dollar/euro exchange rate reacted stronger to US macroeconomic news announcements than to macroeconomic news emanating from the euro area. Moreover, their results suggest that market participants react asymmetrically to bad/good macroeconomic news. Galati and Ho (2003) define good (bad) news as

the occurrence of a positive (negative) surprise. They also find, that the effect of macroeconomic news on the US dollar/euro exchange rate is stronger when the sign of the news switches. Ehrmann and Fratzscher (2005) also elaborate on the link between economic fundamentals and exchange rates by testing the role of real-time data. They find that macroeconomic news has a statistically significant impact on the US dollar – euro/DEM exchange rate. Their results also show that good news for the US economy is associated with an appreciation of the US dollar. Moreover, good news for the German economy leads to an appreciation of the DEM against the US dollar. However, the empirical findings of Ehrmann and Fratzscher (2005) suggest that US macroeconomic news has a greater impact on the exchange rate than German and euro area news. They suggest that the larger importance of US macroeconomic news can be explained by their earlier release time compared to German and euro area news. Faust et al. (2007) investigate the response of exchange rates and interest rates to macroeconomic news announcements. Their results show that good news, hence news which indicates that the economy is stronger than expected, leads to an appreciation of the US dollar and a rise in expected future interest rates.

Pearce and Roley (1985) investigate on the impact of economic news on stock prices. They examine the daily response of stock prices to announcements regarding the money supply, inflation, real economic activity, and the discount rate. They find that macroeconomic news announcements related to real economic activity have no influence on the S&P 500. Their findings indicate that monetary policy news has a highly statistically significant impact on stock prices. The authors also show that the anticipated part of each economic announcement has no statistically significant impact on stock prices. Hence, they find evidence in favor of the efficient market hypothesis. In contrast to Pearce and Roley (1985), McQueen and Roley (1993) find a strong relationship between news related to real economic activity and movements of stock prices. McQueen and Roley (1993) show that macroeconomic news about inflation, industrial production, and the unemployment rate has an impact on stock prices. However, their results indicate that the stock markets response to macroeconomic news announcements depends on the state of the economy. Hence, they show that good news related to economic activity has a negative impact on stock prices when the economy is relatively strong.

Fleming and Remolona (1999) examine the impact of macroeconomic announcements on the US yield curve. Their empirical results indicate that short maturities react relatively weakly to macroeconomic surprises whereas medium-term government bonds respond strongly to macroeconomic news. Balduzzi et al. (2001) elaborate on the response of bond prices to macroeco-

conomic news announcements. They show empirical evidence that macroeconomic news significantly affects the US Treasury market. Balduzzi et al. (2001) also find that market participants react to macroeconomic news quickly. Hence, it seems that market participants fully process macroeconomic news in a timely manner. Moreover, their results suggest that bond market volatility increases immediately after the announcement of macroeconomic news. Huang and Kong (2007) examine the relationship between macroeconomic news announcements and corporate bond credit spreads. They show that macroeconomic news has an impact on the credit spreads of high-yield bonds.

Andersen et al. (2007) study the impact of macroeconomic news announcements on stock prices, bond markets, and exchange rates, respectively. They find that stock prices, bond prices, and exchange rates are linked to macroeconomic fundamentals. Hence, their results suggest that macroeconomic news affects equity markets, bond markets, and exchange rates. By conditioning on the state of the economy, they show that bond markets respond most strongly to the release of macroeconomic news. Goldberg and Grisse (2013) argue that on the one hand the effects of macroeconomic news on asset prices are well established, but on the other hand that these effects are time variant. They show empirically that the impact of macroeconomic announcements on the yield curve and exchange rates vary with the US VIX and the level of the Federal Fund Rate. Hence, they conclude that the time variation in effects can be explained by economic and risk conditions, respectively.

In recent years, many studies have focused on the effects of non-standard monetary policy measures conducted by large central banks by using an event-study methodology. Typically, these studies elaborate on the impact of unconventional monetary policy announcements on domestic and foreign financial variables, respectively. A crucial step is to identify non-standard monetary policy news. Many different approaches have been developed in the literature. Szczerbowski (2015) and Gagnon et al. (2011) use the narrative approach in order to detect relevant non-standard monetary policy events. They use official press releases, announcements and decisions made by the respective monetary policy authority. Fratzscher et al. (2014) and Urbschat and Watzka (2017) take events into account only if these events were announced by central banks *and* if these events were covered by the Financial Times on the first three pages on the next day. Another approach in order to identify relevant events is to use news databases such as LexisNexis, Factiva, or Google News (Altavilla et al., 2015). In using this approach,

one firstly has to predefine specific search queries. Secondly, only those event dates are included into the event study for which the highest number of articles are found relating to that specific query.

Neely (2010) studies the impact of the first quantitative easing programme (QE 1) of the Federal Reserve. Specifically, he elaborates on the impact of Federal Reserve's large-scale asset purchases (LSAP) of agency debt, mortgage-backed securities (MBS) and long-term US treasuries on domestic and foreign assets. By using event-study techniques, he finds that the FED's announcements regarding asset purchases decreased long-term US and foreign bond yields. Moreover, he shows that the value of the US dollar decreased against major currencies due to the FED's asset purchases. Also focusing on QE 1 and using event study methods, Gagnon et al. (2011) find that the FED's announcements reduced 10-year government bond yields in the US. Meaning and Zhu (2011) also report that QE 1 decreased 10-year government bond yields in the US. Though, they also show that government bonds with shorter maturities were less affected by QE1 than long-term rates.

Krishnamurty and Vissing-Jorgensen evaluate the effects of the first (QE 1) and second (QE 2) quantitative easing programmes of the FED on nominal and real interest rates. In an event-study analysis, they show that 10-year US bond yields were more strongly affected by QE 1 than by QE 2. Moreover their results indicate that US corporate bond yields were negatively affected by the FED's purchases of long-term Treasuries and other long-term bonds. To sum up, empirical evidence shows that asset purchases of the FED led to decreasing long-term interest rates in the US and US dollar depreciation against major currencies. Moreover, it seems that the first QE program led to larger reductions in bond yields than subsequent asset purchases of the FED.

Many studies also focus on the effects of ECB's asset purchases on financial markets. While the FED started its first round of asset purchases in 2008, hence shortly after the beginning of the financial crisis, the ECB's decision to conduct quantitative easing measures came rather late. In 2010, the ECB announced the Securities Market Programme (SMP). SMP involved the purchase of Irish, Italian, Greek, Portuguese and Spanish debt securities on secondary markets. Eser and Schwaab (2013) evaluate the impact of the SMP in five euro area bond markets. Their results suggest that the SMP negatively affected government bond yields in periphery countries. Besides large announcement effects, they find that the actual purchases of sovereign bonds also decreased its yields. Applying event-based regressions, Szczerbowicz (2015) finds that SMP reduced yields on periphery bonds and lowered covered bond spreads. Krishnamurthy et al. (2018) also use event-study regressions and find that government bond yields were lowered in

periphery countries by the SMP. In 2012, the SMP was terminated by the ECB and replaced by the Outright Monetary Transactions (OMT) programme.

OMT included purchases of government bonds in secondary markets with no quantitative limits conditional on certain domestic conditions. Thus far, OMT has never been activated. Altavilla et al. (2016) study the effects of OMT on financial markets in the euro area in an event-study setting. Their findings indicate that OMT announcements led to decreasing 2- year and 10-year government bond yields in Italy and Spain, respectively. In contrast to that, sovereign bond yields in France and Germany were not statistically significantly affected by OMT announcements. Moreover, Szczerbowicz (2015) shows that Portuguese and Irish sovereign bond yields were significantly affected by OMT announcements and that the impact of OMT on Greek bonds was not statistically significant. Krishnamurthy et al. (2018) also find that OMT announcements negatively affected government bond yields in distressed countries in the euro area.

In March 2015, the ECB started its asset purchase programme (APP). This programme consists of ECB purchases of covered bonds, asset-backed securities, government bonds and corporate bonds. Altavilla et al. (2015) evaluate the impact of the ECB's asset purchase programme and try to detect the main transmission channels of the APP by extending a term structure model and using an event-study methodology. They find that 10-year sovereign bond yields in the euro area were strongly affected by the APP, albeit the APP was announced and implemented at a time of low financial distress in the euro area. Moreover, they find that 20-year government bond yields were influenced by APP announcements. Andrade et al. (2015) also study the impact of the ECB's asset purchase programme on yields. They find that asset prices reacted to announcements related to APP. They find no significant impact of APP on asset prices when the purchase of government bonds was initiated. Generally, Andrade et al. (2015) show that sovereign bond yields in the euro area were negatively influenced by APP announcements. De Santis (2016) assesses the impact of the APP on euro area government bond yields by relying on market news. His empirical results indicate that euro area sovereign yields were negatively affected by APP announcements. He also finds that vulnerable countries benefitted most of the Asset Purchase Programme. Moreover, most of the total impact of the APP on sovereign yields took place before euro area sovereign bonds were purchased by the ECB.

In recent years, many studies have focused on the spillover effects of non-standard monetary policies conducted by large central banks. The academic literature mainly elaborates on the

impact of the FED's unconventional monetary policies (UMP) on exchange rates, global government bond yields, corporate bond yields and global equity prices. Empirical evidence suggests that the FED's non-standard monetary policies spilled over to global long-term sovereign bond yields and corporate bond yields (Chen et al., 2012; Glick and Leduc, 2012; Diez and Presno, 2013; Fratzscher et al., 2013; IMF, 2013; Berge and Cao, 2014; Glick and Leduc, 2015). Specifically, this strand of literature finds that the FED's UMP measures led to declining global short-term rates, decreasing long-term government bond yields and falling global corporate bond yields. Moreover, the FED's non-standard monetary policies are associated with a depreciation of the US dollar against other major currencies (Neely, 2015). Furthermore, empirical evidence shows that global equity prices and capital flows were hardly affected by the FED's non-standard monetary policies.

There are also studies which investigate the impact of the ECB's unconventional monetary policy measures on asset prices globally. Fratzscher et al. elaborate on international spillover effects of the ECB's non-standard monetary policies. Their empirical findings suggest that the ECB's unconventional monetary policies spilled over to equity markets, globally. Moreover they find that the euro depreciated vis-à-vis advanced and emerging market economy currencies. Furthermore, their results indicate that global bond yields were hardly influenced by the ECB's non-standard monetary policy measures. Georgiadis and Gräß (2015) investigate the international spillover effects of the ECB's asset purchase programme. They show that the announcement of the asset purchase programme boosted equity prices in the euro area and the rest of the world. Furthermore, their results indicate that the euro depreciated against advanced and emerging market economy currencies. Moreover, they find that the announcement of the asset purchase programme had only a small effect on global bond yields.

Event-study regressions have also been used in order to analyze the short-term impact of fiscal policy announcements on financial markets. For instance, Wachtel and Young (1987) elaborate on the impact of fiscal deficit announcements on interest rates. For the case of the US, they find that larger than expected deficits are associated with rising interest rates. Falagiarda and Gregori (2015) study the effect of fiscal policy announcements by the Italian government on the sovereign bond spread. Their results indicate that fiscal policy announcements made by the Italian government had a significant impact on the sovereign bonds of Italy relative to Germany. De Jong (2018) investigates the relationship between fiscal announcements and interest spreads in

the Netherlands. The empirical results of de Jong (2018) suggest that announcements of substantial consolidation packages lowered yield spreads on ten year bonds vis-à-vis German government bonds.

This thesis investigates the short-term effects of political events and non-standard monetary policy news on financial markets. In particular we elaborate on the impact of Brexit¹ on British pound exchange rates (Celebi and Korus, 2019) and on credit spreads in the United Kingdom (UK) and Eurozone (Kadiric and Korus, 2019), respectively. Moreover, I study the spillover effects from the ECB’s Unconventional Monetary Policies on a broad range of financial assets from Denmark, Norway and Sweden (Korus, 2019). Hence, each chapter deals with the impact of news on financial markets and extends the above mentioned literature which tries to understand how financial assets react to macroeconomic news, monetary policy announcements and political events. These three research articles were written in the years 2015 to 2019 during my doctoral studies at the Schumpeter School of Business and Economics at the University of Wuppertal. The following figure illustrates how all papers are connected with each other:

Figure 1.1: Framework of the thesis

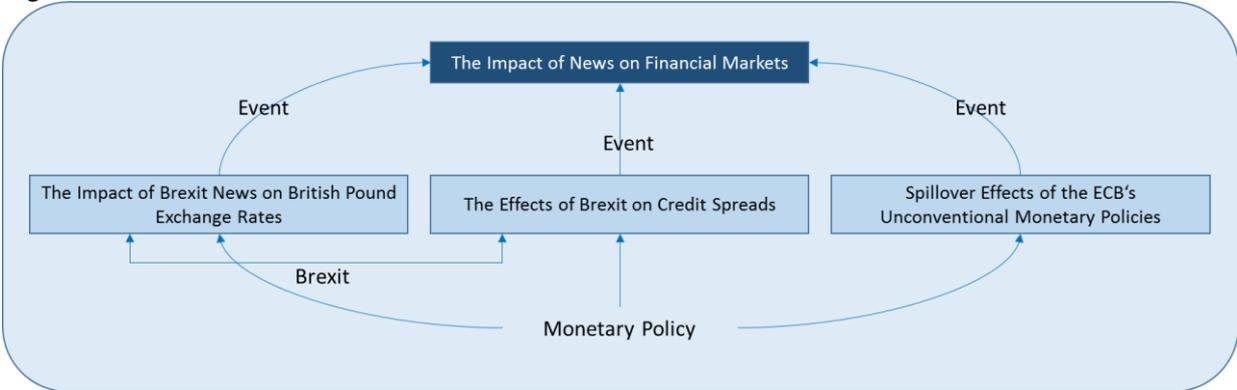


Figure 1.1. illustrates how all papers are connected with each other. In each chapter we employ event-study regressions in order to identify the impact of news on financial markets. In chapter 2 we use the HAC estimator and GARCH models. In chapter 3 we apply the ARMA Maximum Likelihood (ML) method. In chapter 4 we also apply the HAC estimator. All papers are analyzing the effects of events/news on financial markets. In chapter 2 and chapter 3 we elaborate on the impact of Brexit events on financial assets. Whereas in chapter 4 we investigate the effects of ECB’s monetary policy announcements on financial markets. Moreover, all chapters include monetary policy aspects.

¹ On 23 June, 2016, the United Kingdom voted to exit the European Union, an event which became perhaps better known under a portmanteau of ‘Britain’ and ‘exit’, i.e. Brexit.

1.2 Overview

In this subchapter, I provide a short summary and discuss the main contributions of each of the following research papers. Moreover, I also briefly present the main findings of each chapter.

Chapter 2: The Impact of Brexit News on British Pound Exchange Rates

This chapter is based on the article titled “The impact of Brexit news on British pound exchange rates” co-authored by Kaan Celebi. This article was published in the peer-reviewed journal *International Economics and Economic Policy* (2019, Vol. 16(1), pp. 161-192) as part of the special issue on “Institutional Changes and Economic Dynamics of International Capital Markets in the Context of Brexit”. Using event-study regressions, we investigate the impact of Brexit-related events on the spot exchange rate of the British pound against the euro and the US dollar. We want to find out whether Brexit-related news, including the result of the Brexit referendum itself, has an impact on British pound exchange rates. By splitting our Brexit-related events into ‘good’ Brexit news and ‘bad’ Brexit news, we find that Brexit news has an impact on British pound exchange rates. Bad Brexit news is associated with a depreciation of the British pound against the euro and the US dollar whereas ‘good’ Brexit news appreciates the Pound against the euro. Furthermore, our empirical results suggest that market participants display a delayed reaction to bad Brexit news. Although the referendum clearly has a significant impact on both British pound/euro and British pound/US dollar exchange rate volatility, the impact of Brexit news is only measurable for the British pound/euro exchange rate volatility. Besides the asymmetric volatility pattern towards positive and negative shocks in general, we find that the statistical significance and the magnitude of the impact of good Brexit news is higher than those of bad Brexit news. Concerning the British pound/US dollar exchange rate volatility, our results display a weak presence of volatility asymmetry in terms of shocks and good/bad Brexit news, respectively.

The main contribution of this paper to the literature is threefold: Firstly, thus far the literature has focused particularly on the effect of the Brexit referendum result itself on British pound exchange rates, whereas we consider 16 additional Brexit-related events. Secondly, to the best of our knowledge, we are the first to categorize Brexit-related events into ‘good’ Brexit news and ‘bad’ Brexit news. Thirdly, we also elaborate on the impact of Brexit-related events on the exchange rate volatility of the British pound.

Chapter 3: The effects of Brexit on credit spreads: Evidence from UK and Eurozone corporate bond markets

Chapter 3 is based on the paper “The effects of Brexit on credit spreads: Evidence from UK and Eurozone corporate bond markets” co-authored by Samir Kadiric. This paper was published in the peer-reviewed journal *International Economics and Economic Policy* (2019, Vol. 16(1), pp. 65-102) as part of the special issue on “Institutional Changes and Economic Dynamics of International Capital Markets in the Context of Brexit”. In this study, we investigate the impact of Brexit-related events on the corporate bond yield spreads in the United Kingdom and Eurozone (or Euro Area: EA), respectively. We want to find out whether Brexit-related news, including the result of the Brexit referendum itself, had an impact on the risk conditions in those two corporate bond markets. Our estimation results indicate that the announcement of the referendum result is associated with increasing credit spreads in the UK and EA. However, only the actual announcement of the UK referendum result itself had an influence on the credit spreads. Furthermore, we distinguish between financial and the non-financial economic sectors in order to analyse more specific sector-related effects of the referendum event. Our estimation results suggest that UK credit spreads were more strongly influenced by the announcement of the results of the Brexit referendum than credit bond spreads in the Eurozone were. Finally, we split our sample into pre-referendum and post-referendum periods to consider the potential changing evaluation of the determinants of corporate bond spreads due to altering risk pricing triggered by the Brexit referendum result. We find that the effect of credit default risk is far stronger and plays a more significant role in the post-referendum period in UK and EA, respectively.

This paper differs from the existing literature in that, to the best of our knowledge, we are the first to analyse the impact of Brexit on corporate bond yield spreads in the UK and EA. Furthermore we extend the existing literature on corporate bond yield spreads in the UK and EA, which to date is rather scarce. We analyse the UK and EA corporate bond markets simultaneously which allows for a direct comparison of the two markets. Moreover, this study is the first to use the forward swap market as an explanatory variable for credit spread.

Chapter 4: Spillover Effects from the ECB's Unconventional Monetary Policies: The Case of Denmark, Norway and Sweden

This chapter is based on the article “Spillover Effects from the ECB's Unconventional Monetary Policies: The Case of Denmark, Norway and Sweden”. This paper was published in the peer-reviewed journal *Athens Journal of Business and Economics* (2019, Vol. 5(1), pp. 53-78). Using event-study techniques, I investigate the impact of ECB's announcements of non-standard policy measures on a broad range of financial assets from Denmark, Norway and Sweden. I find evidence that unconventional monetary policy announcements by the ECB resulted in pronounced spillovers to Denmark, Norway and Sweden. In particular, the results suggest that medium- and long-term government bond yields, corporate bond yields and CDS spreads were affected by the ECB's announcements of non-standard policy measures. The empirical results indicate that the portfolio rebalancing channel played an important role in the transmission of the ECB's non-standard policy measures on medium- and long-term government bonds and corporate bond yields. However, it also seems that declining government bond yields transmitted to decreasing corporate bond yields. Moreover, the results suggest that benchmark stock market indices and exchange rates vis-à-vis the euro were mainly unaffected by the ECB's announcements of unconventional monetary policies. Furthermore, we find pronounced spillover effects from Forward Guidance statements, Securities Markets Programme announcements, and Corporate Sector Purchase Programme announcements on financial assets from Denmark, Norway and Sweden. However, the results depend highly on the monetary policy surprise measure used in the regressions and the degree of policy anticipation.

In this article, I contribute to the existing literature by assessing the effects of the ECB's non-standard policy measure announcements on small, open advanced economies. The paper focuses on the impact of ECB announcements of unconventional monetary policy measures on a broad set of financial variables from three Nordic countries, namely Denmark, Norway and Sweden. Moreover, to the best of the author's knowledge, it is the first paper to analyse the impact of the ECB's announcements of unconventional monetary policies on a broad range of financial assets from Denmark, Norway and Sweden.

1.3 References

- Almeida, A.; Goodhart, C.; Payne, R. (1998), The Effects of Macroeconomic ‘News’ on High Frequency Exchange Rate Behavior, *Journal of Financial and Quantitative Analysis*, Vol. 33(3), 383-408.
- Altavilla, C.A.; Carboni, G.; Motto, R. (2015), Asset purchase programmes and financial markets: lessons from the euro area, ECB Working Paper No. 1864, Frankfurt am Main.
- Altavilla, C.A.; Giannone, D.; Lenza, M. (2016), The Financial and Macroeconomic Effects of the OMT Announcements, *International Journal of Central Banking*, Vol. 12(3), 29-57.
- Andersen, T.G.; Bollerslev, T.; Diebold, F.X.; Vega, C. (2003), Micro effects of macro announcements: real-time price discovery in foreign exchange, *American Economic Review*, Vol. 93(1), 38–62.
- Andersen, T.G.; Bollerslev, T.; Diebold, F.X.; Vega, C. (2007), Real-time price discovery in global stock, bond and foreign exchange markets, *Journal of International Economics*, Vol. 73(2), 251–277.
- Andrade, P.; Breckenfelder, J.; De Fiore, F.; Karadi, P.; Tristani, O. (2016), The ECB's asset purchase programme: an early assessment, ECB Working Paper No. 1956, Frankfurt am Main.
- Balduzzi, P.; Elton, E.J.; Green, T.C. (2001), Economic news and bond prices: evidence from the U.S. treasury market, *Journal of Financial and Quantitative Analysis*, Vol. 36(4), 523–543.
- Berge, T.; Cao, G. (2014), Global effects of U.S. monetary policy: Is unconventional policy different?, *Economic Review (Q I)*, 1-10, Federal Reserve Bank of Kansas City.
- Celebi, K.; Korus, A. (2019), The Impact of Brexit News on British Pound Exchange Rates, *International Economics and Economic Policy*, Vol. 16(1), 161-192.
- Chen, H.; Cúrdia, V.; Ferrero, A. (2012), The macroeconomic effects of large-scale asset purchase programmes, *Economic Journal*, Vol. 122(564), 289-315.
- De Jong, J. (2018), The effect of fiscal announcements on interest spreads: Evidence from the Netherlands, DNB Working Paper No. 584, Amsterdam.
- De Santis, R.A. (2016), Impact of the asset purchase programme on euro area government bond yields using market news, ECB Working Paper No. 1939, Frankfurt am Main.
- Diez, F. J.; Presno, I. (2014), Domestic and Foreign Announcements on Unconventional Monetary Policy and Exchange Rates, Public Policy Briefs (13-7), Federal Reserve Bank of Boston.
- Ehrmann, M.; Fratzscher, M. (2005), Equal Size, Equal Role? Interest Rate Interdependence between the Euro Area and the United States, *Economic Journal*, Vol. 115(506), 930-950.
- Eser, F.; Schwaab, B. (2013), Assessing asset purchases within the ECB’s securities market programme, ECB Working Paper No. 1707, Frankfurt am Main.
- Falagiarda, M.; Gregori, W. (2015), The impact of fiscal policy announcements by the Italian government on the sovereign spread: A comparative analysis, *European Journal of Political Economy*, Vol. 39(C), 288–304.

- Fama, E.F. (1970), Efficient capital markets: A review of theory and empirical work, *Journal of Finance*, Vol. 25(2), 383-417.
- Faust, J.; Rogers, J.H.; Wang, S.Y.B.; Wright, J.H. (2007), The high-frequency response of exchange rates and interest rates to macroeconomic announcements, *Journal of Monetary Economics*, Vol. 54(4), 1051–1068.
- Fleming, M.J.; Remolona, E.M. (1999), Price Formation and Liquidity in the U.S. Treasury Market: The Response to Public Information, *Journal of Finance*, Vol. 54(6), 1901-1915.
- Fratzscher, M.; Lo Duca, M.; Straub, R. (2013), On the international spillovers of US Quantitative Easing, ECB Working Paper No. 1557, Frankfurt am Main.
- Fratzscher, M.; Lo Duca, M.; Straub, R. (2014), ECB unconventional monetary policy actions: Market impact, international spillovers and transmission channels, Paper presented at the 15th Jacques Polak Annual Research Conference hosted by the International Monetary Fund.
- Gagnon, J.; Raskin, M.; Remace, J.; Sack, B. (2011), The Financial Market Effects of the Federal Reserve's Large Scale Asset Purchases, *International Journal of Central Banking*, Vol. 7(1), 3-43.
- Galati, G.; Ho, C. (2003), Macroeconomic News and the Euro/Dollar Exchange Rate, *Economic Notes*, Vol. 32(3), 371-398.
- Georgiadis, G.; Gräß, J. (2015), Global financial market impact of the announcement of the ECB's extended asset purchase programme, Globalization and Monetary Policy Institute Working Paper No. 232, Federal Reserve Bank of Dallas.
- Glick, R.; Leduc, S. (2012), Central bank announcements of asset purchases and the impact on global financial and commodity markets, *Journal of International Money and Finance*, Vol. 31(8), 2078-2101.
- Glick, R.; Leduc, S. (2015), Unconventional monetary policy and the dollar: conventional signs, unconventional magnitudes, Working Paper Series (2015-18), Federal Reserve Bank of San Francisco.
- Goldberg, L.S.; Grisse C. (2013), Time variation in asset price responses to macro announcements, Staff Reports 626, Federal Reserve Bank of New York.
- Huang, J.J.; Kong, W. (2007), Macroeconomic News Announcements and Corporate Bond Credit Spreads, Working Paper, Penn State University.
- International Monetary Fund (2013), Global Impact and Challenges of Unconventional Monetary Policies, IMF Policy Paper.
- Kadiric, S.; Korus, A. (2019), The Effects of Brexit on Corporate Yield Spreads: Evidence from UK and Eurozone Corporate Bond Markets, *International Economics and Economic Policy*, Vol. 16(1), 65-102.
- Korus, A. (2019), Spillover Effects from the ECB's unconventional monetary policies: The case of Denmark, Norway and Sweden" (2019), *Athens Journal of Business & Economics*, Vol. 5(1), 53-78.
- Krishnamurthy, A.; Vissing-Jorgensen, A. (2011), The Effects of Quantitative Easing on Long-term Interest Rates, Meeting Papers 1447, Society for Economic Dynamics.

- Krishnamurthy, A.; Nagel, S.; Vissing-Jorgensen, A. (2018), ECB Policies Involving Government Bond Purchases: Impact and Channels, *Review of Finance*, Vo. 22(1), 1-44.
- McQueen, G.; Roley, V.V. (1993), Stock Prices, News, and Business Conditions, *Review of Financial Studies*, Vol. 6(3), 683-707.
- Meaning, J.; Zhu, F. (2011), The impact of recent central bank asset purchase programmes, *BIS Quarterly Review*, December, 73-83.
- Neely, C.J. (2010), The large-scale asset purchases had large international effects, Working Paper 018C, Federal Reserve Bank of St. Louis.
- Neely, C. J. (2015), Unconventional monetary policy had large international effects, *Journal of Banking & Finance*, Vol. 52(C), 101–111.
- Neely, C.J.; Rubun Dey, S. (2010), A Survey of Announcement Effects on Foreign Exchange Returns, *Federal Reserve Bank of St. Louis Review*, Vol. 92(5), 417-463.
- Pearce, D.K.; Roley, V.V. (1985), Stock Prices and Economic News, *Journal of Business*, Vol. 58(1), 49-67.
- Shiller, R.J. (2003), From Efficient Markets to Behavioral Finance, *Journal of Economic Perspectives*, Vol. 17(1), 83-104.
- Szczerbowicz, U. (2015), The ECB unconventional monetary policies: have they lowered market borrowing costs for banks and governments?, *International Journal of Central Banking*, Vol 11(4), 91–127.
- Urbschat, F.; Watzka, S. (2017), Quantitative Easing in the Euro Area - An Event Study Approach, *Macro, Money and International Finance*, cesifo Area Conferences 2017, Munich, 30 June & 1 July 2017.
- Wachtel, P.; Young, J. (1987), Deficit announcements and interest rates, *American Economic Review*, Vol. 77(5), 1007–1012.

5 Policy Implications and Caveats

5.1 Policy Implications

In this chapter we discuss several policy implications which can be drawn from the three articles presented in this dissertation. The present study deals with the impact of news on financial assets. Hence, we analyze the short-term impact of monetary policy measures and political events on selected economies. As a result, we can derive policy recommendations from our empirical findings which are related to the short-term. However, announcements and news could also have an indirect impact on real variables via their influence on financial assets. For instance, a depreciation of the domestic currency triggered by the announcement of an expansionary monetary policy measure against major currencies may lead to a higher inflation rate and thus to lower real income growth and consumption growth in the domestic country. Thus, monetary policy announcements and Brexit news may have medium-term effects on the economy of a country. For that reason, we also discuss policy implications which are related to the medium-term.

In the second and third chapter we are using a Brexit event list published by the House of Commons Library (Walker, 2018). We only include Brexit-related events which are defined by the House of Commons Library (Walker, 2018) as events leading to the UK's exit from the European Union into our event list. This institution is highly reputable and independent from the UK government. Thus, we think that the Brexit-related news which have been added in to the event list of the House of Commons Library are of high quality. Expected Brexit-related events have been also included into the Brexit event list of the House of Commons Library. It's a meaningful way of political expectation formation by incorporating future Brexit events into an official event list. Hence, we recommend that the EU institutions should also provide high quality event lists in which expected events are also included. This could help financial market participants to form firmer expectations about political events in the EU.

In the second chapter, we find that bad Brexit news is associated with a depreciation of the British pound against the euro and the US dollar, respectively. In particular, the announcement of the Brexit referendum result itself heavily depreciated the British pound against major currencies. It seems that the depreciation of the Pound due to Brexit-related events encouraged exporters to increase production (Bank of England, 2018). Moreover, import prices also increased due to the deprecation of the British pound. This prompted UK households to decrease their consumption of foreign-produced goods. It also seems that companies in the UK adjusted

their supply chains. The Bank of England (2018) reported that companies in the manufacturing sector reduced imports of foreign-produced intermediate goods. Moreover, the depreciation of sterling also stimulated investment expenditure of foreign-oriented firms (Górnicka, 2018). Thus, rising net exports due to the depreciation of the British pound against major currencies had a stabilizing effect on the GDP growth rate in the UK. The GDP growth rate in 2017 was higher than previously forecasted by the Bank of England due to higher than expected net exports. Furthermore, it seems that the negative impact of a higher inflation rate was offset by the positive effect of the sterling depreciation on net exports on the GDP growth rate in 2017 (Bank of England, 2018).

Our empirical results in the second chapter also suggest that both bad Brexit news and good Brexit news have a significant impact on the volatility of the British pound/euro exchange rate. Hence, it seems that the Brexit process has led to higher economic uncertainty in the UK. A higher exchange rate volatility may have a negative impact on the UK's GDP growth rate. From a theoretical point of view, a higher exchange rate volatility is associated with lower business investment and lower trade and hence with a negative impact on GDP growth (Darby et al., 1999). Moreover, it seems that the negative impact of exchange rate volatility on economic growth is stronger in countries adopting a flexible exchange rate regime and financially open economies (Barguëllil, 2018). For these reasons, we recommend in the second chapter (see Section 2.7) that the UK government should implement a smoother communication strategy in order to avoid a sharp rise of exchange rate volatility of the British pound/euro exchange rate due to statements concerning both bad and good Brexit news.

It seems that the negative effect of uncertainty on economic growth is gaining importance (Bloom et al., 2019) and that the positive impact of the sterling depreciation due to Brexit-related events has faded because export growth in the UK has decelerated noticeably in 2018 (Bank of England, 2019). Bloom et al. (2019) find that Brexit has been an important source of uncertainty for around 40 per cent of UK businesses. Moreover, they find evidence that businesses do not understand how Brexit will influence their sales, exports and costs in the longer-term. Thus, it may be suspected that the uncertainty created by Brexit should be associated with lower investments. However, thus far the relationship between uncertainties created by Brexit and business investment has not been thoroughly explored in the literature. To sum up, we conclude that the British government should come to an arrangement regarding the UK's future trade and investment relationship with the EU as soon as possible in order to eliminate the drag of uncertainty on business investments and hence economic growth in the UK.

In chapter 3 our empirical results suggest that the very announcement of the result of the Brexit referendum itself had an impact on risk conditions in the UK corporate bond market. Moreover, we find that credit spreads in both the UK financial sector and non-financial sector were affected by Brexit. Hence, the creditworthiness of UK businesses weakened due to the Brexit process. This means that Brexit caused rising financing-costs for UK businesses. So, we suspect that rising corporate bond yield spreads dampened business investments and hence economic growth in the UK. In order to attenuate the negative impact of increasing corporate bond yield spreads on investments, the UK government may consider to decrease the statutory corporate tax rate further. On the one hand, a lower statutory corporate tax rate is associated with higher transitory net profits and hence decreasing corporate bond yield spreads. Both effects might dampen the negative impact of Brexit on increasing financing-costs for UK businesses. On the other hand, it could also be the case that the positive impact of declining corporate tax rates will be offset by the negative impact of uncertainties related to the Brexit process on business investment. So, it is unclear whether a decrease of the statutory corporate tax rate will boost UK business investments or not, especially as the statutory corporate tax rate of the UK is already relatively low (Baier and Welfens, 2018). Furthermore, it can be expected that reducing corporate taxes may have a negative impact on the fiscal outlook. This implies, that decreasing corporate tax rates are associated with higher government bond yields in the UK and thus with a higher default risk for UK government bonds.

The departure of the UK from the EU may also bring negative effects for the City of London. According to the analysis of Oliver Wyman (2016), the City of London may lose up to £18 billion in revenue and 30,000 jobs due to Brexit. Indeed other estimates suggest that job losses triggered by Brexit will be much higher. PwC (2016) estimates that 70,000 jobs will be lost by leaving the EU single market. The company Ernst and Young (2017) estimates the job loss due to Brexit at 80,000. Overall, the estimates suggest that employment will drop between seven and eight per cent. Moreover, it seems that the loss of revenue of the financial sector of the City of London will be between 12 and 18 per cent. These numbers suggest that the liquidity of the UK corporate bond markets will be negatively affected by Brexit. Remember that a lower liquidity of the UK corporate bond market is associated with higher credit spreads and thus with higher credit costs for UK companies. This, in turn, should negatively affect UK businesses investment. In order to combat these negative effects of Brexit on the City of London, the British government could undertake financial deregulation. This could trigger a regulatory race with other financial centres. Such a development would be harmful for the stability of the global financial system (Baier and Welfens, 2019).

In the fourth chapter of this dissertation, we find that the ECB's unconventional monetary policies spilled over to financial variables from advanced small open economies. In particular, long-term government bond yields and corporate bond yields were affected by the ECB's non-standard monetary policies. Furthermore, it seems that the ECB's unconventional monetary policy measures spilled over to our countries of interest irrespective of the relevant exchange rate regime. Hence, we find that central banks in our countries of interest are not able to run a monetary policy independent of that of the ECB. Moreover, adopting a flexible exchange rate regime would not necessarily mean that for instance the Danish central bank may adopt a monetary policy independently of that of the ECB. This finding is in line with that of Miranda-Agrippino and Rey (2015). They find that increasing financial integration led to a co-movement of financial assets globally. Hence, they detected a global financial cycle which is strongly affected by the FED's monetary policy. Moreover, they find that financial assets from countries adopting a flexible exchange rate regime were also affected by a global financial cycle. Hence, they conclude that the classical "trilemma" in international macroeconomics changed into a "dilemma". Miranda-Agrippino and Rey (2015) argue that the policy choice is restricted between an independent monetary policy and an open capital account. Thus, if for instance the Norwegian central bank should want to run an independent monetary policy, it must adopt capital controls. However, in order to raise the ability of domestic policy institutions to steer domestic financial conditions, the domestic central bank or another domestic institutions may use macroprudential policy tools.

Lower government bond yields in small open advanced economies triggered by the ECB's unconventional monetary policies may transmit to lower mortgage rates. Lower mortgage rates should be associated with a higher demand for real estate. This may lead to higher real estate prices and hence to a higher inflation rate in small open economies. It could also be the case that the ECB's non-standard policies may trigger a housing boom in small open economies. In order to dampen the impact of the ECB's unconventional monetary policy measures on the domestic real estate market, the domestic central bank may implement or adjust the loan-to-value (LTV) ratio. The domestic central bank may lower the LTV so that the expansion of loans in the domestic economy will be dampened. This would also distract complementary FDI inflows to the construction sector. Hence, with the use of the LTV, the domestic central bank is able to steer the inflation rate and to run its monetary policy independently of the ECB's monetary policy.

5.2 Limitations and Options for Future Research

The empirical findings and policy implications of the analytical chapters are subject to a number of limitations, which also have to be discussed. In the second and third chapters we use a Brexit event-dummy based on the list of Walker (2018) and the Financial Times. Furthermore, we split our Brexit events into good Brexit news and bad Brexit news by reading the Financial Times thoroughly and searching for signalling words in order to classify Brexit news into the aforementioned categories. However, this approach of classifying Brexit events into bad Brexit events and good Brexit news is necessarily subjective. Therefore, in future research, computational linguistics can be used to infer the different dimensions of Brexit events. This should at least reduce the subjectivity of the approach used in the second and third chapters of this thesis. A task for future research could also be to create a continuous Brexit news variable by using machine learning methods. The consequence would be to replace the dummy variable by a continuous Brexit news index. By using such an index in the empirical analysis, one can estimate a quasi-elasticity for Brexit events. Hence, this gives politicians better opportunities to react to adverse effects of Brexit on the economy of the United Kingdom. Moreover, one could also create a trade news index by using machine learning methods. This could help policymakers to react more adequately to the US trade policy.

In the third chapter we are using the sovereign CDS spread as a proxy for corporate credit risk. This may be misleading and incapable of fully grasping the variation in the underlying corporate CDS spreads. Moreover, the literature shows some stronger or weaker spillovers from sovereign risk to bank and non-financial corporate credit risk, but such effects are rather time-, country- and sector-specific (Breckenfelder and Schwaab, 2018). It tends to be stronger when a sovereign faces strong increases in its expected default risk as happened in the peripheral countries of the euro area during the height of the sovereign debt crisis. To sum up, incorporating corporate CDS spreads may enrich the empirical model and will be a task for future research. However, corporate CDS spreads may be more relevant to speculative bonds although CDS spreads largely focus on default risk. An alternative measure for corporate credit risk may also be to use the swap rate curve (LIBOR-based swap spreads).

In the third chapter we distinguish between financial and non-financial sectors. For future research, it may be beneficial to distinguish among the different rating groups (Chen et al., 2007), at least between investment grade and speculative bonds, as the latter group bear more risk. Additionally, one could estimate the Brexit effects across different business sectors to test whether credit spreads react differently depending on the respective sector. In fact, due to the

different economic relationships between individual euro area countries and the UK, the diverse risk conditions in each business sector, and given that different business sectors are influenced by macroeconomic conditions (economic control variables) and “events” in different ways, it may also be beneficial to conduct the event study at the firm level instead. That is, to calculate the credit spread on a firm-by-firm basis and aggregate it by rating group, country of origin, sector and time horizon.

In the fourth chapter, we study the impact of the ECB’s unconventional monetary policies on financial variables from Denmark, Norway and Sweden. We find that the ECB’s announcement of non-standard monetary policies resulted in pronounced spillover effects on financial assets in Denmark, Norway and Sweden. Moreover, our empirical results suggest that the portfolio rebalancing channel played an important role in the transmission of the ECB’s non-standard policy measures on medium- and long-term government bonds and corporate bond yields. However, it should be acknowledged that we are not testing for the presence of the portfolio rebalancing channel directly. Indeed, this could be a task for future research. One could use high-frequency data on capital flows in order to measure the influence of the portfolio rebalancing channel on financial variables from our countries of interest (Falagiarda et al., 2015). Furthermore, the presence of the confidence channel and the signalling channel could also be investigated empirically.

We focus on the impact of the ECB’s announcements of unconventional monetary policies on financial assets from Denmark, Norway and Sweden. In the fourth chapter we also use the FED’s non-standard monetary policies as a control variable in our empirical analysis. However, we do not put much emphasis on the effects of the FED’s announcements of unconventional monetary policies on financial variables from our countries of interest. We think that it will be fruitful to study the impact of the FED’s non-standard monetary policies in Denmark, Norway and Sweden in a more detailed way. Moreover, the impact of the Bank of England’s and Bank of Japan’s respective non-standard policies on financial assets from our countries of interest could also be studied. Hence, it could be possible to assess which central bank of the four major currency areas had the largest impact on securities from Denmark, Norway and Sweden.

5.3 References

- Baier, F.J.; Welfens, P.J.J. (2018), BREXIT and Foreign Direct Investment: Key Issues and New Empirical Findings, *International Journal of Financial Studies*, Vol. 6(2), 46.
- Baier, F.J.; Welfens, P.J.J. (2019), The UK's banking FDI flows and Total British FDI: a dynamic BREXIT analysis, *International Economics and Economic Policy*, Vol. 16(1), 193-213.
- Bank of England (2018), Inflation Report February 2018, London.
- Bank of England (2019), Inflation Report May 2019, London.
- Barguelli, A.; Ben-Salha, O.; Zmami, M. (2018), Exchange Rate Volatility and Economic Growth, *Journal of Economic Integration*, Vol. 33(2), 1302-1336.
- Breckenfelder, J.; Schwaab, B. (2018), Bank to sovereign risk spillovers across borders: evidence from the ECB's Comprehensive Assessment, ECB Working Paper No. 2193, Frankfurt am Main.
- Chen, L.; Lesmond, D.A.; Wei, J. (2007), Corporate Yield Spreads and Bond Liquidity, *Journal of Finance*, Vol. 62(1), 119-149.
- Darby, J.; Hughes Hallet, A.; Ireland, J.; Piscitelli, L. (1999), The Impact of Exchange Rate Uncertainty on the Level of Investment, *Economic Journal*, Vol. 109(454), Conference Papers (Mar., 1999), C55-C67.
- Ernst & Young, (2017), UK/EU: Working through uncertainty - Practical considerations for Financial Institutions, London.
- Falagiarda, M.; McQuade, P.; Tirpák, M. (2015), Spillovers from the ECB's non-standard monetary policies on non-euro area EU countries: evidence from an event-study analysis, ECB Working Paper No. 1869, Frankfurt am Main.
- Górnicka, S. (2018), Brexit Referendum and Business Investment in the UK, Working Paper 18/247, IMF Working Paper.
- Miranda-Agrippino, S.; Rey, H. (2015), US Monetary Policy and the Global Financial Cycle, Working Paper 21722, NBER Working Paper Series.
- Oliver Wyman (2016), The impact of the UK's exit from the EU on the UK-based financial services sector, London.
- PricewaterhouseCoopers (2016), Leaving the EU: Implications for the UK financial services sector, London.
- Walker, N. (2018), Brexit timeline: events leading to the UK's exit from the European Union, Briefing Paper No. 07960, House of Commons Library.