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The Impact of Brexit on the British Pound/Euro Exchange rate

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Summary

Using event-study techniques we investigate the impact of Brexit-related events on the spot exchange rate of the British pound against the euro. We want to find out whether Brexit-related news, including the Brexit referendum itself, has an impact on the Pound sterling/Euro exchange rate. By splitting our Brexit-related events into ‘good’ Brexit news and ‘bad’ Brexit news, we find an impact of Brexit news on the British pound/Euro exchange rate. Bad Brexit news is associated with a depreciation of the British pound against the euro whereas ‘good’ Brexit news appreciates the Pound sterling against the euro. Furthermore, our empirical results suggest that market participants display a delayed reaction to bad and good Brexit news, respectively. Additionally, it seems that the impact of bad Brexit news on the spot exchange rate of the British pound against the euro is more persistent than the effect of good Brexit news.

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1. Introduction

In this paper we study the impact of the Brexit process on the spot exchange rate of the Pound sterling against the euro by using event-study techniques. We want to find out whether Brexit-related news, including the Brexit referendum itself, has an impact on the Pound sterling/Euro exchange rate. On 23 June, 2016, the United Kingdom (UK) voted to leave the European Union (EU), a process which has become well-known as Brexit. Just one day after the referendum, stock market indices in the UK decreased sharply, uncertainty increased, and the Pound sterling depreciated heavily against major currencies. The Pound sterling depreciated against the US dollar by nearly eight percent and against the euro by six percent, respectively. The depreciation of the British pound was triggered by sales of British securities by investors. Brexit also triggered a more aggressive expansionary monetary policy by the Bank of England. Interest rate cuts and additional non-standard monetary policy measures conducted by the Bank of England further depreciated the Pound sterling against other major currencies. Undoubtedly, Brexit represents a significant shock to the economy of the United Kingdom. The Brexit process has already had significant short-term effects on financial markets and is expected to have long-term effects on real economic activity through increasing barriers to trade, labour and capital mobility, and hence through declining productivity in the United Kingdom.

Many studies focus on the long-term impact of Brexit on real economic activity in the UK. For example, Ottaviano et al. (2014) predict that increasing trade barriers would result in a 1.1 percent to 3.1 percent reduction of GDP by using a quantitative static general equilibrium trade model. Dhingra et al. (2017) estimate that Brexit would lead to a permanent 1.3 percent to 2.7 percent decline in UK consumption per capita using a quantitative trade model. By using gravity equations for bilateral trade, Dhingra et al. (2017) find that Brexit may lead to a reduction of UK income per capita of between 6.3 and 9.4 percent. The general finding of studies, which focus on the impact of higher trade costs due to Brexit, is that welfare in the United Kingdom will drop. Other studies focus on the impact of Brexit on foreign direct investment (FDI) and immigration. For instance Baier and Welfens (2018) use the gravity equation for FDI flows and find that Brexit will lead to a reduction of FDI inflows to the UK by 42 percent. Portes and Forte (2017) elaborate on the impact of lower immigration from the EU on the UK's GDP per capita. They find that restricting immigration from the EU may reduce GDP per capita in the UK by between 0.9 percent and 3.4 percent until 2030.

There are also studies which focus on the short-run impact of Brexit on financial markets. In particular, these studies investigate the effects of Brexit events on stock markets, uncertainty (Baker et al., 2016) and exchange rates. Davies and Studnicka (2017) analyse the influence of Brexit-related events on stock movements in the UK by using event study methods. They find that the announcement of the referendum's result led to a sharp decline of the FTSE 350. According to their results the FTSE 350 lost seven percent of its value in the first two days after the announcement of the referendum result. Moreover, they find that stock markets in the UK reacted promptly and persistently. They also show that after the Brexit referendum, the share price of a firm heavily depended on a global value chain structure and export performance, respectively. By conducting an event study, Ramiah, Pham and Moosa (2017) find that stock prices of financials were particularly affected by the announcement of the referendum results. Caporale, Gil-Alana and Trani (2018) apply long-memory techniques to elaborate on the impact of Brexit on the FTSE 100 Implied Volatility Index and on the British pound's implied volatilities vis-à-vis the main currencies. They find that Brexit led to significant changes in the degree of persistence of the FTSE 100 Implied Volatility Index and on the British pound's implied volatility vis-à-vis the euro and the US dollar, respectively. The Bank of England (2016) elaborate on the impact of the Brexit referendum on the Sterling effective exchange rate index (ERI). The Bank of England (2016) finds that the Sterling ERI was significantly affected by a measure of the referendum-related news flow, accounting for half of the depreciation of the sterling.

By focusing on the impact of Brexit-related events on the spot exchange rate of the Pound sterling against the euro, our paper is related to the studies which investigate the short-term impact of Brexit on financial markets and in particular to the study of the Bank of England (2016). The study of the Bank of England differs from ours in two ways. First, we focus on a bilateral exchange rate instead of investigating the impact of Brexit-related news on the Sterling ERI. Second, the Bank of England (2016) studies the impact of the referendum on the Sterling ERI whereas we consider 14 additional Brexit-related events.

Our results show that Brexit-related events have got no statistically significant impact on the spot exchange rate of the British pound against the euro. However, by splitting our 15 Brexit-related events into 'good' Brexit news and 'bad' Brexit news, we find an impact of Brexit news on the British pound/Euro exchange rate. Our results show that bad news is associated with a depreciation of the British pound against the euro and that good news led to an appreciation of the British pound vis-à-vis the euro. Moreover, we find that market participants display a delayed reaction to bad and good Brexit news, respectively. Additionally, our results indicate that the impact of bad Brexit news on the spot exchange rate of the British pound against the euro is more persistent than the effect of good Brexit news.

The remainder of the paper is organised as follows. Section 2 describes our data and our event identification method. In Section 3 we present our empirical approach and discuss our empirical findings. Finally, Section 4 concludes.

2. Data Description and Events

The sample data set ranges from 1 January, 2013, to 31 October, 2017. Daily data for the spot exchange rate of the British pound against the euro is obtained from Datastream. For our regression analysis we include three-month OIS rates, 10-year government benchmark bond yields, benchmark stock market indices and a measure for macroeconomic surprise for both the United Kingdom and the euro area, respectively (see Appendix for a detailed variable list). All data is collected from Datastream. Additionally, we control for the impact of unconventional monetary policies conducted by the Bank of England (BoE), the European Central Bank (ECB), and the US Federal Reserve (FED) on the British pound/Euro exchange rate. In order to identify events associated with announcements of unconventional monetary policies, we look at all BoE news releases, ECB press releases, and FED press releases from 1 January, 2013, to 31 October, 2017. Additionally, we try to identify unconventional monetary policy events by reading the Financial Times. We include an unconventional monetary policy announcement in our event list whenever an announcement is covered in the press releases of each central bank and on the first three pages of the Financial Times. Hence, we follow the event identification method of Fratzscher et al. (2014). Furthermore, we use 10-year government bond futures as a market-based measure for monetary policy surprise. This data is also obtained from Datastream.

Concerning the identification of events associated with Brexit, we also follow the identification method of Fratzscher et al. (2014). The overall aim by using this identification method is to identify only truly relevant event days. First, we take a look at the Brexit event list published by the parliament of the UK (Walker, 2017). From this event list we only take Brexit-related events which are defined by Walker (2017) as events leading to the UK's exit from the European Union. Second, we review if these events were covered by the Financial Times on the first three pages on the next day. Third, we include an event in our list of event days, if this event can be unambiguously assigned to be either good news or bad news. By reading the Financial Times thoroughly, we are able to distinguish between bad and good news associated with the Brexit process. If an event fulfils all these restrictions, it will be included in our list of event days. With our identification strategy of Brexit-related events we find a total of 15 event dates as illustrated in Table 1. Moreover, we find a total of eight bad Brexit event days and seven good Brexit event days.

Table 1: Event Days from Walker (2017) and Financial Times Headlines

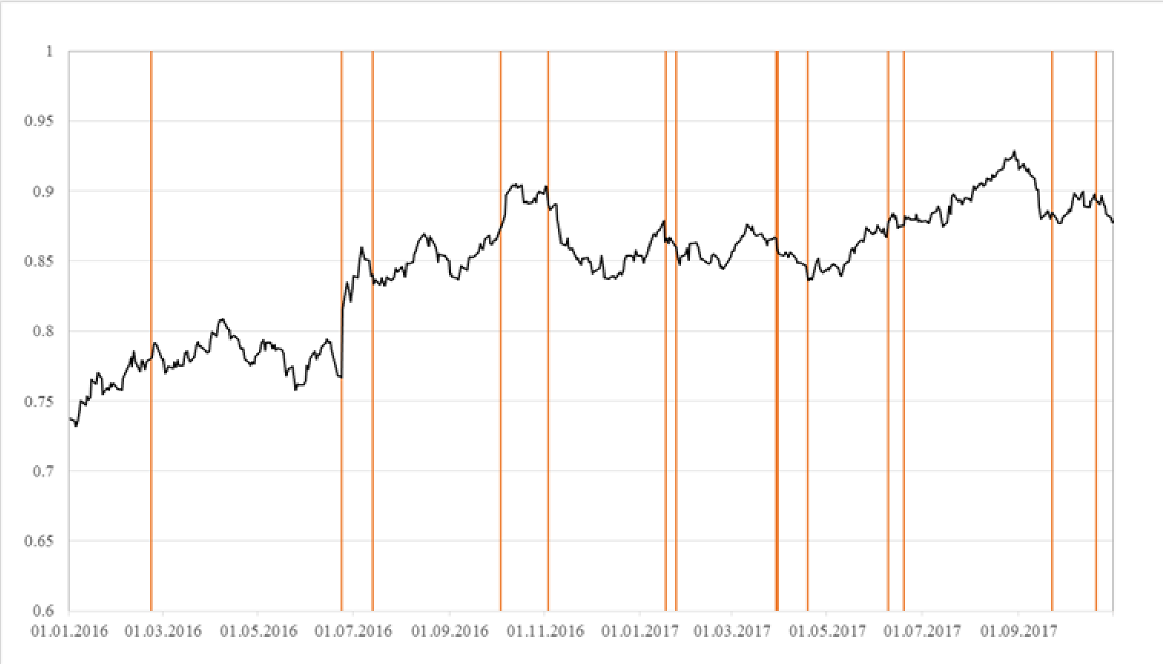
Date	*Event*	*Type of Event*
23.01.2013	Announcement of an in-out referendum	bad
22.02.2016	The Prime Minister announces the EU referendum date	bad
23.06.2016	UK holds referendum on its membership of the EU	bad
13.07.2016	Theresa May becomes the new UK Prime Minister	bad
02.10.2016	Article 50 will be triggered before the end of March 2017	bad
03.11.2016	High court rules UK parliament must have a say	good
17.01.2017	UK Prime Minister gives her Lancaster House speech	good
24.01.2017	Supreme Court rejects the UK Government's appeal of the Gina Miller case	good
29.03.2017	UK Prime Minister triggers Article 50 of the Treaty on European Union	good
30.03.2017	UK Government publishes the Great Repeal Bill White Paper	bad
18.04.2017	UK Prime Minister calls a General Election	good
08.06.2017	UK General Election results	bad
19.06.2017	First round of UK-EU exit negotiations begin	bad
22.09.2017	UK Prime Minister delivers her key Brexit speech in Florence	good
20.10.2017	European Council meeting to assess progress on the first phase of Brexit negotiations	good

Source: Walker (2017) and Financial Times, pp.1-3

Figure 1 shows the behaviour of the spot exchange rate of the British pound from January 2016 to October 2017. The British pound depreciated heavily against the euro following the announcement of the referendum result. On 23 June, 2016, the British pound depreciated against the euro by more than six percent (from 0.77 to 0.82). The British pound also lost against the US dollar and the Yen one day after the referendum. On the day of the announcement of the referendum result, the British pound depreciated against the US dollar by eight percent and against the Yen by nearly 12 percent. The depreciation of the British pound against the euro continued until November 2016. This protracted depreciation of the British pound vis-à-vis major currencies may have been beneficial for UK exports but it was also a sign of higher political uncertainty due to Brexit (Baker et al., 2016). From November 2016 until the end of 2016, the British pound appreciated against the euro remarkably after the legality of Brexit was challenged by the High Court in the UK on 3 November, 2016. We suspect that at this time market participants expected that Brexit would have less severe implications for the economy of the UK. The spot exchange rate of the British pound against the euro stagnated between January 2017 and May 2017.

Afterwards the British pound depreciated against the euro until September 2017 mainly due to two Brexit-related events which triggered investors to expect that Brexit may lead to severe welfare losses in the UK. From September 2017 to October 2017 the British pound appreciated against the euro again. Overall, it seems that the spot exchange rate of the British pound against the euro is driven by Brexit events. Moreover, descriptive statistics suggests that on the one hand there are Brexit events which lead to a depreciation of the British pound against the euro while, on the other hand, a few Brexit-related events are associated with an appreciation of the British pound against the euro.

Figure 1: Spot exchange rate of the Pound sterling against the Euro (Pound sterling per unit of foreign currency)



Source: Datastream and Walker (2017)
Notes: The black line reflects the spot exchange rate of the Pound sterling against the Euro and the vertical red lines indicate Brexit-related events.

3. Econometric Analysis

3.1 Event Study Methodology

Our event study analysis, through which we try to detect the impact of Brexit-related events on the British pound/Euro exchange rate, uses the ordinary least squares estimation. We use a heteroscedasticity and autocorrelation consistent estimation procedure (HAC estimator) because financial market data time series often suffer from heteroscedasticity. Firstly, we estimate the following equation using daily data from 1 January, 2013, to 31 October, 2017:

$$\Delta E_t = \alpha + \gamma Brexit_t + \beta_1 \Delta OIS_t^{UK} + \beta_2 \Delta OIS_t^{EA} + \beta_3 \Delta Bond_t^{UK} + \beta_4 \Delta Bond_t^{EA} + \beta_5 \Delta FTSE_t + \beta_6 \Delta Stoxx_t + \varepsilon_t, \quad (1)$$

where E_t is our dependent variable of interest and represents the change of the exchange rate of the British pound vis-à-vis the euro. $Brexit_t$ is our independent variable of interest. This vector is an event-dummy which captures our identified Brexit events. The dummy variable gets the value of one on all days identified as having had Brexit-related events according to our event identification methodology. As previously mentioned, we have identified 15 events related to the Brexit process. In principle, Brexit news should be associated with lower future growth expectations and thus with a depreciation of the Pound against the euro. Gourinchas and Hale (2017) argue that Brexit could be considered as a deglobalization shock for the UK economy. Brexit could lead to increasing barriers to trade in goods and services, to labour and to capital mobility. Hence, it can be expected that the economy of the United Kingdom will become less specialized and less efficient. Thus, Brexit could be associated with lower aggregate productivity and hence lower than expected GDP growth rates in the future. According to the monetary exchange rate models, lower growth expectations in the future are associated with a depreciation of the British pound against the euro today. Moreover, Brexit may trigger a more aggressive expansionary monetary policy by the Bank of England. Hence, interest rate cuts and additional non-standard monetary policy measures conducted by the Bank of England may further depreciate the British pound against the euro.

However we expect that not all Brexit-related news in our event list are associated with a depreciation of the British pound against the euro. There may be some items of Brexit news which lead to an appreciation of the British pound vis-à-vis the euro because this news might implicate that Brexit will not occur or that its impact on the economy won't be as severe as predicted. Therefore, we divide our events into good news and bad news in several sub-sample analyses. Good news items are defined as news which is associated with less severe implications for the economy of the United Kingdom and hence with an appreciation of the British pound against the euro. Bad news items are specified as events which impose a drag on the UK economy and thus we expect that bad Brexit news will lead to a depreciation of the British pound vis-à-vis the euro. We split up our Brexit events into good Brexit news and bad Brexit news by reading the Financial Times thoroughly. By reading the Brexit-related articles published by the Financial Times we are able to detect whether market participants assessed the associated Brexit event as being either good or bad for the UK economy. We have identified eight bad Brexit news events and seven good Brexit news events.

The variable OIS_t^{UK} reflects the three-month OIS rate in the UK and controls for the impact of the Bank of England's conventional monetary policies on the British pound/Euro exchange rate. OIS_t^{EA} stands for the three-month OIS rate in the euro area and displays the effect of conventional monetary policies conducted by the ECB on our dependent variable of interest. The variables $Bond_t^{UK}$ and $Bond_t^{EA}$ are the 10-year government bond yields in the UK and the euro area, respectively. We control for market participants' expectations about future economic developments in the UK and the euro area by including long-term interest rates into our baseline specification. The variable $FTSE_t$ is the FTSE 100 index and the variable $Stoxx_t$ reflects the Euro Stoxx 50 index. By including benchmark stock market indices we control for the impact of market risk or uncertainty on the British pound/Euro exchange rate. Additionally, stock market indices also reflect expectations about future economic growth rates. In other specifications of our empirical model, we additionally control for the influence of macroeconomic news on the spot exchange rate. We use the United Kingdom series and the Eurozone series of the Citigroup economic surprise index (CESI) to control for the impact of news stemming from macroeconomic data. Moreover, we control for the impact of the BoEs (NSMPBOE), ECBs (NSMPECB) and FEDs (NSMPFED) non-standard monetary policy announcements on the British pound/Euro exchange rate. We introduce event-dummies in order to capture announcements of unconventional monetary policies and interact them with a market-based measure of monetary policy surprise. The unconventional monetary policy dummies take the value of one on the day of an announcement and are zero elsewhere.

The variables used in our regressions are defined as follows: the spot exchange rate of the British pound against the euro and the stock market indices are expressed in percentage rates of change. The three-month OIS rates, the 10-year government bond yields and the Citigroup economic surprise indices are expressed as percentage point changes. For the event dummies, we use one-day event windows. Additionally, we use a two-day window to test for delayed market reactions.

3.2 Empirical Results

First, we investigate whether our Brexit event-dummy, including all Brexit-related events, has a significant impact on the spot exchange rate of the British pound against the euro. We expect that the coefficient of our event-dummy shows a positive sign, indicating that Brexit news is associated with a depreciation of the British pound vis-à-vis the euro. Findings, using the HAC estimator, are presented in Table 1. Several specifications are developed, all of which include the three-month OIS rates, the 10-year benchmark bond yields and the benchmark stock market indices. In Model (2) we additionally control for the influence of macroeconomic news on our dependent variable of interest. In specification (3), we control for the impact of unconventional monetary policies on the spot exchange rate. In Model (4), both the macroeconomic news variables and the unconventional monetary policy event-dummies are included. Our results, presented in Table 1, show that the Brexit dummy, including all events, has no statistically significantly impact on the British pound/Euro exchange rate in any of the four specifications. Hence, we suspect that our Brexit event-dummy contains both bad news and good news. As mentioned previously, we expect that bad news is associated with a depreciation of the British pound against the euro, while good news should lead to an appreciation of the British pound vis-à-vis the euro.

Table 2: Impact of Brexit events on the spot exchange rate of the British pound against the euro (1-day window)

VARIABLES	(1)	(2)	(3)	(4)
Constant	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Brexit News (all Events)	-0.0005	0.0001	0.0000	0.0001
	(0.0022)	(0.0022)	(0.0021)	(0.0022)
UK OIS rate (3 M)	-0.2157***	-0.2117***	-0.2133***	-0.2094***
	(0.0699)	(0.0718)	(0.0758)	(0.0742)
EA OIS rate (3 M)	0.0896***	0.0925***	0.0767***	0.0798***
	(0.0228)	(0.0229)	(0.0202)	(0.0199)
UK benchmark bond yield (10y)	-0.0210***	-0.0179***	-0.0209***	-0.0178***
	(0.0063)	(0.0057)	(0.0061)	(0.0059)
EA benchmark bond yield (10y)	0.0173**	0.0140*	0.0141*	0.0109
	(0.0079)	(0.0074)	(0.0079)	(0.0076)
FTSE 100	0.3004***	0.2990***	0.3033***	0.3012***
	(0.0399)	(0.0357)	(0.0390)	(0.0366)
Eurostoxx 50	-0.2958***	-0.3004***	-0.2957***	-0.3002***
	(0.0346)	(0.0306)	(0.0324)	(0.0309)
UK CESI		-0.0001***		-0.0001***
		(0.0000)		(0.0000)
EA CESI		0.0001***		0.0001***
		(0.0000)		(0.0000)
NSMPBOE*lgilt			0.0004	0.0006
			(0.0011)	(0.0010)
NSMPECB*bund			-0.0019***	-0.0018***
			(0.0007)	(0.0007)
NSMPFED*tnote			-0.0011*	-0.0010
			(0.0006)	(0.0006)
Observations	1261	1261	1261	1261
R-squared	0.29	0.31	0.30	0.32
Adjusted R-squared	0.29	0.31	0.30	0.31

*Note: Newey-West standard errors in parentheses. ***, ** and * display significance at the 1%, 5% and 10% level, respectively.*

In a next step, we split up our Brexit event-dummy into bad news and good news. Hence, we create an event-dummy, which captures bad Brexit news, and a dummy variable which consists of good Brexit news. We suspect, based on the results shown in Table 2 and our considerations in Section 2, that positively and negatively surprising Brexit news differ in sign. It could also be the case that market participants' reactions to Brexit events differ in size between bad Brexit news and good Brexit news.

Table 3: Impact of bad and good Brexit news on the spot exchange rate of the British pound against the euro (1-day window)

VARIABLES	(1)	(2)	(3)	(4)
Constant	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Brexit Bad News	0.0047*	0.0056**	0.0047*	0.0056**
	(0.0024)	(0.0025)	(0.0024)	(0.0025)
Brexit Good News	-0.0050***	-0.0052***	-0.0049***	-0.0051***
	(0.0018)	(0.0016)	(0.0019)	(0.0015)
UK OIS rate (3 M)	-0.2081***	-0.2033***	-0.2062***	-0.2005***
	(0.0599)	(0.0645)	(0.0663)	(0.0668)
EA OIS rate (3 M)	0.0895***	0.0926***	0.0767***	0.0801***
	(0.0225)	(0.0224)	(0.0200)	(0.0194)
UK benchmark bond yield (10y)	-0.0205***	-0.0173***	-0.0204***	-0.0171***
	(0.0063)	(0.0057)	(0.0061)	(0.0059)
EA benchmark bond yield (10y)	0.0172***	0.0136*	0.0140*	0.0106
	(0.0080)	(0.0075)	(0.0080)	(0.0076)
FTSE 100	0.2905***	0.2879***	0.2930***	0.29010***
	(0.0406)	(0.0360)	(0.0396)	(0.0369)
Eurostoxx 50	-0.2893***	-0.2934***	-0.2892***	-0.2933***
	(0.0340)	(0.0299)	(0.0322)	(0.0302)
UK CESI		-0.0001***		-0.0001***
		(0.0000)		(0.0000)
EA CESI		0.0001***		0.0001***
		(0.0000)		(0.0000)
NSMPBOE*lgilt			0.0005	0.0006
			(0.0011)	(0.0010)
NSMPECB*bund			-0.0019***	-0.0018***
			(0.0007)	(0.0007)
NSMPFED*tnote			-0.0010	-0.0009
			(0.0006)	(0.0006)
No. Obs.	1261	1261	1261	1261
R-squared	0.30	0.32	0.31	0.33
Adjusted R-squared	0.29	0.32	0.30	0.32

*Note: Newey-West standard errors in parentheses. ***, ** and * display significance at the 1%, 5% and 10% level, respectively.*

The results reported in Table 3 show that our Brexit bad news event-dummy and Brexit good news event-dummy both have a statistically significantly impact on the British pound/Euro exchange rate. The Brexit bad news event-dummy is statistically significant at the ten percent level in Model (1) and in Model (3) and is statistically significant at the five percent level in Model (2) and Model (4). Hence, the inclusion of the macroeconomic news variable changes the statistical significance of the Brexit bad news event-dummy variable. Moreover, we find that bad news is associated with a depreciation of the British pound against the euro. The four models show a positive coefficient sign of the Brexit bad news dummy variable. Furthermore, our results indicate that the coefficient size of the Brexit bad news event-dummy variable differs noticeably between our four specifications.

All four models reported in Table 3 indicate that the Brexit good news event-dummy variable is highly statistically significant at the one percent level. Hence, the statistical significance does not differ between our four baseline specifications. The coefficient sign of the Brexit good news dummy variable is continuously negative. Therefore, good Brexit news is associated with an appreciation of the British pound vis-à-vis the euro. Moreover, our results show that the coefficient size of the Brexit good news event-dummy variable differs between our four models only slightly. Overall, the empirical results shown in Table 3 confirm our presumption that Brexit news has to be split up into bad Brexit news and good Brexit news because negatively and positively surprising Brexit-related news differ in sign. Furthermore, the coefficient signs of our event-dummies show the expected signs, namely, that bad news is associated with an increase of the British Pound/Euro exchange rate and that good news leads to an appreciation of the British pound against the euro.

Moreover, we find that the impact of bad news and good news on our dependent variable of interest differs only marginally in size. In Model (1) and Model (3) the coefficient size of the Brexit bad news event-dummy variable is smaller in absolute values than the coefficient of the Brexit good news variable. Whereas the results of Model (2) and Model (4) indicate that the British pound/Euro exchange rate is more strongly affected by bad news than by good news. Hence, it is ambiguous whether our dependent variable of interest is more strongly affected by bad news or good news.

Next, we extend our measurement window by using a two-day window. The two-day change is defined as the difference between the end-of-day value of the British pound/Euro exchange rate on the day after and the end-of-day value of our dependent variable on the day before the release of Brexit-related news. The choice of event window length could be crucial because on the one hand the interval should be narrow enough to avoid noise produced by other news during the event window and on the other hand the event window should be broad enough in order to capture delayed market reactions. The corresponding results are reported in Table 4.

Table 4: Impact of bad and good Brexit news on the spot exchange rate of the British pound against the euro (2-day window)

VARIABLES	(1)	(2)	(3)	(4)
Constant	0.0002	0.0002	0.0002	0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Brexit Bad News	0.0087*	0.0100**	0.0087*	0.0100**
	(0.0048)	(0.0047)	(0.0048)	(0.0047)
Brexit Good News	-0.0094***	-0.0099***	-0.0094***	-0.0099***
	(0.0015)	(0.0009)	(0.0015)	(0.0010)
UK OIS rate (3 M)	-0.2263**	-0.2185**	-0.2244**	-0.2156**
	(0.0943)	(0.0921)	(0.0956)	(0.0932)
EA OIS rate (3 M)	0.0815***	0.0859***	0.0662***	0.0709***
	(0.0264)	(0.0265)	(0.0242)	(0.0238)
UK benchmark bond yield (10y)	-0.0223***	-0.0191***	-0.022***	-0.0189**
	(0.0075)	(0.0076)	(0.0076)	(0.0076)
EA benchmark bond yield (10y)	0.0211**	0.0165**	0.0101*	0.0128
	(0.0010)	(0.0099)	(0.0173)	(0.0099)
FTSE 100	0.2569***	0.2560***	0.2609***	0.2598***
	(0.0469)	(0.0463)	(0.0466)	(0.0460)
Eurostoxx 50	-0.2766***	-0.2822***	-0.2771***	-0.2827***
	(0.0420)	(0.0416)	(0.0415)	(0.0409)
UK CESI		-0.0001***		-0.0001***
		(0.0000)		(0.0000)
EA CESI		0.0002***		0.0002***
		(0.0000)		(0.0000)
NSMPBOE*lgilt			0.0001	0.0002
			(0.0013)	(0.0013)
NSMPECB*bund			-0.0026***	-0.0026***
			(0.0009)	(0.0009)
NSMPFED*tnote			-0.0005	-0.0003
			(0.0010)	(0.0009)
Observations	1260	1260	1260	1260
R-squared	0.17	0.19	0.18	0.20
Adjusted R-squared	0.17	0.18	0.17	0.19

*Note: Newey-West standard errors in parentheses. ***, ** and * display significance at the 1%, 5% and 10% level, respectively.*

All four specifications in Table 4 indicate that both bad Brexit news and good Brexit news have a statistically significant impact on the British pound/Euro exchange rate, respectively. The results reported in Table 4 confirm the results documented in Table 3 in so far as bad Brexit news leads to a depreciation of the British pound against the euro and good Brexit news is associated with an appreciation of the British pound vis-à-vis the euro. The main difference between the results reported in Table 3 and Table 4 are the coefficient sizes of the Brexit dummy variables. The coefficients of the Brexit news dummy variables are visibly larger in the two-day window than in the one-day window. Hence, we conclude that market participants exhibit a delayed reaction to both bad and good Brexit news, respectively. Hence, the foreign exchange rate market needs a prolonged period of time to fully process news related to Brexit.

Furthermore, we additionally check for delayed market reactions by lagging our Brexit-related event dummies (see Table 5 and Table 6). Firstly, we want to check whether the British pound/Euro exchange rate has a delayed reaction to bad Brexit news. We therefore additionally introduce a one-day, two-day, and three-day lagged Brexit bad news event dummy. Hence, we lag our Brexit bad news event dummy by one day, two, and three days. Table 4 shows the impact of our lagged Brexit bad news event dummies on our dependent variable of interest. The results suggest that the British pound/Euro exchange shows a delayed response to bad Brexit news up to two days after the event. In all four models reported in Table 5, the one-day lagged Brexit bad news dummy variable has got a statistically significant impact at the five percent level on the British pound/Euro exchange rate. Bad Brexit news released at time t-1 is associated with a depreciation of the British pound against the euro at time t. The coefficient size of the one-day lagged bad Brexit dummy is almost identical to the coefficient size of the bad Brexit event-dummy variable at time t. Moreover, we find that the two-day lagged Brexit bad news event-dummy has a statistically significant impact on our dependent variable of interest. Our results suggest that bad Brexit news is associated with a depreciation of the British pound against the euro two days after its release. However, the coefficient size of the two-day lagged bad Brexit event-dummy is clearly smaller than the coefficient size of the one-day lagged dummy variable and the event-dummy at time t. Moreover, we find that the three-day lagged Brexit bad news event-dummy has no significant impact on the British pound/Euro exchange rate.

Table 5: Impact of bad Brexit news on the spot exchange rate of the British pound against the euro (1-day window)

VARIABLES	(1)	(2)	(3)	(4)
Constant	0.0000	0.0000	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Brexit Bad News t	0.0047**	0.0055**	0.0045**	0.0055**
	(0.0024)	(0.0025)	(0.0024)	(0.0024)
Brexit Bad News t-1	0.0051**	0.0049**	0.0052**	0.0050**
	(0.0024)	(0.0022)	(0.0024)	(0.0023)
Brexit Bad News t-2	0.0026*	0.0027**	0.0027*	0.0028**
	(0.0015)	(0.0013)	(0.0015)	(0.0014)
Brexit Bad News t-3	-0.0013	-0.0009	-0.0013	-0.0009
	(0.0016)	(0.0014)	(0.0016)	(0.0014)
UK OIS rate (3 M)	-0.2151***	-0.2106***	-0.2127***	-0.2073***
	(0.0535)	(0.0554)	(0.0568)	(0.0578)
EA OIS rate (3 M)	0.0879***	0.0908***	0.0747***	0.0780***
	(0.0228)	(0.0229)	(0.0203)	(0.0198)
UK benchmark bond yield (10y)	-0.0199***	-0.0167***	-0.0196***	-0.0163***
	(0.0062)	(0.0057)	(0.0060)	(0.0058)
EA benchmark bond yield (10y)	0.0164**	0.0130*	0.01317	0.0098
	(0.0081)	(0.0076)	(0.0081)	(0.0077)
FTSE 100	0.2961***	0.2930***	0.2983***	0.2949***
	(0.0404)	(0.0365)	(0.0400)	(0.0374)
Eurostoxx 50	-0.2915***	-0.2954***	-0.2913***	-0.2952***
	(0.0339)	(0.0302)	(0.0328)	(0.0306)
UK CESI		-0.0001***		-0.0001***
		(0.0000)		(0.0000)
EA CESI		0.0001***		0.0001***
		(0.0000)		(0.0000)
NSMPBOE*lgilt			0.0006	0.0008
			(0.0010)	(0.0010)
NSMPECB*bund			-0.0019***	-0.0019***
			(0.0007)	(0.0007)
NSMPFED*tnote			-0.0011*	-0.0009
			(0.0006)	(0.0006)
Observations	1261	1261	1261	1261
R-squared	0.30	0.32	0.31	0.33
Adjusted R-squared	0.30	0.32	0.31	0.33

*Note: Newey-West standard errors in parentheses. ***, ** and * display significance at the 1%, 5% and 10% level, respectively.*

Table 6: Impact of good Brexit news on the spot exchange rate of the British pound against the euro (1-day window)

VARIABLES	(1)	(2)	(3)	(4)
Constant	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001
Brexit Good News t	-0.0050***	-0.0052***	-0.0050***	-0.0051***
	(0.0018)	(0.0017)	(0.0019)	(0.0016)
Brexit Good News t-1	-0.0028***	-0.0021	-0.0027**	-0.0020
	(0.0011)	(0.0014)	(0.0012)	(0.0013)
Brexit Good News t-2	0.0008	0.0009	0.0008	0.0010
	(0.0020)	(0.0018)	(0.0020)	(0.0018)
Brexit Good News t-3	0.0004	-0.0002	0.0004	-0.0001
	(0.0015)	(0.0013)	(0.0014)	(0.0014)
UK OIS rate (3 M)	-0.2140***	-0.2107***	-0.2125***	-0.2085***
	(0.0705)	(0.0728)	(0.0763)	(0.0752)
EA OIS rate (3 M)	0.0900***	0.0927***	0.0773***	0.0803***
	(0.0228)	(0.0230)	(0.0203)	(0.0201)
UK benchmark bond yield (10y)	-0.0214***	-0.0184***	-0.0213***	-0.0183***
	(0.0063)	(0.0057)	(0.0060)	(0.0060)
EA benchmark bond yield (10y)	0.0178**	0.0145*	0.0146*	0.0114
	(0.0079)	(0.0074)	(0.0078)	(0.0076)
FTSE 100	0.2931***	0.2919***	0.2959***	0.2944***
	(0.0394)	(0.0353)	(0.0381)	(0.0362)
Eurostoxx 50	-0.2909***	-0.2958***	-0.2908***	-0.2957***
	(0.0342)	(0.0305)	(0.0319)	(0.0308)
UK CESI		-0.0001***		-0.0001***
		(0.0000)		(0.0000)
EA CESI		0.0001***		0.0001***
		(0.0000)		(0.0000)
NSMPBOE*lgilt			0.0004	0.0005
			(0.0011)	(0.0010)
NSMPECB*bund			-0.0019***	-0.0018***
			(0.0007)	(0.0007)
NSMPFED*tnote			-0.0011*	-0.0010
			(0.0006)	(0.0006)
Observations	1261	1261	1261	1261
R-squared	0.30	0.32	0.31	0.33
Adjusted R-squared	0.29	0.31	0.30	0.32

*Note: Newey-West standard errors in parentheses. ***, ** and * display significance at the 1%, 5% and 10% level, respectively*

Secondly, in Table 6 we investigate whether the British pound/Euro exchange rate responds in a delayed manner to good Brexit news. Therefore, we lag our Brexit good news event-dummy by one-day, two-, and three-days. The results reported in Table 6 indicate that the evidence concerning the delayed reaction of the British pound/Euro exchange rate to good Brexit news is mixed. In Models (1) and (3) the Brexit good news event-dummy lagged by one day has a statistically significant impact on the British pound exchange rate, whereas in Model (2) and Model (4) the one-day lagged event-dummy becomes insignificant. Hence, the inclusion of our macroeconomic news variables makes the impact of the Brexit good news dummy lagged by one-day on our dependent variable of interest insignificant.

The coefficient sign of the one-day lagged Brexit good news event dummy indicates that good Brexit news released at time t-1 is associated with an appreciation of the British pound/Euro exchange rate. Moreover, we find that good Brexit news released at time t-2 and t-3 has no statistically significant impact on the British pound/Euro exchange rate, respectively.

4. Conclusion

This study investigates the impact of Brexit-related events on the spot exchange rate of the British pound against the euro. With our identification strategy, we find a total of 15 Brexit-related events. Hence, we consider the influence of the Brexit referendum and other Brexit-related events on the British pound/Euro exchange rate. Moreover, we split our Brexit-related events into bad and good Brexit news, respectively. We find, that bad Brexit news is associated with a depreciation of the British pound against the euro and that good Brexit news resulted in an appreciation of the British pound vis-à-vis the euro. Furthermore, our results suggest that market participants displayed a delayed reaction to bad and good news because our findings show that the coefficients of the Brexit news dummy variables are clearly larger in the two-day window than in the one-day window. Our results also show that the impact of bad Brexit news is more persistent than the effect of good Brexit news on the spot exchange rate of the British pound against the euro, respectively. We find that bad Brexit events have got an impact on the spot exchange rate of the British pound against the euro two days following the announcement of bad Brexit news. Whereas good Brexit events have no influence on the British pound/Euro exchange rate two days following the announcement of good Brexit news.

References

Baier, F. and P.J.J Welfens (2018) "BREXIT and FDI: Key Issues and New Empirical Findings." EIIW Discussion Paper No. 241, January 2018 http://eiiw.eu/fileadmin/eiiw/Daten/Publikationen/Gelbe_Reihe/disbei241.pdf (accessed 21.02.2018)

Baker, S.R., N. Bloom and S.J. Davis (2016) "Policy uncertainty: trying to estimate the uncertainty impact of Brexit." Presentation, http://www.policyuncertainty.com/media/Brexit_Discussion.pdf (accessed 21.02.2018)

Bank of England (2016) "Inflation Report May 2016." London

Caporale, G.M., L. Gil-Alana and T. Trani (2018) "Brexit and Uncertainty in Financial Markets." DIW Discussion Papers 1719

Davies, R.B. and Z. Studnicka (2017) "The Heterogeneous Impact of Brexit: Early Indications from the FTSE." CESifo Working Papers 6478

Dhingra, S., H. Huang, G. Ottaviano, J.P. Pessoa, T. Sampson and J. Van Reenen (2017) "The Costs and Benefits of Leaving the EU: Trade Effects." CEP Discussion Paper 1478

Fratzscher, M., M. Lo Duca, and R. Straub (2014) "ECB unconventional monetary policy actions: Market impact, international spillovers and transmission channels." In: International Monetary Fund

Gourinchas, P.O. and G. Hale (2017) "Brexit: Whither the Pound?" FRBSF Economic Letter 2017-11

Ottaviano, G., J.P. Pessoa and T. Sampson (2014) "The costs and benefits of leaving the EU." Technical Paper, CEP

Portes, J., and G. Forte (2017) "The Economic Impact of Brexit-induced Reductions in Migration." Oxford Review of Economic Policy 33 (Supplement 1), 31–S44

Ramiaha, V., H.N.A Phama and I. Moosab (2017) "The sectoral effects of Brexit on the British economy: early evidence from the reaction of the stock market." Applied Economics, 49(26), 2508-2514

Walker, N. (2017) "Brexit timeline: events leading to the UK's exit from the European Union." Briefing Paper No. 07960, House of Commons Library

Appendix

Table 7: List of Variables

Variables	Definition	Source
Bilateral Exchange Rate (with the Euro)	First differences of the spot exchange rate of the Pound sterling against the Euro (percentage rates of change)	Datastream
UK OIS rate (3M)	First differences of the three-month rate in the United Kingdom (in percentage points)	Datastream
EA OIS rate (3M)	First differences of the three-month rate in the euro area (in percentage points)	Datastream
UK benchmark bond yield (10y)	First differences of yields on the ten-year government bond in the United Kingdom (in percentage points)	Datastream
EA benchmark bond yield (10y)	First differences of yields on the ten-year government bond in the euro area (in percentage points)	Datastream
FTSE 100	First differences of logs of the FTSE 100 (percentage rates of change)	Datastream
Eurostoxx 50	First differences of logs of the Eurostoxx 50 (percentage rates of change)	Datastream
UK CESI	First differences of the United Kingdom series of the Citigroup economic surprise index (in percentage points)	Datastream
EA CESI	First differences of the euro area series of the Citigroup economic surprise index (in percentage points)	Datastream
lgilt	First differences of the long gilt future (in ticks)	Datastream
bund	First differences of the Bund future (in ticks)	Datastream
tnote	First differences of US ten-years treasury notes (in ticks)	Datastream
Brexit News	Event-dummy which captures all Brexit news included	Financial Times; Walker (2017)
Brexit Bad News	Event-dummy which captures bad Brexit news; bad Brexit news is specified as events which impose a drag on the UK economy	Financial Times; Walker (2017)
Brexit Good News	Event-dummy which captures good Brexit news; good news is defined as news which are associated with less severe implications for the economy	Financial Times; Walker (2017)
NSMPBOE	Event-dummy associated with the BoE's announcements of non-standard monetary policy measures	Financial Times
NSMPECB	Event-dummy associated with the ECB's announcements of non-standard monetary policy measures	Financial Times
NSMPFED	Event-dummy associated with the FED's announcements of non-standard monetary policy measures	Financial Times

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