Analysis of the Differential Effect of Brexit on the FTSE Stock and Money Market Performance

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Abstract: The objective of this paper is to analyze the differential effect of Brexit on the British stock market and money market before and after the Brexit referendum. Prior work. Many research articles have emerged on the economic effect of Brexit, but these papers have largely been predictive in nature; this paper builds on these prior research and examines what exists rather than being predictive. Approach. Stock market data and exchange rate data were collected from the London Stock Exchange. The data were analyzed with the usage of paired t-test of difference in means. Results: Findings from the analysis show a negative stock value within three days after the referendum, but further analysis show a positive stock value increase within twenty one days after the Brexit referendum. Additionally, the t-test results show that the British Pound fluctuated toward a weaker trajectory than the pre-Brexit period. Implications: Policy makers should shorten the negotiation period for exiting international integrations to reduce protracted loss of investments. Future searchers should observe more days to expand this paper's new result between stock and money market fluctuations. Value: This paper contributes by examining the difference in fluctuation between stock and money market effects of Brexit.

Key words: Economic Uncertainty; Exchange Rate; Economic Policy; Investment Uncertainty; London Stock Exchange

JEL Classification: M21; M2; G1; G18

1.Introduction

The UK referendum of June 23 2016 to exit the European Union (EU) has sparked several studies, which evaluate probable effects of the Brexit on the UK's economy (Topliceanu & Sorcaru, 2019). This paper adopts a slightly difference stance and examines the differential effect of UK's EU exit referendum on U.K's stock and money markets. The European Union (EU) was established to enhance economic integration and wellbeing of the EU member countries (Degner 2019). This has had an attendant effect of strengthening the member countries' stock and money markets over the years (Pietrzak, Faldzinski, Balcerzak, Meluzín & Zinecker, 2017). Stock

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markets around the world can be affected by sudden events (political and otherwise) within and outside their host countries (Sajid, Younus, Kaleem & Anwar, 2014). Such events often affect investment uncertainty and indecisions on the part of investors (Jensen & Schmith, 2005). In some instances, some investors may tend to pull out their investments from host countries that experience sudden events in order to protect their investments (Mei & Guo, 2004). Since investors are jittered by stock market volatility, pulling out investments to a safer investment zone is seen as an investor's defensive mechanism (Oyerinde, 2019). This is enhanced by the speed of information dispersal, hence Loan and Loan (2016) identified information as a problem in this age of globalization. Investors may adopt different strategic investment behaviour during times of political economy uncertainty, for instance, investors may delay their intended investment options in order to wait for new and more certain information before committing their funds (Korus & Celebi, 2018; Ali, 2001). In some other instances, political economy uncertainty may lead to complete divestment by investors (Kaempfer et al, 1987). Any of these investment behaviours has the propensity to affect stock and money market conditions (Korus & Celebi, 2018).

Problem Statement: Therefore, the problem of this paper draws from recent economic event when the citizens of the United Kingdom cast their vote on the 23 of June 2016. An economic and investment related market survey found that the referendum outcome was somewhat unpredicted by investors, hence investors and stock markets were shocked (Gourinchas & Hale, 2017). Consequently, the announcement of the Brexit referendum provoked a sudden dive by the Pound Sterling with attendant jittery on the general stock market (Gourinchas & Hale, 2017). Therefore, the referendum outcome has sparked a protracted and heated debate in the British Parliament and amongst economic and investment stakeholders. Such debates has spawned diverse economic and investment news (Korus & Celebi, 2019; Lim, 2018) with attendant economic policy and investment uncertainties (Belke, Dubova & Osowski, 2018). Hence, the problem of this paper is therefore intertwined in Brexit event, with mixed news that causes investment uncertainty, which affects both the stock and money market.

Previous studies on Brexit economic implication have combined other factors aside of Brexit referendum and have focused on three common analytical methods namely Linear regression (Plakandaras, Gupta & Wohar, 2017), event study (Oehler, Horn & Wendt, 2017) and correlation technique (Alvarez-Diez et al, 2019). However, this study adopts a slightly different approach to provide new contribution by applying the paired t-test of difference in means for analytical comparison between stock and money market performance before and after the Brexit referendum. Furthermore, whilst previous research have mostly used few days of data immediately after the Brexit referendum, this paper expands the days of observation to 21 days before the Brexit referendum and 21 days after the Brexit referendum to provide a better view

of stock and money market reaction, which is not limited to short-term observation. This paper is therefore timeous to bridge this identified gap in research. Hence, this paper offers important policy implication for economic policy makers in Europe and other regional blocks who might be thinking of exiting their international integration to carefully manage and reduce the exit negotiation time in order to reduce loss of investments given that investors apply a waiting behavior during events that cause market uncertainty. The paper also provide new evidence to assist further research in expanding the comparative analysis between stock market fluctuation and money market fluctuation during economic events to other European countries and beyond.

The subsequent sections of this paper is organized as follows: soon after this general introduction, the next section presents the objectives of the paper. This is followed by the review of relevant literature. After the literature, the paper presents a detailed methodology, data analysis and discussion of findings. The final section presents the implication and original value or contribution of the paper; thereafter, the paper ends with a conclusion.

1.1. Objective of the Paper

Drawing from the foregoing background and problem statement, this paper has two key objectives; firstly, to examine the differential effect of Brexit referendum on the FTSE stock market and secondly, to evaluate the differential effect of Brexit referendum on the money market (with a focus on Pound Sterling exchange rate fluctuations) before and after the Brexit referendum of June 23 2016.

2. Literature Review

In their research, Oehler, Horn and Wendt (2017) applied an event study approach to analyze the possibility of abnormality in stock returns after the Brexit referendum in 2016. They also considered the influence of internationalization at the corporate level on potential abnormal stock returns. Their event study findings show that companies whose sales were home based suffered greater negative abnormal stock returns than companies whose sales were internalized. Another closely related research applied an event study to examine the effect of Brexit on UK's economy for the period June to July 2016. The result show that the leisure and banking industries suffered negative 15% abnormal returns (Ramiah, Pham & Moosa, 2017).

Another research evaluated the heterogeneous effect of British exit from EU on FTSE expectations from stock return. It was found that the core European companies experience worst stock returns than other companies within the first two days of the referendum (Davies & Studnicka, 2018). This finding is somewhat related to Oehler et al. (2017) findings, which highlights that home based companies are more likely

to experience negative stock price returns than internationalized companies. This points to the need for companies, irrespective of their market niche preference, to strive toward internationalization as this has potential advantage of instilling resiliency during periods of host country events that could inflict negative shock on the stock market (Wahid, 2015).

In their predictive research regarding post-Brexit pound depreciation, Plakandaras, Gupta and Wohar, (2017), applied the linear and non-linear econometric approach to engage in an out-of-sample forecasting of pound volatility based on economic uncertainty news about the Brexit. Their findings show that majority of the pound depreciation emanated from the Brexit market uncertainties. In a related study, other researchers have examined the influence of Brexit on the concurrent movement between the Euro, British pound and Japanese yen. A different analysis on the Brexit effect on paired currency' performance was currently researched by Alvarez-Diez et al (2019). They examined the correlation between the British pound, the Euro and Japanese yen using the asymmetric and conditional dynamic correlation statistics during the pre-Brexit period. Their findings indicate a negative correlation between the British pound and the Euro pair and no effect between the British pound and Japanese yen pair. Their result also highlight uncertainty about the ultimate impact of British exit on the EU economies. Such scepticism was also alluded to by (Korus & Celebi, 2018).

A recent research on good and bad news effect on Pound sterling, Korus and Celebi (2018) examined the impact of Brexit news on the Pound sterling and Euro exchange rates performance. They applied a splitting method by dividing the Breixt news into bad news and good news. Their results show that the two types of Brexit event news does have different effects on the exchange rate of Pound sterling against the Euro. They find that whereas bad news influence a depreciation of the pound against the Euro, good news enhances an appreciation of the pound sterling against the Euro. They also find that investors show a delay in reacting to both bad and good news, which shows that investors are reasonable and would not just jump on any news to take a quick investment action, they rather choose to wait and be watchful regarding how the Brexit news unfolds and which direction to channel their investment choice (Korus & Celebi, 2018). Raddant (2016) explored the reaction of the European stock markets to the U.K Brexit referendum by applying the correlation approach on the indices of the markets and stock volatility. Findings from the research indicate similar volatility amongst three EU stock markets namely Germany, France and Spain. In a related study, Madhavi and Reddy (2018) applied the econophysics technique to examine how the Brexit referendum has affected the European Union stock markets by dividing the event period into before and after the Brexit referendum. Their results show a reduction in the cross-correlation coefficient,

which indicates that the British stock market has become more segmented than in the previous periods compared to other European partners.

Shahzad et al (2019) analysed the effect of 27 spotted events regarding the Brexit on the British Stock Market. They initially discovered that the stock market reacted negatively, but their further analysis show that a dissection of the referendum period into pre and post referendum period produces a better result. Using this dissection, they therefore find negative market reaction just before the Brexit referendum and the period within the referendum announcement. Furthermore, Shahzad et al (2019) result disclosed another noteworthy finding, which is that the market reacted positively during periods after the Brexit referendum. This means that initial market reaction was negative, but soon after the referendum, when news brought more clarity of information to investors, the market started reacting positively. They note that companies who are involved in more international trading showed more positive reaction to Brexit referendum (Shahzad et al, 2019). This finding resonates with the importance of internationalization of companies' trading activities to withstand shock in periods of local economic policy uncertainty highlighted earlier in previous empirical research finding (Oehler, Horn & Wendt, 2017).

A recent study on Brexit effect on market return has also concluded an increase in market trading activity during the day of the referendum and following the days of the referendum (Lobao & Santos, 2019).Closely related to this, other researchers have applied a de-trending approach to evaluate the before and after Brexit referendum events on the dynamic relationship between stock market and exchange rate performance in the UK and four EU markets (Bashir et al., 2019). They applied the fluctuation and cross-correlation coefficient analysis and found both negative and positive co-movement of market performance between the before and after the Brexit referendum. In addition, their findings show that some European Markets tend to have a long term negative effect after the Brexit referendum (Bashir et al., 2019). This current paper builds on the foregoing existing research and contributes to the literature by using a different analytical approach, which is the t-test of difference in stock value and exchange rate value before and after the Brexit (21 days before and after the referendum). The following sections present the, method, data analysis and findings of this paper.

3. Methodology

This paper applied a quantitative approach in examining the effect of Brexit on the British stock and money markets. Borrowing from the approach of Madhavi and Reddy (2018) and that of Shahzad et al (2019), the paper divided the Brexit referendum period into two, namely before and after the Brexit Period. However, this paper differs in previous researcher approach by increasing the period of observation to 21 days before the Brexit referendum and 21 days after the Brexit referendum. It also differs in analysis approach by using the paired t-test of means statistics to align with the two period effect analysis. This therefore, created equal pair of observation and comparison using the t-test of paired sample statistics. Both the FTSE 100 stock value data and the GBP/EUR exchange data were collected from the London Stock Exchange. The significance of result was gauged against an alpha level of 0.05(5%) on a two tail p-value.

3.1. Results and Discussion

The first objective of this paper is to examine the differential effect of Brexit on the FTSE stock market. Table 1 and Table 2 present the results showing different outcomes based on the length of observations. Table 1 presents the FTSE100 stock value 3 days before and 3 days after the Brexit referendum. The result in Table 1 shows that the mean stock values in 3 days before the referendum is significantly higher than mean stock values in 3 days after the referendum, which weakened from a mean stock value of 6230 three days before down to a mean of 6087 three days after. Since the literature indicates that investors adopt a waiting behavior during events of this nature(Ali, 2001), Table 2 presents expanded data covering 21 days before the referendum and 21 days after the referendum, the result now differ from the shorter time data in Table 1. Accordingly, Table 2 shows an increased stock value within 21 days after Brexit referendum, which is significantly higher than the stock value 21 days before referendum at an alpha level of 0.000. This differs from the findings of Bashir et al (2019) about long term negative effect on stock market after the referendum. However this paper's finding confirms previous research allusions by Shahzad et al (2019) that when information becomes clearer days after an economic event, investors may respond positively. Shahzad et al (2019) also indicated that companies that are more internationally connected are more prone to positive response to Brexit event, this research also confirms this as it used the FTSE 100 which are renowned even for their international trading connections. This finding also confirms that indeed investors do adopt a waiting attitude as indicated in the literature (Korus & Celebi, 2018; Ali, 2001).

The second objective of this paper is to analyze the differential effect of Brexit referendum on the British money market. The paper used EUR/GBP exchange rates

data (21 days before the referendum and 21 days after the referendum). Table 3 presents the result of the application of t-test of difference in means at 5% alpha level, which shows that the Pound Sterling was stronger 21 days before the Brexit referendum and weaker against the EUR within 21 days after referendum. The difference between the before and after Brexit rates is highly significant at a P-value of 0.000 at two tail test, which is lower than 5% alpha level. This finding provides caution to exchange rate traders that it may take some time after economic events such Brexit referendum before the money market can normalise again.

Having discussed the findings of results in Table 1 to Table 3 in the foregoing paragraphs, Table 4 presents a unique result, which previous researchers have not touched. Table 4 compares the fluctuations between the British money market and stock market to see whether the fluctuations in these markets differed significantly from each other during the Brexit referendum. The t-test result shows lack of significant difference in the fluctuations of both markets with a p-value of 0.07 on one tail test and 0.14 on two tail tests, which are all higher that the alpha level of 0.05. The mean difference shows only 2% difference higher in the money (exchange rate) market. Although 2% is insignificant but this shows that the exchange rate fluctuates slightly quicker than the stock market during the Brexit referendum period. This finding is absent in the previous research, hence this paper contributes a nuance to the literature. This paper also contributes by being the first paper to examine the stock and money market reactions to Brexit using 21 days observation before and after the Brexit referendum. This provides an agenda for further researcher using the same data and analytical approach to study the Brexit event in other European markets. Given the waiting attitude of investors, the paper provides policy makers with an insight to reduce protracted negotiations as this can cause delayed investment and losses to the nation.

Table 1. t-Test: Paired Two Sample for Means of FTSE 100 Index Values 3 days before and After Brexit Referendum

	AfterBrexitRef	*BeforeBrexitRef*
Mean	6087.095505	6230.577409
Variance	8252.235764	829.7654522
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-2.711675427	
P(T<=t) one-tail	0.056669123	
t Critical one-tail	2.91998558	
P(T<=t) two-tail	0.113338247	
t Critical two-tail	4.30265273	

Table 2. t-Test: Paired Two Sample for Means for FTSE 100 Stock Values 21 Days Before and After Brexit Referendum

	AfterBrexitRef	*BeforeBrexitRef*
Mean	6536.617749	6173.437975
Variance	45450.05079	14233.77957
Observations	21	21
Hypothesized Mean Difference	0	
df	20	
t Stat	5.804371083	
P(T<=t) one-tail	0.00000	
t Critical one-tail	1.724718243	
P(T<=t) two-tail	0.00000	
t Critical two-tail	2.085963447	

Table 3. t-Test of Difference for EUR/GBP before and after Brexit Referendum

	21daysBeforRef	*21daysAfterRef*
Mean	0.777542857	0.838890476
Variance	0.000140173	0.000113888
Observations	21	21
Hypothesized Mean Difference	0	
df	20	
t Stat	-19.64371854	
P(T<=t) one-tail	0.00000	
t Critical one-tail	1.724718243	
P(T<=t) two-tail	0.00000	
t Critical two-tail	2.085963447	

Table 4. t-Test: Paired Sample for Means between %Change in FTSE100 and % Change in EUR/GBP Exchange Rate Before and After the Brexit Referendum

	FTSE100%change	*EUR/GBP%change*
Mean	0.059499205	0.079098866
Variance	0.002256749	0.000368997
Observations	21	21
Hypothesized Mean Difference	0	
df	20	
t Stat	-1.508065694	
P(T<=t) one-tail	0.073586326	
t Critical one-tail	1.724718243	
P(T<=t) two-tail	0.147172651	
t Critical two-tail	2.085963447	

3.2. Implication of Findings for Academia and Practice

The significant difference in stock and money market performance between the pre-Brexit and during Brexit period in the U.K offer important investment implications for investors and portfolio managers especially with regards to hedging of currencies and stock for local and international traders who can draw lessons to enhance their strategic approach to investment decisions during similar events whether in the U.K, EU or in other regional integrations. Further research should expand this research by using other FTSE indices, such as the FTSE250, FTSE350, FTSE-All-Share and other stock exchanges in the EU markets.

3.3. Value (Contribution of Paper)

The value or contribution of this paper lies on its ability to provide the first comparative analysis between stock fluctuation and exchange rate fluctuation before and after the Brexit referendum. Amongst the ongoing research on the effect of Brexit referendum on the British stock and money market, this paper provides the first comparative analysis between the stock market fluctuation and money market fluctuations before and after tahe Brexit referendum. Hence, the paper provides first new investment information for investors regarding which investment portfolio (between stock market and money market) to pay more attention to during economic events such as the Brexit referendum.

4. Conclusion

This paper set out to achieve two main objectives, which is to examine the differential effect of Brexit referendum on the British stock and money markets. Findings of this paper differs from previous research as the paper used data for 21 days before the referendum and 21 days after the referendum, hence covering many days to capture investors waiting period. The new result that emerged contributes new insight to the literature, which is that 3 days after the Brexit exit referendum, FTSE stock value decline quickly and stopped. But within an expanded period beyond the initial three days, spanning up to the next 21 days, the FTSE stock quickly increased positively in value, indicating that investors had elicited certain information to proceed with their investments. The result of this paper also adds another new insight to the literature by discovering that stock market (using FTSE100) and money markets using EUR/GBP fluctuated almost at the same degree with no significance difference. However, the money market showed a 2% higher fluctuation more than the stock market. These findings present policy and further research implications. Policy makers who contemplate exit from international integration should shorten negotiation periods to reduce loss of investments from investors who may adopt a waiting behavior. This paper opens an avenue for further

research to examine the difference in fluctuation between other FTSE indices and money market within the London Stock Exchange and other EU markets to see if this current research finding is replicable in other FTSE indices and in other European stock markets.

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