

Impact of Brexit on the UK Stock Markets: Evidence from FTSE-100

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Abstract

The Brexit process has potential to affect the stock markets through enhancing the risk and uncertainty. This study investigated the impact of Brexit on the UK stock markets over the period between May 2016 and May 2021 through the unit root test with multiple breaks. The empirical analysis revealed the structural breaks in July 2016 and January 2020 and indicated that emergence and finalization of Brexit caused the structural changes in the course of stock market index.

Keywords: Brexit, stock markets, FTSE 100 index, unit root analysis

JEL Classification: C32, G14, G40

1. Introduction

The withdrawal process of the United Kingdom (UK), one the largest three economies in the European Union (EU) from the EU during the period between June 2016-January 2020 has led the scholars to explore the possible economic impacts of the Brexit on the EU and the UK. The scholars have generally predicted a negative impact of the Brexit on output and trade volume in the EU member states and the UK (Sampson, 2017; Felbermayr et al., 2017; Holobiuc, 2018; Chen et al., 2018; Pandzic, 2021).

The main objective of the study is to analyze the effect of the Brexit on FTSE (Financial Times Stock Exchange) 100 index and volume. The Brexit process may affect the stock markets through raising the uncertainty about its possible economic costs for both sides at theoretical terms. In the related literature, only a few scholars have focused on the effect of the Brexit on the stock markets and reached a significant effect of the Brexit on the stock markets (Breinlich et al., 2018; Ben Ameer, and Louhichi, 2021; Qiao et al., 2021).

Breinlich et al. (2018) researched the reaction of the stock market to the Brexit referendum on 23 June 2016 and revealed that the economic slowdown fears and sterling depreciation firstly affected the stock prices after the referendum and the stock prices of the companies more exposed to the UK markets were relatively more affected by the Brexit referendum. On the other side, Ben Ameer, and Louhichi (2021) analyzed the dependence among the London stock exchange, German stock market, and the French stock market during the 2013-2019 period through Diebold and Yilmaz approach and revealed a high volatility and spillover between September 2015 and September 2016 which verified the strong market integration and the uncertainty resulting from the Brexit referendum clearly affected the three largest European stock markets. Furthermore, they determined the spillover's direction from the UK stock market to the German and French stock markets due to uncertainty about the referendum pre-exit period and the period immediately after Brexit.

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Qiao et al. (2021) examined the effect of Brexit on the S&P 500 returns and revealed that volatility and trend of S&P 500 returns increases prior to the Brexit, but the Brexit affected the S&P 500 returns trend negatively in the short run and also raised the market volatility. In this research, we analyzed the impact of the Brexit on FTSE-100 index and volume through Carrion-i-Silvestre et al. (2009) unit root test with multiple structural breaks to see whether the Brexit led a structural break or not in FTSE-100 index and volume. In this context, the next section described the dataset and method and the empirical analysis was conducted in Section 4. The Conclusion concluded the study.

2. Dataset and Method

The study analyzed the impact of Brexit on FTSE-100 index (closing values) and FTSE-100 volume over the period of 9th May 2016-6th May 2021 through Carrion-i-Silvestre et al. (2009) unit root test with multiple structural breaks. The daily data of FTSE-100 index and volume were provided from London Stock Exchange (2021). The econometric analyses were conducted with the help of Gauss 10.0 and Eviews 10.0 software packages. The course and main characteristics of FTSE index and volume during the study period were respectively shown in Chart 1 and Table 1. The mean of FTSE-100 index was 6996.149 and the mean of FTSE-100 volume was 811,000,000, during the study period, but two series exhibited considerable changes.

Chart 1: Course of FTSE-100 index and volume

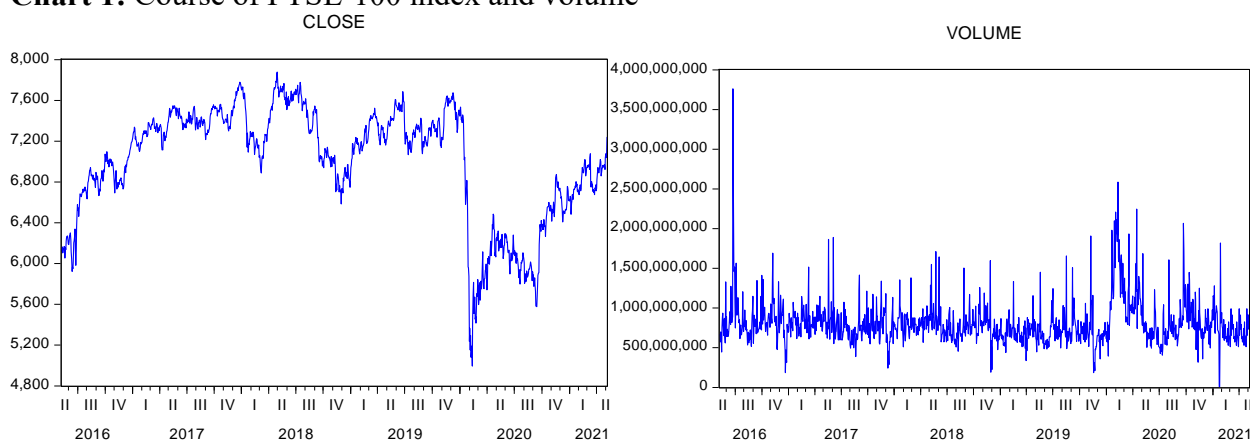


Table 1: Summary characteristics of the dataset

Statistics	FTSE-100 index	FTSE-100 volume
Mean	6996.149	8.11E+08
Median	7163.900	7.57E+08
Maximum	7877.500	3.76E+09
Minimum	4993.900	8378200.
Std. Dev.	548.5487	2.79E+08
Skewness	-0.953535	2.668329
Kurtosis	3.210961	18.09597

Carrion-i-Silvestre et al. (2009) unit root test allows five structural breaks and endogenously detects the structural breaks through Bai and Perron (2003) algorithm. The test can be employed in the small samples and the asymptotic values to test the hypothesis is generated through bootstrapping as following: .

$$y_t = d_t + u_t \quad (1)$$

$$u_t = \alpha u_{t-1} + v_t \quad t = 0, 1, 2, \dots, T \quad (2)$$

The null hypothesis of the test indicates the presence of unit root under structural breaks. Carrion-i-Silvestre et al. (2009) developed the following five test statistics to check the stationarity of the series:

$$P_T(\lambda^0) = \frac{[S(\bar{\alpha}, \lambda^0) - \bar{\alpha}S(1, \lambda^0)]}{S^2(\lambda^0)} \quad (3)$$

$$MP_T(\lambda^0) = \frac{[c^{-2}T^{-2} \sum_{t=1}^T \tilde{y}_{t-1}^2 + (1-\bar{c})T^{-1} \tilde{y}_T^2]}{s^2(\lambda^0)^2} \quad (4)$$

$$MZ_\alpha(\lambda^0) = (T^{-1} \tilde{y}_T^2 - s(\lambda^0)^2) \left(2T^{-2} \sum_{t=1}^T \tilde{y}_{t-1}^2 \right)^{-1} \quad (5)$$

$$MSB_\alpha(\lambda^0) = \left(s(\lambda^0)^{-2} T^{-2} \sum_{t=1}^T \tilde{y}_{t-1}^2 \right)^{1/2} \quad (6)$$

$$MZ_t(\lambda^0) = (T^{-1} \tilde{y}_T^2 - s(\lambda^0)^2) \left(4s(\lambda^0)^2 T^{-2} \sum_{t=1}^T \tilde{y}_{t-1}^2 \right)^{1/2} \quad (7)$$

3. Empirical Analysis

We analyzed the effect of Brexit on FTSE-100 index (closing values) and FTSE-100 volume over the period of 9th May 2016-6th May 2021 through Carrion-i-Silvestre et al. (2009) unit root test with multiple structural breaks and the test model allowing structural breaks in constant and trend was selected and the findings were displayed in Table 2. The null hypothesis was accepted, because the calculated test statistics were found to be higher the bootstrap critical values and in turn the existence of unit root at both series were revealed. In other, the series were not stationary at their levels. Furthermore, the test endogenously determined five structural breaks for FTSE-100 index and FTSE-100 volume and the structural breaks corresponded to the Brexit decision by referendum and Brexit finalization. In other words, Brexit led structural changes on FTSE-100 index and FTSE volume.

Table 2: Carrion-i-Silvestre et al. (2009) unit root with structural breaks

Variables	Level Values					Structural Breaks
	P_T	MP_T	MZ_α	MSB	MZ_T	
FTSE-100 index	23.45	18.29	-22.98	0.12	-2.62	27/06/2016,01/12/2016,07/03/2017, 29/11/2018, 11/02/2020
FTSE-100 volume	29.16	21.67	-24.55	0.17	-3.01	23/06/2016,21/12/2016,13/04/2017, 10/02/2020, 22/01/2021

* it is significant at 5% significance level

5. Conclusion

The Brexit process and the UK withdrawal from the EU had many implications for both parties. In the article, the effect of Brexit on FTSE-100 index volume was analyzed through Carrion-i-Silvestre et al. (2009) unit root test with multiple structural breaks. The analysis revealed that the

Brexit led the structural breaks in both FTSE index and volume and verified the theoretical expectations and were consistent with the limited empirical literature.

References

- Bai, J., Perron, P. (2003). Computation and analysis of multiple structural change models. *Journal of Applied Econometrics*, 18, 1-22.
- Ben Ameer, H., Louhichi, W. The Brexit impact on European market co-movements. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-020-03899-9>
- Breinlich, H., Leromain, E., Novy, D., Sampson, T., Usman, A. (2018). The economic effects of Brexit: Evidence from the Stock Market. *Fiscal Studies*, 39(4), 581–623.
- Carrion-i-Silvestre, J.L., Kim, D., Perron, P. (2009). GLS-based unit root tests with multiple structural breaks under both the null and the alternative hypotheses. *Econometric Theory*, 25, 1754-1792.
- Chen, J., Ebeke, C., Lin, L., Qu, H., Siminitz, J. (2018). The Long-Term Impact of Brexit on the European Union, <https://blogs.imf.org/2018/08/10/the-long-term-impact-of-brexit-on-the-european-union/>
- Felbermayr, G., Fuest, C., Gröschl, J.K., Stöhlker, D. (2017). Economic effects of Brexit on the European Economy, *EconPol Policy Report*, No. 04, ifo Institute - Leibniz Institute for Economic Research at the University of Munich, Munich
- London Stock Exchange (2021). FTSE 100, <https://www.londonstockexchange.com/indices/ftse-100>
- Pandzic, L. (2021). Impact of Brexit on UK-EU trade relationship. *Ecoforum*, 10(1), 1-7.
- Qiao, K., Liu, Z., Huang, B., Sun, Y., Wang, S. (2021). Brexit and its impact on the US stock market. *Journal of Systems Science and Complexity*, 34, 1044–1062. <https://doi.org/10.1007/s11424-020-9174-0>
- Sampson, T. (2017). Brexit: the economics of international disintegration. *Journal of Economic Perspectives*, 31(4), 163-84. <https://doi.org/10.1257/jep.31.4.163>