Quantitative Finance and Economics

QFE, 4(3): 503–514.
DOI: 10.3934/QFE.2020023
Received: 15 May 2020
Accepted: 29 June 2020
Published: 13 July 2020

http://www.aimspress.com/journal/QFE

Research article

Covid-19, oil price and UK economic policy uncertainty: evidence from the ARDL approach

Saeed Sazzad Jeris* and Ridoy Deb Nath

Department of Business Administration, Shahjalal University of Science and Technology, Sylhet, Bangladesh

*** Correspondence:** Email: saeedjeris30@gmail.com; Tel: +8801765360660.

Abstract: This study attempts to investigate how the spread of coronavirus (COVID-19) influence the UK economic policy uncertainty. Using daily data ranging from 11 March 2020 to 7 May 2020, an ARDL model has been applied in this study to capture both the short-run and long-run impact of COVID-19 on economic policy uncertainty. Additionally, the influence of Brent oil price on economic policy uncertainty is also examined. Based on the ARDL result, it is found that both COVID-19 new cases and new deaths reported in the UK have a strong and positive association with the UK economic policy uncertainty in the long-run. However, Brent oil price shows an inverse connection with economic policy uncertainty in the long run.

Key words: COVID-19; oil price; economic policy uncertainty; short-run; long-run; ARDL

JEL Codes: E52, E60, F62, G01

1. Introduction

As of May 9, 2020, the global outbreak of coronavirus disease 2019 (COVID-19) has invaded 212 countries and territories around the world (Worldometer, 2020). Starting as pneumonia of unknown cause identified in Wuhan, China on December 31, 2019, Covid-19 was declared a "Public Health Emergency of International Concern" on January 30, 2020, by the World Health Organization (WHO). Although the number of daily new cases started to decline in China since February 13, the daily new cases reported outside China increased drastically. As the situation got worse, the WHO went on to

declare COVID-19 as a global pandemic on 11 March 2020 (WHO, 2020). United Kingdom, one of the European nations, is now severely affected. The first case of covid-19 was reported in the UK on January 31, 2020 (Tom and Charlotte, 2020). As of now, the UK stands third in position in the European region and fourth in the world considering the total number of COVID-19 cases. However, the UK has the second-highest total number of deaths reported in the world, following the USA, according to the data recorded by Worldometer on 9 May 2020.

The UK government reacted to this outbreak by shutting down all schools, pubs, restaurants, indoor entertainment venues and leisure centers with some exceptions on March 20. However, the situation at hand impelled the government to impose a lockdown on the whole population, shutting down almost all businesses, venues, places of worship etc. Emergency powers were granted to the government by the Parliament of the United Kingdom with the Coronavirus Act 2020 (BBC News, 2020). On February 3, Prime Minister Boris Johnson expressed his concern that "coronavirus will trigger a panic and a desire for market segregation that go beyond what is medically rational to the point of doing real and unnecessary economic damage". The UK Treasury along with the governor of the Bank of England was reported to work together to prevent the economy from falling into recession by providing a package of economic stimulus (Jasper and Julia, 2020). Furthermore, bank rate of interest was cut from 0.75% to 0.25% by the Bank of England in order to vitalize the economy (Phillip et al., 2020). On March 19, the interest rate was further cut down to 0.10%, the lowest in the Bank's history (BBC News, 2020). Additionally, Fitch Ratings, one of "The Big Three" rating agency, deduced that the UK government might encounter a deficit of 9% of GDP in 2020, as compared to the 2% in the previous year (Henderson, 2020). Moreover, a report of May 7 reveals that the Bank of England forecasted the worst recession of the UK since "The Great Frost" (Giles, 2020). These drastic predictions create a hazy future for economic policies in the UK. Thus, in a general sense, the dynamics of the UK's economic policy are uncertain regarding the covid-19 situation.

To capture the essence of the current scenario and what it may lead to in the future, we provide a comprehensive analysis of the COVID-19 and the economic policy uncertainty (EPU) of the UK. We present our analysis and provide discussions of the short-run and long-run impact of COVID-19 on UK EPU. Furthermore, we analyze the impact of oil price on economic policy uncertainty. The UK, with the growing oil-dependency, is expected to react to the decrease of oil prices around the world. We, therefore, attempt to analyze this impact on both short-run and long-run perspective. We use the Brent oil in our study as it is expected to impact the UK economy more, being the product of the UK origin. Although, studies have already been conducted to address the relationship between oil price and economic policy uncertainty (e.g. Chen et al., 2020; Kang et al., 2017), they did not consider Brent oil prices in the UK and the covid-19 scenario in this regard. Additionally, only a limited number of studies have attempted to establish the factors behind the EPU (e.g. Chen et al., 2020; Duca and Saving, 2018). Most of the studies have been conducted to analyze the impact of EPU on firm performance (e.g. Wu et al., 2020; Iqbal et al., 2019), economic activity (e.g. Nyamela et al., 2019; Sahinoz and Cosar, 2018), bank valuation (e.g. He and Niu, 2018) or financial volatility (e.g. Tiwari et al., 2019; Mei et al., 2018). Thus, our empirical investigation adds to the existing literature by providing a comprehensive analysis of the impact of COVID-19 and oil price on the economic policy uncertainty of the UK.

The rest of the paper advances as follows. Section 2 includes the literature review where the methodology section described in Section 3. Section 4 illustrates the empirical results. Finally, Section 5 concludes and discusses policy implications.

2. Literature review

The ongoing COVID-19 crisis presents not only an international public health concern but also a global economic crisis. Many predict that it may surpass the Global Financial Crisis of 2007–2008 (e.g. Loayza and Pennings, 2020). At this severe time, policymakers and regulators around the world are concerned about the upcoming financial crisis and the economic challenges it may pose to the economy at large. As many argue, the effectiveness of any country's ability to handle shocks and provide support is determined by the quality of governance (e.g. Chuah et al., 2020; Kaufmann et al., 2011). Thus, the short-run and long-run economic policy uncertainty of a country generated by the covid-19 situation is a matter of great concern to the regulators, business enterprises and all the economic entities at large. A set of both short-term and long-term policy responses will be required by the governments and regulatory bodies of each nation (McKibbin and Fernando, 2020).

In order to understand the impact of COVID-19 on various aspects of the economy, several attempts have been made till date. Zaremba et al. (2020) conducted a study to investigate the impact of non-pharmaceutical policy responses to COVID-19 on stock market volatility. Their evidence from 67 countries suggests that government interventions influence the stock market volatility significantly and robustly. In another study, Zhang et al. (2020) stated that the uncertainty and the economic losses of the pandemic have caused the stock market to be highly unpredictable and volatile. Al-Awadhi et al. (2020) also reported that daily growths in both the total number of cases and the total number of deaths are negatively associated with stock market return. Other studies attempted to unfold the reaction of other market instruments to COVID-19. Conlon and McGee (2020) and Corbet et al. (2020) argued that gold and cryptocurrencies are not hedges or safe havens at a time of financial or economic disruption, rather are the contagion amplifiers. Ding et al. (2020) reveal another interesting finding. They argue that the stock of firms owned by hedge funds perform worse, whereas the stock of firms owned by non-financial corporations performs better. Their findings suggest that hedge funds intensify downward pressure on the stock prices by selling the stocks rapidly in response to the negative information on COVID-19. A unique study conducted by Corbet et al. (2020) reveals that companies related to the name "corona" suffered reputational damage, although they were not responsible or connected to the COVID-19 outbreak in any way. Dietrich et al. (2020) ran a survey of household expectations in the US, considering that the short-term impact of covid-19 is determined by the expectations of the people about the overall effect. Their findings reveal a high standard deviation in people's responses, indicating the uncertainty of the economic costs of covid-19. Dietrich et al. (2020) further argue that the monetary policy is the key in the short run; however, the effect of shock on possible output cannot be offset by monetary policy in the medium run. Sharif et al. (2020) conducted a study on the US economy and found that covid-19 has a long-term negative impact of economic policy uncertainty. Another study conducted on the US economic policy uncertainty by Albulescu (2020) reveals that covid-19 numbers reported globally (including China) has no significant effect on the US EPU. However, their findings reveal a positive impact of covid-19 on US EPU while considering the covid-19 status outside of China.

The association between economic policy uncertainty and oil price has been widely investigated by the literature. Alekhina and Alekhina (2018) conducted a study on the Russian economy and argued that oil prices cause monetary policy reactions and affect macroeconomic performance. Zhao et al. (2017)

mentioned that oil price is crucial in economic activity because it is one of the most important inputs of transportation and industrial production. In an earlier study, Hamilton (1983) found a strong negative association between economy and oil prices. A lot of studies report that oil price has a strong impact on economic activity (Sum, 2013; Alexopoulos & Cohen, 2015; Demir et al., 2017). Kang & Ratti (2013) investigated the connectedness between economic policy uncertainty and structural oil price shocks by applying a VAR model and noted that oil production and demand shocks are strongly correlated with rising economic policy uncertainty. Antonakakis et al. (2014) found an inverse association between the shock of oil prices and the US economic recessions. In addition, Aloui et al. (2016) conducted a study to find out the dependence between economic policy uncertainty and oil prices by applying a copula approach and their findings report a negative association between oil prices and economic policy uncertainty at the entire period except in the short-run. Furthermore, Berger & Uddin (2016) and Qadan & Nama (2018) suggest that the fluctuations in oil prices have a significant influence on economic policy uncertainty. Economic policy insecurity can also be affected by the shocks of oil prices (Kang et al., 2017; Chen et al., 2019) while Ma et al. (2018) suggest that economic policy uncertainty will provide vital assistance to predict future oil prices. Sun et al. (2018) investigated the relationship between oil price and economic policy uncertainty and found that there is no short-run association between these two. However, there is a strong association in both long-run and medium term. Yang (2019) also found a long-run and short-run association between economic policy uncertainty and oil price. Chen et al. (2019) further argue that economic policy uncertainty has been positively affected by the shock of oil prices in both the short and long run while shows a negative impact on the medium term. In a recent paper, Hailemariam et al. (2019) investigated the association between oil price and economic policy uncertainty and noted that oil prices affect economic policy uncertainty negatively. However, the relationship is conditioned by global aggregate demand. Most of the studies are based on the USA economic policy uncertainty, but the impact of oil prices on the UK economic policy uncertainty is still needed some fresh insights. As other studies suggest that UK economic policy have a significant difference in terms of both monetary and fiscal policy with other countries (e.g. Antonakakis et al., 2014), we believe that the UK needs distinct attention in this regard. Albulescu (2020) studied the US EPU; however, UK EPU requires additional attention to address the policy uncertainty of the nation in this pandemic time. Thus, our paper is a timely contribution to the literature.

3. Methodology

3.1. Data and variables

In this study, we attempt to measure the impact of COVID-19 on economic policy uncertainty. Therefore, we use EPU index as the dependent variable in our study. We use Covid-19 daily new cases and daily new deaths as independent variables. Additionally, we add Brent oil in our study to assess the combined effect of COVID-19 and oil price on economic policy uncertainty. Brent crude oil is the most traded of all the oil benchmarks. We collected our COVID-19 data of the UK from Worldometer. Our data for EPU index were collected from policyuncertainty.com. Finally, our data for Brent oil is collected from investing.com. Our study period ranges from March 11, 2020, to May 7, 2020. Based on data availability of Brent oil Price, our final sample consist a total of 40 observations, 15 from March, 20 from April and 5 observations from May. In Figure 1, we present the UK's COVID-19 daily new cases, daily new deaths, economic policy uncertainty (EPU) index

developed by Baker and Bloom (2016) and Brent oil price. Here, we observe an upward trend in the COVID-19 daily new cases and economic policy uncertainty reported in the UK. An initial shock is observed in the UK EPU, which may be associated with COVID-19. Although there is a noticeable increase in the number of daily new deaths reported in the UK, the numbers since the last week of April present a downward trend in a fluctuating fashion. However, the time series trend of Brent oil price shows an increase in the first and last week of April.

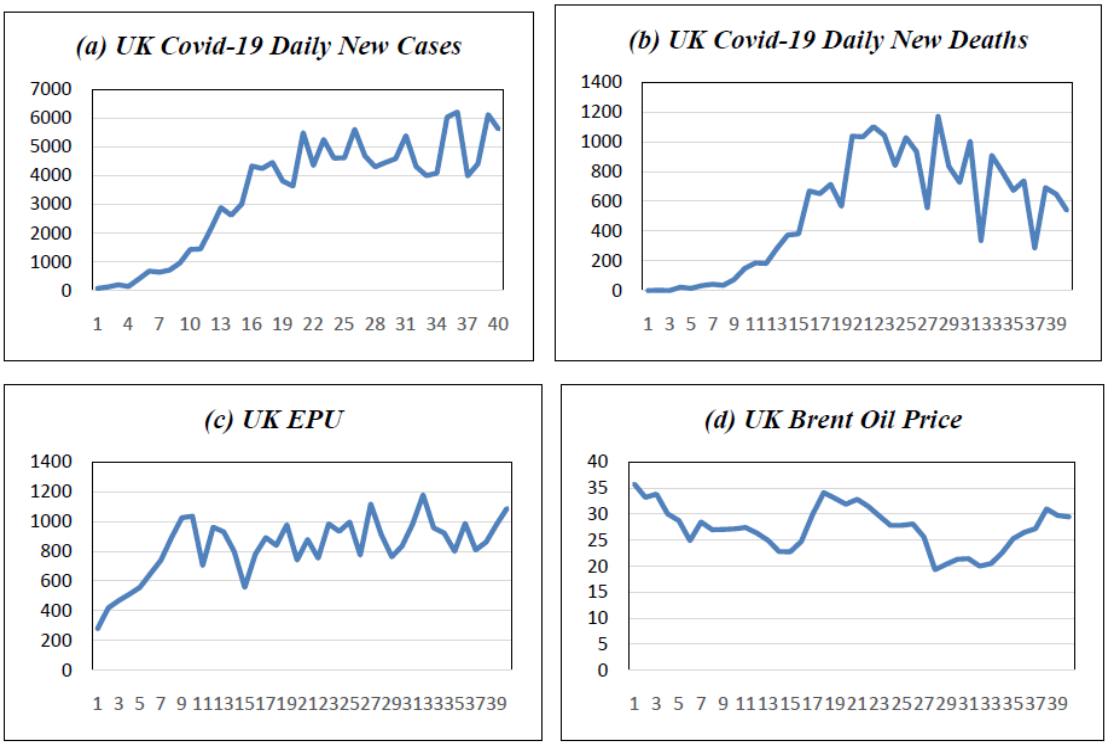

Figure 1. Time series trend of UK COVID-19 Daily New Cases, UK COVID-19 Daily New Deaths, UK EPU and UK Brent Oil Price. Source: Authors' own estimation.

3.2. Autoregressive-Distributed Lag (ARDL)

In our study, we use the Autoregressive-Distributed Lag (ARDL) model proposed by Pesaran et al. (2001) to investigate the relationships among the variables. The ARDL model has multiple benefits over various other cointegration models in empirical research. (1) ARDL model can be applied to small sample size (Narayan and Narayan, 2005; Narayan, 2004). (2) ARDL model assumes that all the variables are endogenous. It can be applied in situations when the variables integrate at level I(0), in the first order I(1), or few variables integrate at I(0), few variables at I(1) (Qamruzzaman and Jianguo, 2018). (3) Additionally, the ARDL model allows simultaneous estimation of both long-run and short-run parameters (Qamruzzaman and Jianguo, 2018). Because of the benefits mentioned above, the ARDL model, we use it in our study to analyze the short-run and long-run impact of covid-19 and oil price on UK economic policy uncertainty.

The equation used in this study is following:

$$\Delta EPU_t = c + \delta_{EPU} EPU_{t-1} + \delta_{COVID19} COVID19_t + \delta_{BOIL} BOIL_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta EPU_{t-i} + \sum_{i=1}^{p} \beta_i \Delta COV19_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta BOIL_{t-i} + \theta ECT_{t-i} + \epsilon_t \quad (1)$$

Note: where, Δ and δ are short- and long-run terms respectively; "i" represents the maximum number of lags; ECT= the error correction adjustment term; θ = the sprred of adjustment, and ϵ is the error term.

4. Results and discussions

4.1. Summary statistics

The summary statistics of the variables briefly outline in Table 1. The average economic policy uncertainty (EPU) is 831.39 with the lowest being 280.61 and the highest at 1178.45. For the new case of COVID-19, the average is approximately 4000 where the average of new death is 533. Brent oil (BOIL) has a mean and standard deviation of 27.29, and 4.29 respectively.

Table 1. Summary statistics.

	EPU	COVNC	COVND	BOIL
Mean	831.3952	3399.550	533.4750	27.29375
Median	870.1300	4160.000	608.5000	27.29500
Maximum	1178.450	6201.000	1172.000	35.79000
Minimum	280.6100	77.00000	0.000000	19.33000
Std. Dev.	197.0978	1949.131	380.8927	4.295852
Observations	40	40	40	40

Notes: EPU = Economic policy uncertainty, COVNC = COVID-19 new cases, COVND = COVID-19 new deaths, and BOIL = Brent oil. Source: Authors' calculation.

The correlation matrix of the variables is shown in Table 2. Both the COVNC and COVND shows positive association with EPU where BOIL is negatively related to EPU. As expectedly, the relationship between COVNC and COVND is positive. Another point is that the correlation between the variables is not so high. So, multicollinearity should not be an issue in our study.

Table 2. Correlation matrix.

	EPU	COVNC	COVND	BOIL
EPU	1			
COVNC	0.61	1		
COVND	0.43	0.84	1	
BOIL	−0.39	−0.24	−0.19	1

Notes: EPU = Economic policy uncertainty, COVNC = COVID-19 new cases, COVND = COVID-19 new deaths, and BOIL = Brent oil. Source: Authors' calculation.

We considered the Phillips-Perron unit root test (Table 3) to check our series are either I (0) or I (I). To exemplify, COVNC, COVND, and BOIL are mean reverting where EPU present unit roots.

Table 3. Panel unit root test result.

	Phillips-Perron	
Variables	Level	Difference
EPU	−3.61***	−15.33***
COVNC	−1.40	−10.44***
COVND	−2.19	−12.91***
BOIL	−2.41	−4.92***

Notes: (a) ***, **, and * indicate statistical significance at 1%, 5%, and 10% respectively. (b) The optimal lag selection is based on Akaike Information Criteria (AIC). (c) EPU indicates economic policy uncertainty. (d) COVNC indicates total new cases and COVND refers to the total new deaths (e) BOIL refers to Brent oil prices.

4.2. Bound test results

In this step, we examined the bound tests to check the long-run existence. Bound tests have an upper bound for I (I) series and, a lower bound for I (0) series. The critical values of these series are derived from Narayan (2005). If the critical value of the upper bound is less than the value of F-statistic, then it will indicate a cointegration relationship. In both the models, referring to the new cases and new deaths of COVID-19, long-term associations are noticed among the coronavirus numbers, Brent oil prices, and the economic policy uncertainty (see Table 4).

Table 4. Bound test results (BRENT).

	F-statistic	Critical values		Conclusion
Model specification		Lower bound (I(0))	Upper bound (I(1))	
COVNC	5.32	3.10	3.87	Cointegration
COVND	4.22	3.10	3.87	Cointegration

Notes: (a) Critical values at 5% significance level. (b) COVNC indicates COVID-19 new cases and COVND refers to the COVID-19 new deaths. Source: Authors' calculation.

4.3. Regression analysis

In this step, ARDL estimation results for the two models are presented in Table 5. Model 1 considers the new cases of COVID-19 where model 2 outlines the new death of COVID-19. From the first model, it is found that the new cases of COVID-19 have a positive and significant impact on economic policy uncertainty in the long-run, meaning that an increase in the new cases raises the uncertainty of economic policy in the UK. This result is consistent with Albulescu (2020). On the other hand, the findings indicate an inverse association between Brent oil and economic policy uncertainty in the equilibrium (long-run). It suggests that a decline of Brent oil price increases the economic policy uncertainty in the long term. This result is also supporting the findings of Aloui et al. (2016), Sun et al. (2018), and Hailemariam et al. (2019) where they also found a long run association between economic policy uncertainty and the prices of oil. In model 2, the results are similar to the first model where new deaths of COVID-19 shows positive, and Brent oil shows a negative correlation with economic policy uncertainty in the long run. In the case of short-run, the results depict that there is no short-run relationship between the variables except in some cases in model 2.

The lower part of Table 5 includes the diagnostic tests of our study. We conducted the Jarque-Bera normality test for checking the normality problem, Breusch- Godfrey Serial Correlation LM test for serial correlation. Breusch-Pagan-Godfrey heteroskedasticity, ARCH effect, and Ramsey reset tests are also estimated. All tests are passed the probability chi-square value.

We further test the dynamic stability of our model using the cumulative sum of recursive residuals (CUSUM) and cumulative sum of recursive residual square (CUSUM Sq), both are shown in Figure 2, the results show that the overall model is stable.

Table 5. ARDL specification (BRENT).

	Model 1: COVNC	Model 2: COVND
Long-run equation		
COV_t	0.055***	0.189**
	(0.012)	(0.073)
BOIL_t	−11.79*	−14.525**
	(5.85)	(6.527)
C	965.34***	1126.753***
	(177.04)	(191.653)
Short-run equation		
$\Delta\mathrm{COV}_{t+1}$		−0.074
		(0.088)
$\Delta\mathrm{BOIL}_{t+1}$		−9.089
		(9.752)
$\Delta\mathrm{BOIL}_{t+2}$		20.601**
		(9.617)
ECT_t	−0.616***	−0.602***
	(0.128)	(0.139)
Diagnostic Tests		
Normality	0.667	0.445
Serial correlation	0.582	0.076
Heteroskedasticity	0.654	0.90
ARCH	0.922	0.629
Ramsey reset	0.115	0.373
CUSUM	Stable	Stable
CUSUM Sq.	Stable	Stable

Note: ***. **, * indicates significance at 1%, 5%, and 10% level respectively; Values in parenthesis indicate standard error; Jarque-Bera test for normality, Breusch-Godfrey serial correlation LM test, Breusch-Pagan-Godfrey heteroskedasticity, ARCH effect, Ramsey reset, CUSUM test are used.

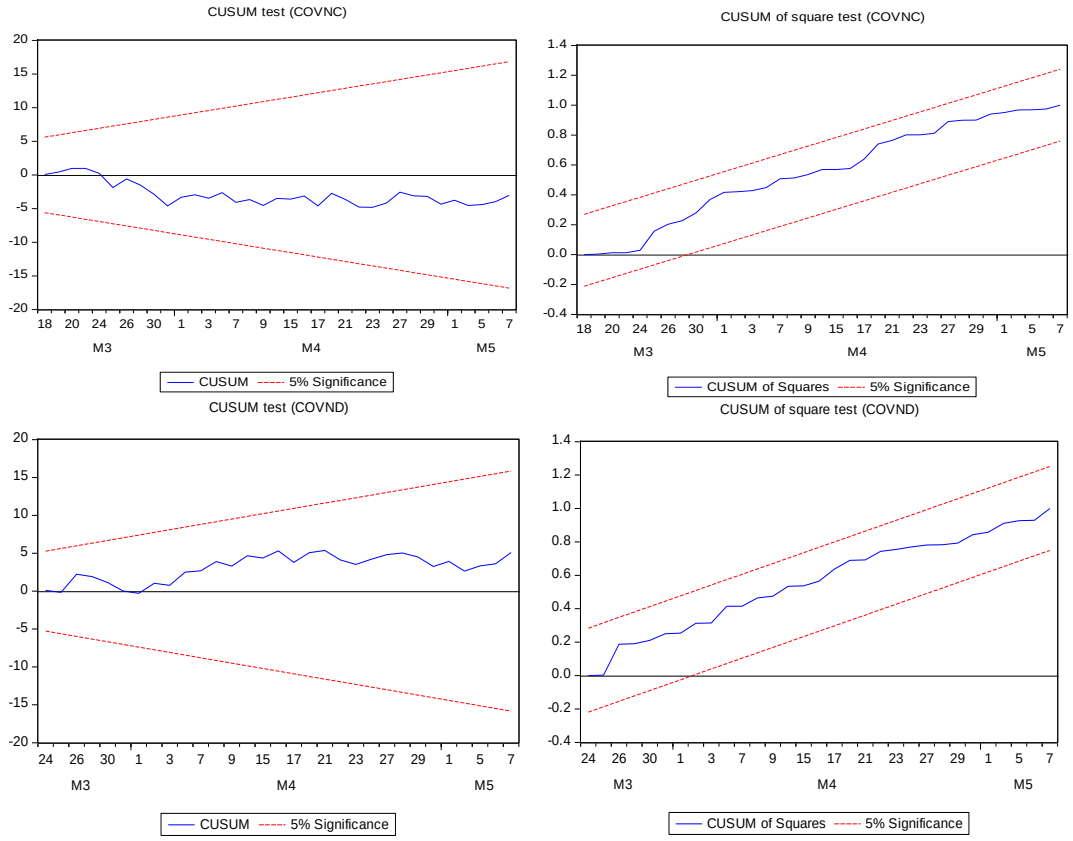

Figure 2. CUSUM test and CUSUM of square test of Covid new cases (COVNC) and Covid new deaths (COVND).

5. Conclusion

This paper investigates the impact of COVID-19 pandemic (new cases and new deaths) and oil price on the UK economic policy uncertainty. For this purpose, Autoregressive-Distribute Lag (ARDL) model has been applied on the data from 11 March 2020 to 7 May 2020 in order to capture both long-run and short-run impact on economic policy uncertainty. This study is one of the precursors on identifying the connection among COVID-19 pandemic, crude oil price, and, economic policy uncertainty and the importance of this field is highlighted by Goodell (2020). From the outcome of the study based on ARDL, COVID-19 (new cases and new deaths) has a long-run influence on economic policy uncertainty in the UK which is consistent with the findings of Albulescu (2020). Furthermore, Brent oil prices have a negative and strong impact on the UK economic policy uncertainty in the equilibrium. This finding also supports the results obtained by Aloui et al. (2016), Sun et al. (2018), and Hailemariam et al. (2019). However, the relationship is not strong in the short-run. To control this hazard situation, the results of this study can be used as a helping hand for policymakers. Additionally, the UK government should declare some special policy packages to control policy uncertainty. The UK government can consider coherent COVID-19 economic policy that fosters the market. As the result is also indicating a strong relationship between Brent oil price and economic policy uncertainty, the policymakers should be more cautious when conducting the macroeconomic policies in this pandemic time because the oil price shocks could destroy the effective outcomes of these policies. This study will be new insights for other scholars who will show their interest in this sector in future.

The limitation of this study is that the sample period is less than two months though it covers the most recent period. However, this study provides the platform for investigating many research questions concerning the short and long-run impacts of COVID-19 pandemic and oil price on financial soundness, monetary policy, and other macroeconomic factors using real-time data or even large data sample.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgments

The authors would like to thank the editor and the reviewers for their helpful comments. It helps us a lot to make this paper more strengthen.

Conflict of interest

All authors declare no conflicts of interest in this paper.

References

Al-Awadhi AM, Al-Saifi K, Al-Awadhi A, et al. (2020) Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *J Behav Exp Financ*, 100326.

Albulescu C (2020) Do COVID-19 and crude oil prices drive the US economic policy uncertainty? arXiv preprint arXiv:2003.07591.

Alekhina V, Yoshino N (2019) Exogeneity of world oil prices to the Russian Federation's economy and monetary policy. *Eurasian Econ Rev* 9: 531–555.

Alexopoulos M, Cohen J (2015) The power of print: Uncertainty shocks, markets, and the economy. *Int Rev Econ Financ* 40: 8–28.

Aloui R, Gupta R, Miller SM (2016) Uncertainty and crude oil returns. *Energ Econ* 55: 92–100.

Antonakakis N, Chatziantoniou I, Filis G (2014) Dynamic spillovers of oil price shocks and economic policy uncertainty. *Energ Econ* 44: 433–447.

Baker SR, Bloom N, Davis SJ (2016) Measuring economic policy uncertainty. *Q J Econ* 131: 1593–1636.

BBC News (2020) Coronavirus: UK interest rates slashed again in emergency move. Available from: https://www.bbc.com/news/business-51962982.

BBC News (2020) PM announces strict new curbs on life in UK. Available from: https://www.bbc.com/news/uk-52012432.

Berger T, Uddin GS (2016) On the dynamic dependence between equity markets, commodity futures and economic uncertainty indexes. *Energ Econ* 56: 374–383.

Chen X, Sun X, Li J (2020) How does economic policy uncertainty react to oil price shocks? A multi-scale perspective. *Appl Econ Lett* 27: 188–193.

Conlon T, McGee R (2020) Safe haven or risky hazard? Bitcoin during the COVID-19 bear market. *Financ Res Lett* 35: 101607.

Chuah LL, Loayza N, Myers CB (2020) The Fight against Corruption: Taming Tigers and Swatting Flies. World Bank Research and Policy Briefs, 145050. Available from: http://documents.worldbank.org/curated/en/294321578642864410/The-Fight-against-Corruption-Taming-Tigers-and-Swatting-Flies.

Corbet S, Larkin C, Lucey B (2020) The contagion effects of the COVID-19 pandemic: Evidence from gold and cryptocurrencies. *Financ Res Lett* 35: 101554.

Corbet S, Hou Y, Hu Y, et al. (2020) Aye Corona! The contagion effects of being named Corona during the COVID-19 pandemic. *Financ Res Lett*, 101591.

Demir E, Ersan O (2017) Economic policy uncertainty and cash holdings: Evidence from BRIC countries. *Emerg Mark Rev* 33: 189–200.

Dietrich A, Keuster K, Müller GJ, et al. (2020) News and uncertainty about covid-19: Survey evidence and short-run economic impact. Working paper 20(12). Federal Reserve Bank of Cleveland.

Ding W, Levine R, Lin C, et al. (2020) Corporate immunity to the COVID-19 pandemic (No. w27055). National Bureau of Economic Research.

Duca JV, Saving JL (2018) What drives economic policy uncertainty in the long and short runs: European and US evidence over several decades. *J Macroecon* 55: 128–145.

Goodell JW (2020) COVID-19 and finance: Agendas for future research. *Financ Res Lett* 35: 101512.

Giles C (2020) BoE warns UK set to enter worst recession for 300 years. Financial Times. Available from: https://www.ft.com/content/734e604b-93d9-43a6-a6ec-19e8b22dad3c.

Hailemariam A, Smyth R, Zhang X (2019) Oil prices and economic policy uncertainty: Evidence from a nonparametric panel data model. *Energ Econ* 83: 40–51.

Hamilton JD (1983) Oil and the macroeconomy since World War II. *J Polit Econ* 91: 228–248.

He Z, Niu J (2018) The effect of economic policy uncertainty on bank valuations. *Appl Econ Lett* 25: 345–347.

Henderson R (2020) Fitch downgrades UK debt citing coronavirus impact. Financial Times.

Iqbal U, Gan C, Nadeem M (2019) Economic policy uncertainty and firm performance. *Appl Econ Lett* 27: 765–770.

Jasper J, Julia K (2020) Bank of England drafts action plan to head off coronavirus recession. *Guardian*. Available from: https://www.theguardian.com/business/2020/mar/05/coronavirus-could-push-uk-to-brink-of-recession-says-goldman-sachs.

Kang W, Ratti RA (2013) Oil shocks, policy uncertainty and stock market return. *J Int Financ Mark Inst Money* 26: 305–318.

Kang W, Ratti RA, Vespignani JL (2017) Oil price shocks and policy uncertainty: New evidence on the effects of US and non-US oil production. *Energ Econ* 66: 536–546.

Kaufmann D, Kraay A, Mastruzzi M (2011) The worldwide governance indicators: methodology and analytical issues. *Hague J Rule Law* 3: 220–246.

Loayza NV, Pennings S (2020) Macroeconomic policy in the time of covid-19: A primer for developing countries. Research & Policy Brief No.28.

McKibbin WJ, Fernando R (2020) The global macroeconomic impacts of COVID-19: Seven scenarios. CAMA Working Paper.

Mei D, Zeng Q, Zhang Y, et al. (2018) Does US Economic Policy Uncertainty matter for European stock markets volatility? *Phys A* 512: 215–221.

Narayan P (2004) *Reformulating critical values for the bounds F-statistics approach to cointegration: an application to the tourism demand model for Fiji*, Australia: Monash University, 1–40.

Narayan S, Narayan PK (2005) An empirical analysis of Fiji's import demand function. *J Econ Stud* 32: 158–168.

Nyamela Y, Plakandaras V, Gupta R (2019) Frequency-dependent real-time effects of uncertainty in the United States: evidence from daily data. *Appl Econ Lett*, 1–5.

Pesaran MH, Shin Y, Smith RJ (2001) Bounds testing approaches to the analysis of level relationships. *J Appl Econometrics* 16: 289–326.

Phillip I, Richard P, Mark S (2020) Coronavirus: Bank of England makes emergency interest rate cut. *Guardian*. Available from: https://www.theguardian.com/business/2020/mar/11/coronavirus-bank-of-england-makes-emergency-interest-rate-cut.

Qamruzzaman M, Jianguo W (2019) SME financing innovation and SME development in Bangladesh: An application of ARDL. *J Small Bus Entrepreneurship* 31: 521–545.

Sahinoz S, Cosar EE (2018) Economic policy uncertainty and economic activity in Turkey. *Appl Econ Lett* 25: 1517–1520.

Sharif A, Aloui C, Yarovaya L (2020) COVID-19 Pandemic, Oil Prices, Stock Market and Policy Uncertainty Nexus in the US Economy: Fresh Evidence from the Wavelet-Based Approach. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3574699.

Sum V (2013) Economic policy uncertainty in the United States and Europe: A cointegration test. *Int J Econ Financ* 5: 98–101.

Sun X, Chen X, Wang J, et al. (2018) Multi-scale interactions between economic policy uncertainty and oil prices in time-frequency domains. *North Am J Econ Financ* 51.

Tiwari AK, Jana RK, Roubaud D (2019) The policy uncertainty and market volatility puzzle: Evidence from wavelet analysis. *Financ Res Lett* 31: 278–284.

Tom B, Charlotte W (2020) Hunt for contacts of coronavirus-stricken pair in York. The Times. ISSN 0140-0460. Available from: https://www.thetimes.co.uk/article/hunt-for-contacts-of-coronavirus-stricken-pair-in-york-dh363qf8k.

WHO (2020) Coronavirus disease (COVID-19) outbreak. Available from: https://www.who.int/westernpacific/emergencies/covid-19.

Worldometer (2020) Coronavirus Pandemic. Available from: https://www.worldometers.info/coronavirus/.

Wu J, Zhang J, Zhang S, et al. (2020) The economic policy uncertainty and firm investment in Australia. *Appl Econ* 52: 3354–3378.

Yang L (2019) Connectedness of economic policy uncertainty and oil price shocks in a time domain perspective. *Energ Econ* 80: 219–233.

Zaremba A, Kizys R, Aharon DY, et al. (2020) Infected Markets: Novel Coronavirus, Government Interventions, and Stock Return Volatility around the Globe. *Financ Res Lett* 35: 101597.

Zhang D, Hu M, Ji Q (2020) Financial markets under the global pandemic of COVID-19. *Financ Res Lett*, 101528.

Zhao Y, Li J, Yu L (2017) A deep learning ensemble approach for crude oil price forecasting. *Energ Econ* 66: 9–16.