LINKAGES BETWEEN BRENT OIL PRICE AND IRAN STOCK MARKET: NEW EVIDENCE FROM THE CORONA PANDEMIC

Vida Varahrami  
Shahid beheshti university - associate professor  
E-mail: vida.varahrami@gmail.com

Masoome Dadgar  
Alzahra university- Phd student  
E-mail: Mdadgar@ymail.com

Abstract

This article reviews the relationship between the oil market and the stock market during the Corona outbreak. The hypothesis of this paper is whether while oil prices shocks happen due to business cycle fluctuations and some other reasons like political reasons occur; the correlations between changes in Brent oil prices and stock market indices tend to be affected by named corona indexes. Forecasting the stock market in each period has been difficult and the value of stock index has been affected by various factors. Among these factors has been the oil and gas sector, especially in countries dependent on the revenue from their sales. This study examines relationship between Brent oil price and Iran stock market Index during the outbreak of corona pandemic. Research method is, vector autoregression model (VAR) which using daily data covering the period from February 20, 2020 to August 21, 2020. The findings of this study suggest that a negative causal effect from Brent oil price changes to the Iran stock market Index. Also, the results of impulse response functions and variance decompositions showed that some corona pandemic indicators have significant effects on the stock index.

Keywords: Corona virus, oil price, stock market index, VAR, Covid-19, Brent oil price, Tehran stock Index, Gold price, Media Hype Index, fake news Index, Media Coverage Index and Panic

JEL Classification: I18, E44, Q4, C5.

Introduction

In late 2019 and early 2020, the world faced a new wave of crisis called the Corona Pandemic. The global pandemic of the Corona pandemic is one of the greatest social and economic crises in human history. It is predicted that with the outbreak of this pandemic, global GDP will decrease by 4.6% in 2020 [1].
Furthermore the COVID-19 pandemic has made over 4.3 million confirmed cases. This has raised concerns about an impending economic crisis and recession. Social distance, personal isolation and travel restrictions have reduced work in all sectors of the economics [2].

While there is limited previous literature on how pandemics affect financial markets, its effects can be seen in parallel with the effects of other forms of natural disasters. These studies would seem to suggest that the effect of pandemic outbreaks on different economic sectors of countries has been through different channels. One obvious way that pandemics like the corona can affect financial systems is their huge economic costs [3]. Governments use a variety of financing methods to meet these costs. The Corona pandemic has also affected businesses and organizations, affecting financial markets and the global economy in a chain reaction. Meanwhile, unusual reactions from governments have led to disruptions in the supply chain [4]. Under these circumstances, oil-dependent countries are facing financing problem and Economic uncertainty has increased in these countries; therefore, in these crises, the stock market can be considered as one of the financing centers for the government. Due to the outbreak of COVID-19 in the Middle East and North Africa, oil prices fell sharply. As a result, trade around the world locked in and restrictions on transportation led to negative oil demand [5].

In previous studies, the relationship between the stock market and oil prices has been extensively analyzed. In different time periods, the study of these two sections will be important and different crises have had different effects on this relationship in different countries. Among these crises have been crises such as the outbreak of corona heart disease. Recent studies have shown that during the 22 trading days (February 24 to March 24), 18 stock market jumps were recorded, 16 to 18 of which were in response to "bad news" about corona pandemic. Therefore, corona pandemic is a source of systematic risk and there is a need for further research on the financial effects of corona pandemic development [2]. This article deals specifically with the relationship between oil prices and the Iranian stock market due to the prevalence of the corona pandemic.

In addition, the role of stock markets in developing economies has become more important since the global crises, and their economies are becoming more involved in the international oil market [6]. The last decade has seen dramatic changes in crude oil prices. One of the most important is the sharp drop in prices in 2008. Resumption of the upward trend after the financial crisis due to oversupply and declining global demand for energy goods [7]. Ferreira and et al [8] found that stock markets are now more exposed to oil price fluctuation than before the 2008 financial crisis.

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6 Coronavirus disease 2019
To review the relationship between oil prices and the stock market index with the outbreak of the corona pandemic, this article uses data from February 19, 2020 to August 21, 2020. The data are Brent oil prices, the Iranian stock index and some indicators related to the corona pandemic news and the method used in this research is vector autoregression regression.

The rest of the paper is arranged as follows. Section 2 reviews related works with most focus on the research for COVID-19 and relationship between stock market and oil price. Section 3 discusses in details about methodology and used data. Section 4 describes the results of some tests and impulse response functions and variance decompositions. Section 5 evolves this work with a brief of key findings.

**Literature Review**

Oil price shocks and the reaction of monetary policy by the oil producer have been an important topic of theory in modern literature.

Jammazi et al [9] showed significant bidirectional causal relations between oil and stock markets at the different time horizons for France, Germany, Italy, Spain, the UK and the US. Xu and et al [10] showed that strong evidence of asymmetries in volatility shocks between the oil and stock markets due to bad volatility. Also, Bahmani et al. [11] studied asymmetric causality not only from oil price to stock returns but also from stock returns to oil price. They found that an increase in oil price causes returns of three sectors of the U.S. economy, while a decrease in oil price causes returns of four sectors of the U.S. economy, all in the short run.

Delpachitra et al [12] examined the economic outcomes of oil price shocks and supply of oil while allowing for interaction between domestic and foreign monetary policy. They concluded that domestic monetary policy is a important channel that computes for over 40% of discounted variation in domestic output across a 4-year horizon after an oil shock. In contrast, US monetary policy is less important in transmitting oil price shocks to the oil-exporting economy through the international channel. Also, Köse and Ünal [13] studied the impact of oil price shocks on the stock exchanges of three countries in the Caspian Basin – Iran, Kazakhstan and Russia. The results showed, in these three countries, the impact of negative oil price shocks on the stock market was greater than the positive shocks. The response of the stock exchanges in the three countries to negative oil shocks was highly significant. Bakas and Triantafyllou [14] showed the impact of economic uncertainty about global pandemics on the volatility of the broad commodity price index also on the sub-indexes of crude oil and gold. The conclusion of their study showed that uncertainty related to pandemics have a negative impact on the volatility of commodity markets and especially on crude oil market, while the effect on gold market is positive but less significant.
Mokni [15] studied the dynamic reaction of a set of oil-related countries’ stock markets to oil price shocks. He found that the stock returns react more to supply shocks than supply shocks. In addition, the impact of supply shocks on stock returns is generally limited and negative, while aggregate demand shocks have a positive effect on almost all stock returns. Oil demand shocks have positive effects on oil exporter stock returns and negative effects on oil-importing countries, except the Chinese market. Engelhardt et al [16] showed while the covid-19 was driven by news attention or rational expectations about the pandemic's economic impact. Using a sample of 64 national stock markets, which account for 94% of the world’s gross domestic product, they present that the fall in stock markets is largely accompanied by more attention to news and less than reasonable expectations. Basher et al [17] concluded the effect that oil market shocks have on stock prices in the fall of the oil exporter is for both domestic and international investors. They studied the nonlinear relationship of oil price shocks with stock market returns in major oil-exporting countries in a multi-factor Markov-switching framework. A portfolio that uses the possibility of Markov switching to move between low-volatility stocks and volatile T-banknotes works better than a buy-and-hold strategy for some countries.

Salisu and et al [18] found the impact of own and cross oil price and stock prices shocks during the post-announcement of COVID-19 to be more pronounced for oil and stocks albeit with a larger impact for the former. Azimli [19] investigated the impact of the corona pandemic on the degree and structure of risk-return dependence in the US. Following the COVID-19 outbreak, degrees of dependence among returns and market portfolio have increased in the higher quantiles.

Lyócsa and Molnár [20] use a nonlinear autoregressive model to show that abnormal Google searches related to COVID-19. Al-Awadhi et al [21] studied whether contagious infectious diseases have effect on stock market outcomes. They examined the effect of the COVID-19 virus by using panel data analysis on the Chinese stock market. They concluded that both the daily growth in total confirmed cases and in total cases of death caused by COVID-19 have strong negative effects on stock returns across all companies. He et al. [22] showed the impact of the corona pandemic on the stock prices of some Chinese industries. They concluded that the pandemic negatively impacted stock prices on the Shanghai Stock Exchange, whiles it positively effected the stock prices on the Shenzhen Stock Exchange.

Ashraf [23] examined the stock markets’ response to the COVID-19 pandemic. He showed that stock markets response more proactively to the growth in number of COVID-19 confirmed cases as compared to the growth in number of deaths. He also shows negative market response was strong during early days of confirmed cases. He also finds that stock markets quickly react to COVID-19 pandemic and this reaction is different over time depending on the phase of outbreak.
Liu et al. [24] examined the short-term effects of the corona pandemics on 21 major stock indices. Using the study event method, they concluded that these indices fell rapidly after the corona outbreak. Indices of Asian countries experienced lower negative returns compared to other countries. Topcua and Gulalb [25] studied the impact of COVID-19 on emerging stock markets. The findings display that the negative impact of pandemic on emerging stock markets has piecemeal fallen and then begun to pull in. The outbreak effects the highest in Asian emerging markets whereas emerging markets in Europe have experienced the lowest. Khantavit [26] performed the stock market response test to COVID-19 using the event study method. The results of this study showed that the stock returns of the world, France, Germany, Italy, Spain, the United States, China, the Philippines and Thailand to the Covid-19 pandemic have been significant and negative. In these countries, reactions to the widespread media coverage of the COVID-19 have been greater than the events and situations taking place. In other words, the markets' reaction to the old news was greater than the new news. Hanke et al. [27] using the risk-neutral densities of six world-famous stock indexes to assess the stock market's preparation for economic shocks, concluded that financial markets had failed to mitigate the major economic effects of COVID-19 predict until late February. This behavior in the market lasts until about mid-March, but from mid-March onwards, market behavior changes. They found that stock markets in countries with lower mortality (Japan, Germany, and the US) are more optimistically than those with higher mortality (France, Italy). Ali et al. [28] investigated the impact of COVID-19 on different financial securities and compared the situation of China and other countries but paid less attention to industry heterogeneity. Qin et al. [29] investigated the impact of the pandemic on oil markets. Liu et al. [30] studied the impact of COVID-19 on crude oil prices and stock prices in the US. Atri et al. [31] examined how the COVID-19 new cases, deaths, panic and media coverage affect oil and gold prices. Using the ARDL approach over the period January 23, 2020 to June 23, 2020, they found that COVID-19 deaths and panic have negative effects on crude oil price and the empirical results showed that the COVID-19 new infections, deaths and media coverage have positive effects on the gold price.

According to the above literature, the prevalence of corona pandemic has undoubtedly overshadowed the relationships of economic variables. Therefore, it seems necessary to study its effects on various economic relations. This study is the first comprehensive study on the effects of the corona pandemic on the relationship between oil prices and the stock market in Iran. Using the daily statistics of the variables used, the results of the VAR model estimation are examined in the next section.
Data and Methodology

The main purpose of this article is to investigate the effect of the corona pandemic on the relationship between oil prices and the total Iranian stock index. The sample period of February 20, 2020 to August 21, 2020. The reasons for choosing this period are, firstly, the existence of daily required data in statistical centers, secondly, the existence of oil price shock in this period and thirdly, the outbreak of corona pandemic in the sample selected period. Also, daily data show the relationship between the independent variable and the dependent variable due to the high frequency. Daily data have also been used in the studies of Cepoi [32], Kocaarslan and Soytas [33] and Mensi et al. [34] who have done a topic related to the subject of the present study. Model variables with the following symbols and definitions are included in the model:

| Variable | Statement | Resource |
|----------|-----------|----------|
| Tepix    | Tehran stock Index | www.tse.ir |
| BOP      | Brent oil price | www.eia.gov |
| Covid    | Total Corona confirmed cases | www.behdasht.gov.ir |
| Gold     | World gold price | www.federalreserve.gov |
| MHI⁷     | This Index shows the percentage of news talking about the novel Coronavirus. Values range between 0 and 100 | coronavirus.ravenpack.com |
| Panic⁸   | This Index shows the level of news chatter that makes reference to panic or hysteria and coronavirus. Values range between 0 and 100. | coronavirus.ravenpack.com |
| Fake_news| This Index shows the level of media chatter about the novel virus that makes reference to misinformation or fake news alongside COVID-19. Values range between 0 and 100. | coronavirus.ravenpack.com |
| Mediaco⁹ | This Index shows the percentage of all news sources covering the topic of the novel Coronavirus. Values range between 0 and 100 | coronavirus.ravenpack.com |
| Sentim¹⁰ | This Index shows the level of sentiment across all entities mentioned in the news alongside the Coronavirus. The index ranges between -100 and 100 | coronavirus.ravenpack.com |
| Info¹¹   | This Index shows the percentage of all entities (places, companies, etc.) that are somehow linked to COVID-19. Values range between 0 and 100 | coronavirus.ravenpack.com |

In this paper, Vector Autoregressive (VAR) model is used to analyze the relationship between variables. Vector autoregression model is one of the successful and flexible models in multivariate time series analysis. In this model, the effect of unexpected shocks is also investigated. This effect is usually determined by examining the impulse response functions and analysis of variance. To estimate the model to achieve the results, it is necessary to go through several steps in all research. There are some tests to examine the model. The following sections include these tests.

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⁷Coronavirus Media Hype Index
⁸Coronavirus Panic Index
⁹Coronavirus Media Coverage Index
¹⁰Coronavirus Sentiment Index
¹¹Coronavirus Infodemic Index
Empirical Results

To examine the stationary of the variables, some unit root tests, augmented dickey fuller, Phillips-perron and breakpoint were used. The results of the unit root test of variables are shown in Table 2.

| Variable | ADF test | BP test | PP test |
|----------|----------|---------|---------|
|          | 1st difference | level | 1st difference | level | 1st difference | level |
| BOP      | -13.04838 | -2.77307 | -14.19636 | -4.898668 | -13.0571 | -2.836142 |
| covid    | -14.0783 | -2.702396 | -14.77559 | -4.208126 | -14.04418 | -2.76927 |
| Tepix    | -10.08292 | -1.614724 | -11.387 | -2.708662 | -10.85715 | -1.614724 |
| MHI      | -8.057414 | -7.692997 | -18.49894 | -8.564565 | -21.23531 | -7.692997 |
| gold     | -12.74439 | -1.278322 | -14.0478 | -3.127227 | -12.79557 | -1.604293 |
| fake_news| -11.46549 | -9.640716 | -18.58898 | -10.98816 | -41.22403 | -9.544499 |
| mediaco  | -10.83647 | -12.85037 | -33.56785 | -923.601 | -166.3668 | -12.85037 |
| panic    | -9.371086 | -10.44197 | -20.76069 | -17.25826 | -58.60437 | -10.46091 |
| sentim   | -6.324472 | -3.422174 | -14.75188 | -4.401719 | -14.27376 | -3.569898 |
| info     | -9.282874 | -7.925341 | -20.31271 | -8.799036 | -24.353 | -7.925341 |

**Source:** Researcher findings

Table 2
Unit root test

| Variable | ADF test | BP test | PP test |
|----------|----------|---------|---------|
|          | 1st difference | level | 1st difference | level | 1st difference | level |
| BOP      | stationary | nonstationary | stationary | nonstationary | stationary | nonstationary |
| covid    | stationary | nonstationary | stationary | nonstationary | stationary | nonstationary |
| Tepix    | stationary | nonstationary | stationary | nonstationary | stationary | nonstationary |
| MHI      | stationary | stationary | stationary | stationary | stationary | stationary |
| gold     | stationary | nonstationary | stationary | nonstationary | stationary | nonstationary |
| fake_news| stationary | stationary | stationary | stationary | stationary | stationary |
| mediaco  | stationary | stationary | stationary | stationary | stationary | stationary |
| panic    | stationary | stationary | stationary | stationary | stationary | stationary |
| sentim   | stationary | nonstationary | stationary | stationary | stationary | nonstationary |
| info     | stationary | nonstationary | stationary | stationary | stationary | stationary |

**Source:** Researcher findings

In this paper, the optimal lag is determined by Akaike information criterion (AIC) Final prediction error (FPR) and Hannan-Quinn (HQ). According to the table below, the optimal lag for the model is lag one.
Table 4
VAR Lag Order Selection Criteria

| Lag | LogL       | RL       | FPE       | AIC       | SC       | HQ       |
|-----|------------|----------|-----------|-----------|----------|----------|
| 0   | -8994.284  | NA       | 1.79E+36  | 111.8545  | 112.0458 | 111.9322 |
| 1   | -7717.172  | 2379.711 | 8.01e+29* | 97.23195* | 99.33726* | 98.08679* |
| 2   | -7632.562  | 147.1490*| 9.82E+29  | 97.42312  | 101.4423 | 99.05509 |
| 3   | -7559.779  | 117.5374 | 1.42E+30  | 97.76123  | 103.6944 | 100.1703 |
| 4   | -7484.862  | 111.6772 | 2.08E+30  | 98.07282  | 105.9199 | 101.259  |
| 5   | -7415.353  | 94.98047 | 3.39E+30  | 98.4516   | 108.2126 | 102.4149 |
| 6   | -7351.376  | 79.47513 | 6.30E+30  | 98.89908  | 110.574  | 103.6396 |
| 7   | -7240.669  | 123.7719 | 7.09E+30  | 98.76607  | 112.3549 | 104.2837 |
| 8   | -7134.162  | 105.8457 | 9.36E+30  | 98.68524  | 114.188  | 104.98   |

Source: Researcher findings

Cointegration test is to observe the long-term equilibrium relationship between the non-stationary variables. In this study, cointegration tests were accomplished out using the Johansen’s cointegration method. Table 5 shows that there are there are at least 3 long run relationships. The trace statistic value proves it and the maximum eigenvalue that greater than the critical value.

Table 5
Johansen cointegration test result

| Hypothesized No. of CE(s) | Trace Statistic | 0.05 Critical Value | Prob     |
|---------------------------|-----------------|---------------------|----------|
| None *                    | 450.2339        | 239.2354            | 0        |
| At most 1 *               | 329.4797        | 197.3709            | 0        |
| At most 2 *               | 233.4116        | 159.5297            | 0        |
| At most 3 *               | 150.0963        | 125.6154            | 0.0007   |
| At most 4                 | 93.14551        | 95.75366            | 0.0746   |
| At most 5                 | 57.98253        | 69.81889            | 0.3025   |
| At most 6                 | 32.22011        | 47.85613            | 0.6      |
| At most 7                 | 13.86497        | 29.79707            | 0.8481   |
| At most 8                 | 5.254209        | 15.49471            | 0.7812   |
| At most 9                 | 1.545217        | 3.841466            | 0.2138   |

Source: Researcher findings
Figure 1. The Shocks of BOP and Coronavirus indicators on stock market Index
Figure 2. The Shocks of Coronavirus indicators on BOP
The results of variance decompositions show that most of the changes in the variables after the shocks on them are explained by those variables themselves. Also, the change of the total stock index variable after the shock is first explained by the variable itself, then by total corona confirmed cases, oil price, Coronavirus Infodemic index, Coronavirus Media Hype Index, Coronavirus sentiment index, gold price, Coronavirus Fake_news, the Panic Index and finally Coronavirus Media Coverage Index, respectively. As it is clear from the numbers in the table above, the number of daily patients has the most explanation.
Conclusion

The current paper investigates the relationship between oil prices and the Tehran stock index with the presence of the Corona pandemic. To examine the impact of Corona, the indicators have been used. These indicators include the number of total Corona confirmed cases, fake news about the corona, Coronavirus Media Coverage Index, the panic index, Coronavirus Media Hype Index, the sentiment index and the Infodemic index. Descriptions related to each of these indicators are provided in the data introduction section.

While oil prices shocks happen due to business cycle fluctuations and some other reasons like political reasons occur; the correlations between changes in Brent oil prices and stock market indices tend to be affected by named corona indexes.

Using the data of the period from February 20, 2020 to August 21, 2020 and using the vector autoregression model, we came to the conclusion that first of all the variables used in the article except the variables Media Hype Index, Fake news Index, Media Coverage Index and Panic with Once differentiation is sustained, the variables mentioned above are also sustained. The results of the optimal lag also suggested the optimal 1 lag. Using an optimal lag, the Johansson test also proved four significant long-run relationships between the variables.

This finding showed that the dynamics of stock markets during the outbreak of the Coronavirus cannot be accidental. Capelle and Desroziers [34] research has shown that it is not the pre-crisis state of economies that causes current stock market reaction to the corona pandemic, but the adoption of some major government policies that have led to the dynamism of stock markets. He cited government health policies against the Corona pandemic and government support for companies affiliated with health products and services as examples. The results of the model indicate that the unprecedented rise in the stock market cannot be justified in the short term with the outbreak of the Corona virus.

In this study, the Corona Media Index, which due to the significant negative short-term effect it has on the value of the stock exchange, indicates the impact of the stock market on the news in the days when the Corona news was high. With the increase in the number of social and digital networks, it is possible that this index and similar indicators will have a much higher impact on the value of the stock exchange transaction. Also, over time, this connection will become more logical and transparent. The empirical results of Impulse response functions showed that the response of the stock index to the shock on the Infodemic Index and Media Hype Index is negative. Also, the response of the total index to the total Corona confirmed cases was positive. Against the Fake news Index, it tends to be positive in the short run and to a neutral value in the long run.
Regarding the effect of the shock on oil prices and its effect on the total stock index, it can be said that there was a negative relationship from the beginning to the end of the period and a shock on oil prices reduces the stock index. We also found a positive correlation between the oil price response to the shock on the Sentiment Index, Tepix, the Media Coverage Index and the total Corona confirmed cases. And with a positive shock on these indicators, a positive effect on oil prices was observed. A positive shock on the Panic Index, Media Hype Index, the Infodemic Index and gold also had a negative effect on oil prices. Finally, fake news has a positive effect in the short run and a negative effect in the long run, and Media Coverage Index shows a positive effect in the short run and a neutral effect on oil prices in the long run.

This finding implies a mutual risk transmission between oil and stock markets because of the financialization of the crude oil market and the unison movement of oil and stock markets over the last few decades mainly driven by changes in global aggregate demand. The results also show that the causal interactions tend to be stronger at the coarser time scales and are particularly pronounced during periods of economic and financial turmoil such as the recent global financial crisis and European sovereign debt crisis.

References

1. Ru, Hong; Yang, Endong; Zou, Kunru; (2020). Combating the COVID-19 Pandemic: The Role of the SARS Imprint. Retrieved from https://ssrn.com/abstract=3641827
2. Sharif, Arshian; Aloui, Chaker; Yarovaya, Larisa; (2020, July). COVID-19 Pandemic, Oil Prices, Stock Market, Geopolitical Risk And Policy Uncertainty Nexus In The US Economy: Fresh Evidence From The Wavelet-Based Approach. 70:101496. Doi:Https://Doi.Org/10.1016/J.Irfa.2020.101496
3. Goodell, John W.; (2020). COVID-19 And Finance: Agendas For Future Research. Finance Research Letters, 35:101512. Doi:https://Doi.Org/10.1016/J.Frl.2020.101512
4. Nicola, Maria; Alsafi, Zaid; Sohrabi, Catrin; Kerwan, Ahmed; Al-Jabir, Ahmed; Iosifidis, Christos; Agha, Maliha; Agha, Riaz; (2020, June). The Socio-Economic Implications Of The Coronavirus Pandemic (COVID-19): A Review. International Journal Of Surgery, 78, 185-193. Doi:10.1016/J.Ijsu.2020.04.018
5. BOLTON, Patrick; DESPRES, Morgan; SILVA, Luiz Awazu PEREIRA DA; SAMAMA, Frédéric; SVARTZMAN, Romain; (2020). The Green Swan: Central Banking And Financial Stability In The Age Of Climate Change.
6. Zhang, Guofu; Liu, Wei; (2018, December 15). Analysis Of The International Propagation Of Contagion Between Oil And Stock Markets. Energy, 165, Part A, 469-486. Doi:10.1016/J.Energy.2018.09.024
7. Nadal, Raquel; Szklo, Alexandre; Lucena, Andr´E; (2017, December). Time-Varying Impacts Of Demand And Supply Oil Shocks On Correlations Between Crude Oil
8. Ferreira, Paulo; Pereira, Éder John De Area Leão; Fernandes, Marcus; Pereira, Hernane Borges;. (2018, March 1). Detrended Correlation Coefficients Between Oil And Stock Markets: The Effect Of The 2008 Crisis. Physica A, 517, 86-96. Doi:https://Doi.Org/10.1016/J.Physa.2018.11.021

9. Jammazi, Rania; Ferrer, Román; Jareño, Francisco; Shahzad, Syed Jawad Hussain;. (2017, May). Time-Varying Causality Between Crude Oil And Stock Markets: What Can We Learn From A Multiscale Perspective? International Review Of Economics And Finance, 49, 453-483. Doi:Http://Dx.Doi.Org/10.1016/J.Iref.2017.03.007

10. Xu, Weiju; Ma, Feng; Chen, Wang; Zhang, Bing;. (2018, May). Asymmetric Volatility Spillovers Between Oil And Stock Markets: Evidence From China And The United States. Energy Economics, 80, 310-320. Doi: https://Doi.Org/10.1016/J.Eneco.2019.01.014

11. Bahmani-Oskooee, Mohsen; Ghodsi, Seyed Hesam; Hadzic, Muris;. (2019, September). Asymmetric Causality Between Oil Price And Stock Returns: A Sectoral Analysis. Economic Analysis And Policy, 63, 165-174. Doi: https://Doi.Org/10.1016/J.Eap.2019.06.002

12. Delpachitra, Sarath; Hou, Keqiang; Cottrell, Simon;. (2020, September). The Impact Of Oil Price Shocks In The Canadian Economy: A Structural Investigation On An Oil-Exporting Economy. Energy Economics, 91:104846. Doi:https://Doi.Org/10.1016/J.Eneco.2020.104846

13. Köse, Neźir; Ünal, Emre;. (2020, January 1). The Impact Of Oil Price Shocks On Stock Exchanges In Caspian Basin Countries. Energy, 190:116383. Doi:https://Doi.Org/10.1016/J.Energy.2019.116383

14. Bakas, Dimitrios; Triantafyllou, Athanasios;. (2020, August). Commodity Price Volatility And The Economic Uncertainty Of Pandemics. Economics Letters, 193:109283. Doi:Http://Dx.Doi.Org/10.2139/Ssrn.3581193

15. Mokni, Khaled;. (2020, November). Time-Varying Effect Of Oil Price Shocks On The Stock Market Returns:Evidence From Oil-Importing And Oil-Exporting Countries. Energy Reports, 6, 605-619. Doi: https://Doi.Org/10.1016/J.Egyr.2020.03.002

16. Engelhardt, Nils; Krause, Miguel; Neukirchen, Daniel;. (2020). What Drives Stocks During The Corona-Crash? News Attention Vs. Rational Expectation. Sustainability, 12(12). Doi: https://Doi.Org/10.3390/Su12125014

17. Basher, Syed Abul; Haug, Alfred A.; Sadorsky, Perry;. (2018, September). The Impact Of Oil-Market Shocks On Stock Returns In Major Oil-Exporting Countries. Journal Of International Money And Finance, 86, 264-280. Doi:https://Doi.Org/10.1016/J.Jimomfin.2018.05.003

18. Salisu, Afees A.; Ebuh, Godday U.; Usman, Nurudddeen;. (2020, September). Revisiting Oil-Stock Nexus During COVID-19 Pandemic: Some Preliminary Results. International Review Of Economics And Finance, 69, 280-294. Doi:https://Doi.Org/10.1016/J.Iref.2020.06.023
19. Azimli, Asil; (2020, October). The Impact Of COVID-19 On The Degree Of Dependence And Structure Of Risk-Return Relationship: A Quantile Regression Approach. Finance Research Letters, 36:101648. Doi:https://Doi.Org/10.1016/J.Frl.2020.101648

20. Lyócsa, Štefan; Molnár, Peter; (2020, October). Stock Market Oscillations During The Corona Crash: The Role Of Fear And Uncertainty. Finance Research Letters, 36:101707. Doi: https://Doi.Org/10.1016/J.Frl.2020.101707

21. Al-Awadhi, Abdullah M.; Alsaifi, Khaled; Al-Awadhi, Ahmad; Alhammadi, Salah; (2020, September). Death And Contagious Infectious Diseases: Impact Of The COVID-19 Virus On Stock Market Returns. Journal Of Behavioral And Experimental Finance, 27:100326. Doi: https://Doi.Org/10.1016/J.Jbef.2020.100326

22. He, Pinglin; Sun, Yulong; Zhang, Ying; Li, Tao; (2020, July). COVID–19’s Impact On Stock Prices Across Different Sectors—An Event Study Based On The Chinese Stock Market. Emerging Markets Finance And Trade, 56(10), 2198-2212. Doi:https://Doi.Org/10.1080/1540496X.2020.1785865

23. Ashraf, Badar Nadeem; (2020, December). Stock Markets’ Reaction To COVID-19: Cases Or Fatalities? Research In International Business And Finance, 54:101249. Doi:https://Doi.Org/10.1016/J.Ribaf.2020.101249

24. Liu, Lu; Wang, En-Ze; Lee, Chien-Chiang; (2020, July). Impact Of The COVID-19 Pandemic On The Crude Oil And Stock Markets In The US: A Time-Varying Analysis. Energy Research Letters, 70:101496. Doi:10.46557/001c.13154

25. Topcu, Mert; Gulal, Omer Serkan; (2020, October). The Impact Of COVID-19 On Emerging Stock Markets. Finance Research Letters, 36:101691. Doi:https://Doi.Org/10.1016/J.Frl.2020.101691

26. Khandavit, Anya; (2020). World And National Stock Market Reactions To COVID-19. Doi:10.13140/RG. 2.2.22792.57606

27. Hanke, Michael; Kosolapova, Maria; Weissensteiner, Alex; (2020, October). COVID-19 And Market Expectations: Evidence From Option-Implied Densities. Economics Letters, 195:109441. Doi:Https://Doi.Org/10.1016/J.Econlet.2020.109441

28. Ali, Mohsin; Alam, Naﬁs; Rizvi, Syed Aun R.; (2020, September). Coronavirus (COVID-19)—An Epidemic Or Pandemic For Financial Markets. Journal Of Behavioral And Experimental Finance, 27:100341. Doi:Https://Doi.Org/10.1016/J.Jbef.2020.100341

29. Qin, Meng; Zhang, Yu-Chen; Su, Chi-Wei; (2020).The Essential Role Of Pandemics: A Fresh Insight Into The Oil Market. Energy RESEARCH LETTERS, 1(1). Doi:Https://Doi.Org/10.46557/001c.13166

30. Liu, Haiyue; Manzoor, Aqsa; Wang, Cangyu; Zhang, Lei; Manzoor, Zaira; (N.D.). The COVID-19 Outbreak And Affected Countries Stock Markets Response. International Journal Of Environmental Research And Public Health, 17(8). Doi:10.3390/Ijerph17082800

31. Atri, Hanen; Kouki, Saoussen; Gallali, Mohamed imen; (2021).The impact of COVID-19 news, panic and media coverage on the oil and gold prices: An ARDL approach.
32. Cepoi, Cosmin-Octavian; (2020, October). Asymmetric Dependence Between Stock Market Returns And News During COVID-19 Financial Turmoil. Finance Research Letters, 36:101658. Doi:https://doi.org/10.1016/j.frl.2020.101658

33. Kocaarslan, Baris; Soytas, Ugur; (2019, November). Asymmetric Pass-Through Between Oil Prices And The Stock Prices Of Clean Energy Firms: New Evidence From A Nonlinear Analysis. Energy Reports, 5, 117-125. Doi:https://doi.org/10.1016/J.Egyr.2019.01.002

34. Mensi, Walid; Hkiri, Besma; Al-Yahyae, Khamis H.; Kang, Sang Hoon; (2017, March). Analyzing Time-Frequency Co-Movements Across Gold And Oil Prices With BRICS Stock Markets: A Var Based On Wavelet Approach. International Review Of Economics And Finance, 54, 74-102. Doi:10.1016/J.Iref.2017.07.032

35. Capelle-Blancard, Gunther; Desroziers, Adrien; (2020). The Stock Market And The Economy: Insights From The COVID-19 Crisis. Social Science Research Network.