Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
The linkage between the epidemic of COVID-19 and oil prices: case of Saudi Arabia, January 22 to April 17

Said Khalfa Mokhtar Brika\textsuperscript{1,3}, Abdelmageed Algamdi\textsuperscript{2}, Khalil Ahmed Chergui\textsuperscript{4}, Adam Ahmed Musa\textsuperscript{1}

\textsuperscript{1}DEPTARTEMENT OF BUSINESS ADMINISTRATIONS, COLLEGE OF BUSINESS, UNIVERSITY OF BISHA, SAUDI ARABIA; \textsuperscript{2}DEPARTMENT OF COMPUTER SCIENCE, COLLEGE OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY, UNIVERSITY OF BISHA, BISHA, SAUDI ARABIA; \textsuperscript{3}DEPARTMENT OF COMMERCIALS SCIENCES, FACULTY OF ECONOMICS, UNIVERSITY OF OUM EL BOUAGHI. ALGERIA; \textsuperscript{4}DEPARTMENT OF MANAGEMENT SCIENCES, FACULTY OF ECONOMICS, UNIVERSITY OF OUM EL BOUAGHI. ALGERIA

1. Introduction

Saudi Arabia is among the countries affected by the global coronavirus virus epidemic. As cases rise and governments take action to slow the spread of the virus, they are likely to face economic repercussions as business slows. However, the epidemic that has already collapsed in stock markets around the world will only be an addition. In terms of expected and unavoidable short-term economic damage, many countries worldwide are in a recession. The negative consequences are expected to worsen, and the decline in commodity prices could lead to financial pressures on the economy.

Commercial activity is very slow due to the epidemic, paralyzing almost completely the financial and monetary sector temporarily, in addition to all negative economic factors due to the epidemic [1]. According to the World Health Organization [2], “coronavirus (CoV) is a large group of viruses that cause diseases ranging from colds to more serious diseases such as MERS-CoV and SARS-CoV.”

As panic continued due to coronavirus disease 2019 (COVID-19), pessimism prevailed in the markets. Oil-producing economies may have to develop additional methods to counter the continued decline in commodity prices [3], especially crude oil [4—6]. The rapid spread of COVID-19 appears to have derailed the main economic development wheel on which all the various market orientation elements depend [7,8].
Oil prices fell with the coronavirus arrival in most industrialized countries [5,9,10], including Europe and North America. In addition to the expectations of a decrease in global oil demand against a massive increase in stock size, which indicates that the main importers have reduced the oil demand, the global economic slowdown has been further exacerbated [11,12]. Organization of the Petroleum Exporting Countries (OPEC) reports indicate a decline in expectations for global oil demand [12], indicating that major importers such as China and European countries will reduce oil demand.

The World Health Organization report on monitoring COVID-19, published on April 17, 2020, recorded 2,018,474 infections. However, the new coronavirus is contagious and causes much uncertainty in real economic, financial markets [13]. It negatively affects the overall ranking. The COVID-19 virus creates more fear and pressure on financial markets, as price volatility increases continuously. Amidst expectations of a significant decline in global demand in the coming period, during a meeting in the OPEC in Vienna on March 6, Russia refused to reduce oil production by pumping more crude [14–16]. This decision caused the biggest sharp drop in prices; Brent crude fell 24% to $34 a barrel to $25.70, causing the depth of uncertainty [17].

Our study examines the effect of coronavirus cases in the world on oil prices in Saudi Arabia and notes a positive relationship between the epidemic level and oil price shocks [10,18]. We analyzed from January 22, 2020, to April 17, 2020, and we confirm that special attention must be paid to the quantities of OPEC production to forecast oil prices and stability correctly. The repercussions also appear in the short term. The relationship between the epidemic and oil prices reveals an underlying cause.

The Kingdom of Saudi Arabia is the largest exporter of oil in the world [19]. The shocks respond negatively to the oil price shocks and vice versa [17]. The analysis is expanded in the Kingdom using daily data from January 22, 2020, to April 17, 2020. The analysis confirms that there is a temporal effect of oil prices on the epidemic. Other studies highlight the impact of the uncertainty on oil price returns [20–22]. Focusing on the severe dependencies and resorting to an approach that increases the epidemic index positively impacts oil prices [23] in the periods that lead to financial crises [8,24,25]. However, none of these studies focus on the latter situation resulting from the COVID-19 crisis. Therefore we fill this gap and test the effect of coronavirus numbers and oil prices.

The global shock to the epidemic is depressing, as panic in financial markets contributed to lower consumer demand and international companies investment plans. More importantly, the world is becoming more and more integrated, which means that international cooperation is essential to tackle the negative economic impact of the epidemic.

2. Materials and methods

The study data consisted of a daily time series of oil prices in Saudi Arabia (see https://oilprice.com/oil-price-charts/46) and increase in COVID-19 cases in the world (see https://www.worldometers.info/coronavirus/), from the beginning of the corona pandemic January 22, 2020, to April 17, 2020.
COVID-19 data is extracted from the daily status reports issued by the World Health Organization, starting from January 22, 2020. Consequently, our sample covers the period from January 21, 2020, to April 17, 2020 (57 notes). Oil price data was obtained from the US Energy Information Administration (EIA) daily data for the US EPU [26,27]. The study data were analyzed using an econometric model (regression analysis) for this series of data. This model links oil prices in Saudi Arabia as a dependent variable and coronavirus cases in the world as an independent variable to know the development of Saudi Arabia’s situation and forecast the state of oil prices (developing possible scenarios) [28].

3. Coronavirus: pandemic scaring the world

Statistics indicate that the rate of infection with COVID-19 is still high, as the number of confirmed cases in many countries rise, where Fig. 29.1 shows the evolution of cases of this virus in the world (World Health Organization, April 2020).

Although the prevalence of COVID-19 is now widespread abroad, it will directly affect foreign demand for oil exports. Coronavirus infection can also disrupt international supply chains for global companies and international financial markets [29,30]. If COVID-19 becomes widespread in most countries of the world [31], it can reduce economic activity directly by reducing supply and demand.

Fig. 29.1 shows that the number of confirmed cases exceeded 2 million (2,347,256 confirmed cases; 605,661 recovered; 161,099 deaths) registered on April 18, 2020 (see https://www.worldometers.info/coronavirus/). This is a large indication of the strength of this virus spread, confirmed by the World Health Organization experts [32].

In disease outbreaks in a given economy, this economy will see a significant but temporary decrease in consumption growth, due to protective behaviors and policies. The massive domestic demand shock, supposedly ultimately low, maybe especially for economies with weak health systems. In these economies, containment and response will be more difficult, and the consequences of the epidemic maybe even more significant.

![FIGURE 29.1 The evolution of COVID-19 in the world.](image-url)
Saudi Arabia, like other countries in the world, is still recording a rise in the number of cases infected with this virus, as shown in Fig. 29.2.

As of April 18, 2020, the number of infected people in Saudi Arabia with this virus are 8274 confirmed cases, 1329 recovered cases, 92 deaths, according to the stats of the Saudi Center for Disease Prevention and Control [32].

This rise in the number of cases makes us wonder whether we have reached a peak or not. Many countries turn to experts to know whether to reach the peak or not to ease the quarantine restrictions, as this virus has dire effects on the economy. When we talk about the state of Saudi Arabia, we are primarily talking about oil prices.

Since the beginning of this pandemic, the oil price has been falling continuously until April 17, 2020, where the price of Arab Extra Light and Arab Heavy is $22.21 per barrel [32].

The impact of COVID-19 will have lasting impacts on government finances as tax revenues and profits from oil companies will be negatively affected. Policymakers should design quantifiable goals to increase the number of people working in highly skilled sectors [32] such as off-grid renewable energy solutions and provide digitization solutions that enhance potential growth on a more sustainable basis, as well as in other matters to reduce the economic impact on the local economy. Sure, oil prices will cause macroeconomic uncertainty, but policymakers can reduce the adverse effects of COVID-19 (Fig. 29.3).
Oil accounts for about 20% of GDP and covers nearly 75% of commodity exports, while oil-related tax and nontax revenues contribute more than 40% of the total revenue. With exports declining due to COVID-19 and lower prices, capital is likely to flow from the economy, the currency will decrease, and the prices of essential food products will rise. In addition to lower oil sales, oil sales return is likely to reduce these economic impact trends. The currency is likely to depreciate in the near term depending on the virus ramifications, and policymakers can spur capital outflows.

4. Empirical results

It is not easy to model the coronavirus impact on oil prices, especially because both variables development is still not clear. We do not know whether the coronavirus cases will rise or decrease, and we do not know whether oil prices will rise or decrease. Those affected the form of the model that links these two variables, as shown in Fig. 29.4.

The relationship can be divided into two periods: the first period is from the beginning of the crisis to March 8 and the second period is from March 9 to the present day where a violent drop in oil prices occurred (from 52 to 29). The results of the econometric test confirm this (Table 29.1).

By estimating the model during the whole period, we notice an inverse and significant relationship between coronavirus cases and oil prices. The impact factor was 0.17, i.e., increasing the number of cases by 1%, offset by an increase in the oil price by 0.17%. However, there are indications that the model is not appropriate, such as the first curve and the real and expected value curves for the dependent variable, as shown in Fig. 29.5.

There is a mismatch among the actual, residual, and fitted values, which suggests a problem in this model, so we conducted a test of the homogeneity of the time (structural transformation), which is a CUSUM test [33,34].

Fig. 29.6 shows a structural shift in the relationship between two periods before March 8, 2020, and after March 8, 2020, which necessitates estimating the relationship during the two periods.
Table 29.1 The model for all period.

| Variable              | Coefficient | Std. error | t-statistic | Prob.  |
|-----------------------|-------------|------------|-------------|--------|
| LOG (CORONA)          | -0.177044   | 0.012163   | -14.55637   | 0.0000 |
| C                     | 5.787181    | 0.144293   | 40.10720    | 0.0000 |
| R-squared             | 0.713697    |            |             | 3.713577|
| Adjusted R-squared    | 0.710328    |            |             | 0.398017|
| SE of regression      | 0.214217    |            |             | -0.220933|
| Sum squared resid     | 3.900565    |            |             | -0.164245|
| Log likelihood        | 11.61056    |            |             | -0.198106|
| F-statistic           | 211.8879    |            |             | 0.137387|
| Prob (F-statistic)    | 0.000000    |            |             |        |

SD, standard deviation; SE, standard error.

FIGURE 29.5 The actual and fitted values of the model for all periods.

FIGURE 29.6 The CUSUM test of model.
4.1 The impact of coronavirus on oil prices before March 8

Table 29.2 shows the results of the model for the first period (before March 8). There is an inverse and significant relationship; the impact coefficient is –0.04. Whenever the number of cases increases by 1%, it offsets by a decrease in oil price by 0.04%. The estimate is according to the following formula: \( Y \) (oil prices) = \(-0.041130 \times (\text{corona cases} + 4.495394)\). The model considered is valid, as shown in Fig. 29.7.

Fig. 29.7A indicates a congruence between the expected (depending on the model) and the actual values. Fig. 29.7B, represented by a CUSUM test, indicates the relationship between coronavirus cases and oil prices in the first period (before March 8).

4.2 The impact of coronavirus on oil prices after March 8

Table 29.3 shows the results of the model for the second period (after March 8).

Table 29.2 shows an inverse and significant relationship, and the impact coefficient –0.07, that is, the higher the number of cases by 1%, offset by a lower oil price.
by 0.07%. The estimate is according to the following formula: \( Y \) (oil prices) = \(-0.070316 \times (\text{coronavirus cases} + 4.230432)\). The model is considered valid, as shown in Fig. 29.8.

Fig. 29.8A indicates a congruence between the expected (depending on the model) and the actual values. Fig. 29.8B, represented by a CUSUM test, indicates the relationship between coronavirus cases and oil prices in the first period (after March 8).

The spread of the COVID-19 epidemic means a more significant stagnation and fewer production relations, travel, and trade, which explains the decline in oil prices [35]. Those explain the conflict of interest of debt producers with different budget needs, fiscal deficits, and market expectations [36]. Saudi Arabia hopes to maintain high oil prices, and Russia seeks to obtain a more significant share of the global oil markets [14,37] and its implications for prices. Also, deferred spending in China and Europe will ultimately support economic recovery once the epidemic is under control.

### Table 29.3  The model of the second period.

| Variable           | Coefficient | Std. error | t-statistic | Prob.  |
|--------------------|-------------|------------|-------------|--------|
| LOG (CORONA)       | -0.070316   | 0.014949   | -4.703841   | 0.0000 |
| C                  | 4.230432    | 0.199123   | 21.24528    | 0.0000 |
| R-squared          | 0.367995    | Mean dependent var | 3.296313 |
| Adjusted R-squared | 0.351363    | SD dependent var | 0.114771 |
| SE of regression   | 0.092434    | Akaike info criterion | -1.875941 |
| Sum squared resid  | 0.324673    | Schwarz criterion | -1.791497 |
| Log likelihood     | 39.51881    | Hannan-Quinn criterion | -1.845408 |
| F-statistic        | 22.12612    | Durbin-Watson stat | 0.470180 |
| Prob (F-statistic) | 0.000033    |            |             |        |

SD, standard deviation; SE, standard error.

FIGURE 29.8 The validity of the model in the second period.
The effect of more favorable monetary policy and targeted fiscal responses from governments generates a recovery. As such, oil prices are likely to reach new lows [29], but recovery is in sight in the near and medium term.

5. Conclusion and recommendation

Given the severe human, societal, and economic consequences, there is an urgent need for prudent policies that outline the size of the COVID-19 pandemic and potential social and economic devastation. This study provides an overview of the potential impacts of a pandemic on the oil market. COVID-19 would achieve increasingly shattered losses. Intensive multispectral efforts are needed. Determining the potential economic impacts of the outbreak and their purpose is important to explain how the economy will affect different outbreak scenarios instead of providing the best projections for the outbreak. Therefore global GDP [30,38] growth is expected to slow down, as the effects of coronavirus epidemic will gradually fade away and spread. Despite the impact negative of COVID-19, the Organisation for Economic Co-operation and Development (OECD) predicts a global recession as growth remains positive in all significant economic areas.

More importantly, many economies are already adopting pro-macropolicies. Many countries have cut interest rates, continued the facilitation cycle that started in 2019, and have taken supportive financial measures, as well as limit the economic consequences of the coronavirus with primarily targeted policies. As the human costs have risen due to the rapid spread of the coronavirus and the disease has spread to more countries, the priority is to keep people as healthy as possible. Scenarios indicate a global impact ranging from $77 billion to $347 billion or 0.1%—0.4% of global GDP, with an average estimate of $156 billion or 0.2% of global GDP. Oil revenues are channeled through government spending, the main driver of economic activity, oil price volatility, and the cyclic fiscal policy that causes boom and bust cycles. The worst-case scenarios describe the economic impact of an outbreak. Those should not interpret as disease outbreaks in economies, the goal is to direct policies toward costing an outbreak to properly assess prevention and early response costs. The impact of lower oil demand has increased supply from OPEC and Russia due to more serious concerns about the coronavirus outbreak, As well as due to the increase in the number of pandemic infections across countries.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.
Funding
The authors offer their thanks and appreciation to the Deanship of Scientific Research, University of Bisha, Kingdom of Saudi Arabia, for funding scientific research through the University of Bisha Research Initiative to combat the novel coronavirus pandemic (COVID-19), grant number UB-COVID-28-1441.

Conflict of interest
The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

[1] V. Guerrieri, G. Lorenzoni, L. Straub, I. Werning, Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages? National Bureau of Economic Research, 2020, pp. 0898–2937, https://doi.org/10.3386/w26918.

[2] S. Meo, A. Alhowikan, T. Al-Khlaibi, I. Meo, D. Halepoto, M. Iqbal, et al., Novel coronavirus 2019-nCoV: prevalence, biological and clinical characteristics comparison with SARS-CoV and MERS-CoV, Eur. Rev. Med. Pharmacol. Sci. 24 (4) (2020) 2012–2019.

[3] X. Hao, Y. Zhao, Y. Wang, Forecasting the real prices of crude oil using robust regression models with regularization constraints, Energy Econ. (2020) 104683, https://doi.org/10.1016/j.eneco.2020.104683.

[4] M. Ames, G. Bagnarosa, T. Matsui, G.W. Peters, P.V. Shevchenko, Which risk factors drive oil futures price curves? Energy Econ. 87 (2020) 104676, https://doi.org/10.1016/j.eneco.2020.104676.

[5] K. Guhathakurta, S.R. Dash, D. Maitra, Period specific volatility spillover based connectedness between oil and other commodity prices and their portfolio implications, Energy Econ. 85 (2020) 104566, https://doi.org/10.1016/j.eneco.2019.104566.

[6] N. Branger, R.M. Flacke, N. Gräber, Monopoly power in the oil market and the macroeconomy, Energy Econ. 85 (2020) 104597, https://doi.org/10.1016/j.eneco.2019.104597.

[7] M.O. Saliu, A.S. Adejteji, E.O. Ogunleye, Crude Oil Price Shocks, Monetary Policy and Output Growth in African Oil Producing Countries, Editorial Board, 2020, p. 219.

[8] C. Albulescu, Do COVID-19 and Crude Oil prices Drive the US Economic policy Uncertainty? arXiv, 2020 https://doi.org/10.2139/ssrn.3555192 preprint arXiv:200307591.

[9] H. Mzoughi, C. Urom, G.S. Uddin, K. Guesmi, The effects of COVID-19 pandemic on oil prices, CO₂ emissions and the stock market: evidence from a VAR model, in: CO₂ Emissions and the Stock Market: Evidence From a VAR Model (April 28, 2020), 2020, https://doi.org/10.2139/ssrn.3587906.

[10] C. Albulescu, Coronavirus and Oil price Crash: A Note, arXiv, 2020. https://doi.org/10.2139/ssrn.3553452 preprint arXiv:200306184.

[11] J. Scheffran, M. Felkers, R. Froese, Economic growth and the global energy demand, in: Green Energy to Sustainability, 2020, pp. 1–44. https://doi.org/10.1002/9781119152057.ch1.

[12] Ø. Noreng, OPEC—from peak to peak, in: Handbook of OPEC and the Global Energy Order: Past, Present and Future Challenges, 2020. https://doi.org/10.4324/9780429203190-31.

[13] T. Van de Graaf, Is OPEC Dead? Oil Exporters, the Paris Agreement and the Transition to a Post-Carbon World, Beyond Market Assumptions: Oil Price as a Global Institution, Springer, 2020, pp. 63–77. https://doi.org/10.1007/978-3-030-29089-4_4.

[14] M. Krutikhin, I. Overland, OPEC and Russia, in: Handbook of OPEC and the Global Energy Order: Past, Present and Future Challenges, 2020. https://doi.org/10.4324/9780429203190-23.

[15] A.R. Jalali-Naini, M.A. Naderian, Financial vulnerability, fiscal procyclicality and inflation targeting in developing commodity exporting economies, Q. Rev. Econ. Finance (2020). https://doi.org/10.1016/j.qref.2020.01.001.
Chapter 29 • The linkage between the epidemic of COVID-19  

[16] H. Gnutzmann, O. Kowalewski, P. Śpiewanowski, Market structure and resilience: evidence from potash mine disasters, Am. J. Agric. Econ. 102 (3) (2020) 911–933. https://doi.org/10.1093/ajae/aaaz041.

[17] M. Nicola, Z. Alsafi, C. Sohrabi, A. Kerwan, A. Al-Jabir, C. Iosifidis, et al., The socio-economic implications of the coronavirus and COVID-19 pandemic: a review, Int. J. Surg. (2020). https://doi.org/10.1016/j.ijsu.2020.04.018.

[18] A. Sharif, C. Aloui, L. Yarovaya, COVID-19 pandemic, oil prices, stock market and policy uncertainty nexus in the US economy: fresh evidence from the wavelet-based approach, in: Oil Prices, Stock Market and Policy Uncertainty Nexus in the US Economy: Fresh Evidence from the Wavelet-Based Approach (April 13, 2020), 2020. https://doi.org/10.2139/ssrn.3574699.

[19] A. Alharbi, Economic effects of low oil prices in Saudi Arabia, Int. J. Inf. Technol. (2020) 1–6. https://doi.org/10.1007/s41870-020-00432-w.

[20] N. Naifar, S.J.H. Shahzad, S. Hammoudeh, Dynamic nonlinear impacts of oil price returns and financial uncertainties on credit risks of oil-exporting countries, Energy Econ. (2020) 104747. https://doi.org/10.1016/j.eneco.2020.104747.

[21] M. Balcilar, R. Gupta, S. Wang, M.E. Wohar, Oil price uncertainty and movements in the US government bond risk premia, N. Am. J. Econ. Finance 52 (2020) 101147. https://doi.org/10.1016/j.najef.2020.101147.

[22] E.-Z. Wang, C.-C. Lee, Dynamic spillovers and connectedness between oil returns and policy uncertainty, Appl. Econ. (2020) 1–21.

[23] D. Xiao, J. Wang, Dynamic complexity and causality of crude oil and major stock markets, Energy 193 (2020) 116791. https://doi.org/10.1016/j.energy.2019.116791.

[24] S.-I. Krokida, N. Lambertides, C.S. Savva, D.A. Tsouknidis, The effects of oil price shocks on the prices of EU emission trading system and European stock returns, Eur. J. Finance 26 (1) (2020) 1–13. https://doi.org/10.1080/1351847X.2019.1637358.

[25] C.-W. Su, M. Qin, R. Tao, N.-C. Moldovan, O.-R. Lobont’, Factors driving oil price———from the perspective of United States, Energy (2020) 117219. https://doi.org/10.1016/j.energy.2020.117219.

[26] S. Baker, N. Bloom, S.J. Davis, K. Kost, M. Sammon, T. Viratyosin, The unprecedented stock market reaction to COVID-19. Covid Econ. Vetted Real-Time Pap. 1 (3) (2020). https://doi.org/10.3386/w26945.

[27] H. Yan, N. Chen, D. Naresh, What’s Spreading Faster than Coronavirus in the US? Racist Assaults and Ignorant Attacks Against Asians, CNN, 2020.

[28] D.C. Montgomery, E.A. Peck, G.G. Vining, Introduction to Linear Regression Analysis, John Wiley & Sons, 2012.

[29] M. Miller, F. Bastagli, T. Hart, S. Raga, S. Mustapha, P. Papadavid, et al., Financing the Coronavirus Response in Sub-Saharan Africa, 2020.

[30] S.F.P.D.H. Musa, The Impact of COVID-19 on Brunei’s Economy and Economic Policy Measures Introduced, in: BE1201 Macroeconomics: Principles and Issues, 2020.

[31] D. Fanelli, F. Piazza, Analysis and forecast of COVID-19 spreading in China, Italy and France, Chaos Soliton. Fract. 134 (2020) 109761. https://doi.org/10.1016/j.chaos.2020.109761.

[32] E. Callaway, D. Cyranoski, S. Mallapaty, E. Stoye, J. Tollefson, The coronavirus pandemic in five powerful charts, Nature2020 ). https://doi.org/10.1038/d41586-020-00758-2.

[33] M.A. Koondhar, H. Li, H. Wang, S. Bold, R. Kong, Looking back over the past two decades on the nexus between air pollution, energy consumption, and agricultural productivity in China: a qualitative analysis based on the ARDL bounds testing model, Environ. Sci. Pollut. Control Ser. (2020) 1–15. https://doi.org/10.1007/s11356-019-07501-z.
[34] Z. Xiao, P.C. Phillips, A CUSUM test for cointegration using regression residuals, J. Econom. 108 (1) (2002) 43–61. https://doi.org/10.1016/S0304-4076(01)00103-8.

[35] P. O’Grady, The China syndrome? Ir. Marx. Rev. 9 (26) (2020) 23–30.

[36] M. Beine, S. Bertoli, S. Chen, C. D’Ambrosio, F. Docquier, A. Dupuy, et al., Economic Effects of Covid-19 in Luxembourg, 2020.

[37] A.S. Mahdi, Saudi neomercantilism in the oil price war, Rev. Econ. Polit. Sci. (2020). https://doi.org/10.1108/REPS-10-2019-0134.

[38] N. Deyshappriya, Economic impacts of COVID-19 macro and microeconomics evidences from Sri Lanka, in: Economic Impacts of COVID-19 Macro and Microeconomics Evidences From Sri Lanka (May 10, 2020), 2020. https://doi.org/10.2139/ssrn.3597494.