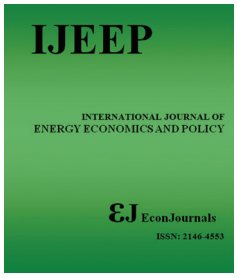


International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2025, 15(2), 221-235.

The Impact of COVID-19 on the Financial Markets, Energy Price and Exchange Rates of GCC Countries

Ahlam Khalid Alalami[1], Mohamed Mahees Raheem[1], Burhan Uluyol[1]*, Shabir Hakim[2]

[1]Effat College of Business, Effat University, Jeddah, Saudi Arabia, [2]Department of Finance, Amity School of Business, Amity University Dubai, Dubai, United Arab Emirates. *Email: borhanseti@gmail.com

Received: 02 October 2024 **Accepted:** 20 January 2025 **DOI:** https://doi.org/10.32479/ijeep.18130

ABSTRACT

No one denies that the COVID-19 health crisis has substantial impact on the financial markets of the globe. It is important to evaluate the performance of financial assets to understand the behaviour of financial markets during such significant event. Therefore, this research investigates the impact of COVID-19 on the GCC stock indices, currency exchange, and oil returns. By application of the event study (constant return Model) and standard Vector Auto-regression models, we examine the index returns of each country, oil price, and currency exchange before and after COVID-19 health crisis. We find that the COVID-19 has a short-term impact on the index returns of Saudi Arabia, and it has a short-term effect on the exchange returns of all GCC counties except Bahrain. However, the COVID-19 has no long-term impact on all selected variables of GCC. This study provides new insight into the financial market during external event which may have a direct or indirect effect on the performance of selected variables of GCC.

Keywords: Event Study, Energy Price, Financial Markets, COVID-19
JEL Classifications: D53, E58, E63, L98

1. INTRODUCTION

COVID-19 spreads worldwide and impacted the world's economies. Almost all significant stock markets reached their lowest point during March 2020 because of the COVID-19 financial crash, the subsequent recovery has been uneven. Some markets have rebounded to reach record highs by 2020 (notably in the U.S.), while others (such as the U.K.) have not yet reached pre-coronavirus levels (Zhang et al., 2020). Pandemic-related developments have also affected other types of financial markets. When the pandemic started, government bond yields dropped as investors sought refuge in safe havens. While U.S. bond yields have increased more rapidly over 2020 than German bond yields, this is indicative that investors have more confidence in the U.S. economy than the German economy. The commodity markets also experienced varying returns in 2020, with precious metals outperforming equities, although overall commodity prices lost money (Hasan et al., 2021).

It is also essential to consider which types of companies operate in different industries when it comes to the uneven recovery in the financial markets following Corona. The NASDAQ, which consists mainly of technology companies, recovered rapidly more than other stock exchanges. There are many fast-growing companies on the NASDAQ in 2020. Many of these companies (such as Amazon and PayPal) are beneficiaries of online retailing growing due to lockdowns. On the other hand, companies that lost the most value over the next decade tend to operate in more traditional industries, such as energy and tourism. Tourism and commuting were impacted during the pandemic, which is not surprising. Consequently, financial markets where a high concentration of shares belonged to companies benefiting from the COVID-19 recovered faster than more diversified, traditional markets (Statista, 2022).

Global economic activity has been seriously disrupted because of the Coronavirus pandemic (COVID-19). Financial vulnerabilities

are being exposed, and the post-financial crisis economic system is being tested. In response to the Coronavirus crisis, the IMF has provided financial assistance at unprecedented speed and magnitude to its member countries, primarily to protect the most vulnerable and ensure a comprehensive, inclusive, and sustainable recovery. Kristalina Georgieva, IMF Managing Director, noted ahead of the IMF/World Bank Annual.

Low oil prices and the Coronavirus have affected the GCC economy in a double-whammy that has led to a shutdown of much of the non-oil economy. Due to a fall in global demand and Government lock-down measures, oil prices have plummeted, triggering a price war between suppliers. Global risk resentment is at a historic high due to the decline in equity markets since February and the widening of sovereign spreads across the Middle East. Additionally, manufacturing and production are disrupted, and investment plans are stalled. In addition to these adverse shocks, consumer and business confidence plummeted, resulting in ratings that rating agencies closely monitor (Shehabi, 2022).

Economic growth and oil are closely associated, so oil has been affected by global growth outlooks. In addition to demand destruction due to COVID-19, the OPEC+ disagreement also contributed to the recent collapse of oil prices. Currently, in a dynamic scenario where COVID-19 is in charge, news on OPEC+ agreements, stimulus, etc. cause prices to rise, while news on oil storage and extension of lockdowns causes prices to fall sharply (Global Investment Outlook, 2019b). Those factors have increased the volatility of oil prices. USO is an exchange-traded fund that attempts to replicate, as closely as possible, the spot price of WTI Light, Sweet Crude oil, minus USO expenses) (Fernandez-Perez et al., 2023). For comparison, the Oil Price Volatility Index (OVX) measures market expectations for 30-day volatility in crude oil prices based on options on the U.S. Oil Fund LP. The Oil Volatility Index measures volatility of price changes in WTI, however, because both Brent and WTI crude prices are affected by similar sentiments and follow similar trends, the volatility index is usually viewed as representing oil volatility in general (Liu et al., 2021). Oil is one of the first commodities to suffer from the Global Financial Crisis, slowdown in global growth, trade wars, or COVID-19. It appears that oil volatility is here to stay, given the uncertainty of these events (Le et al., 2021). The GCC can move away from oil dependence by adopting measures like taxation, subsidy reductions and boosting non-oil growth However, until the GCC is more heavily focused on a non-oil economy, in addition to oil price levels, its volatile nature might affect decision making (Fasano, 2022).

Gulf Cooperation Council (GCC) members are Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, and the United Arab Emirates. Oil reserves are plentiful in them all, and their economies and gross domestic products are heavily reliant on exporting oil at competitive prices to other countries (Altarturi et al., 2016; Alshammari et al., 2019). Oil price increases between 2000 and 2007 benefited the GCC nations financially. In addition, the declining oil prices have impacted their budget and economic growth since 2008 (Reiche, 2010). COVID-19 is a pandemic that must be considered to protect the index, exchange, and oil market from volatility. This research covers the area of a new pandemic that affects the whole world. It specifies it in the GCC. This research fills the gap in the new pandemic facing the world. This paper aims to examine the impact of COVID-19 on the GCC index, exchange, and oil market. An event study using the constant return model shows the impact of COVID-19 on index returns is severe in the short term. In contrast, the Standard Vector Auto-regression model shows the effect of COVID-19 on index returns is severe in the long term.

2. LITERATURE REVIEW

COVID-19 is a new event that needs a researcher's effort to investigate its impact on the global financial markets and global banks in general and its impact on the GCC financial markets and GCC banks in specific. Significant events affect the financial market. Notable events that have involved the financial market identified by previous studies, such as disasters (Kowalewski and Śpiewanowski, 2020), news (Li et al., 2020), sports (Buhagiar et al., 2018), and political events (Bash and Alsaifi, 2019; Shanaev and Ghimire, 2019). COVID-19 also affects the stability of financial markets (Zhang et al., 2020). Ashraf (2020) measured the stock market returns in different countries to confirm COVID-19 cases.

Regarding Topcu and Gulal (2020) studied to investigate the impact of COVID-19 on emerging stock markets. Research reveals that the adverse effects on emerging stock markets began to lessen by mid-April. Asian emerging markets have experienced the highest impact of the outbreak, whereas emerging markets in Europe have had the lowest impact. Stock markets are among the most critical components among these channels (see, for example, Ahmar and del Val, 2020; Al-Awadhi et al., 2020; among others). In early March, the financial markets reacted to COVID-19, though the overall economic impacts are still unclear (Ramelli and Wagner, 2020). The government and central bank have already adopted a broad range of economic policies by late March, regarding Elgin et al., 2020; Nicola et al., 2020; Carlsson-Szlezak et al., 2020, to stem the effects of panic caused by the pandemic, the lockdown needs to be slowed down.

Forecasting the data is necessary to determine how lockdown and COVID-19 will affect the economy. Changes in time series data occur from time to time, and sometimes they happen abruptly. Estimates of the data are required to view these changes over time. Several researchers have studied COVID-19 forecasting and predictions: (Fanelli and Piazza, 2020). Applied the SIRD model to forecast the spread of COVID-19 in China, Italy, and France, (Roosa et al., 2020) studied COVID-19 generalized logistic growth model (GLM) with the real-time forecast in China, (Benvenuto et al., 2020) using ARIMA to measure the forecast of COVID-19, and (Koczkodaj et al., 2020) they used a simple heuristic (exponential curve) to predict COVID-19 outside of China.

There were dramatic impacts on financial markets worldwide by the rapid spread of COVID-19. COVID-19 created an unprecedented level of risk in the financial market. This leaded investor to suffer significant losses in a short time. They mapped the general country-specific risks and systemic risks patterns in

the global financial markets. Additionally, they analyzed the policy interventions' consequences, like the US decision to implement a zero-percent interest rate and unlimited quantitative easing (QE), and to which extent these policies may introduce uncertainties moreover into financial markets (Zhang et al., 2020).

Many scholars responded to the urgent research need on the global economy and international financial markets and the impact of the COVID-19 pandemic on them. Eichenbaum et al. (2020) studied the interaction between economic decisions and pandemics by utilizing the canonical epidemiology model, highlighting the trade-off between existence the severity of the short-run recession caused by the COVID-19 spread. In contrast, Ma et al. (2020) compared global economic and COVID-19 pandemic financial effects with previous epidemic and pandemic events, like SARS (2017), H1N1 (2009), MERS (2012), Ebola (2014), and Zika (2016). Also, Goodell (2020) discusses the impact of COVID-19, making parallels on the economic and social with past crisis events. However, in corporate finance, Corbet et al. (2020) analyzed the "corona" on return impacts and stocks during the COVID-19 pandemics volatility behavior. Also, by considering the relationship between gold and cryptocurrencies, Corbet et al. (2020) provided consistent evidence during the COVID-19 pandemic that Bitcoin does not offer hedging nor safe-haven properties. In addition, Yarovaya et al. (2020) analyzed herding in cryptocurrency markets during the pandemics and reported that herding does not get stronger during the pandemic but remains contingent on up or down markets days. Furthermore, Yarovaya et al. (2020) discuss the COVID-19 crisis characteristics compared to the past crisis and provide directions for future research.

The research identifies the bank and country characteristics that amplify or weaken the impact of the pandemic on bank credit (Çolak and Öztekinb, 2021). By applying the difference-in-difference method to 125 banks, they found that bank lending was lower in countries more affected by the health crisis. Using the difference-in-difference method to 125 banks, they found that bank lending was more down in countries more affected by the health crisis. Academics and policymakers need to understand how the Coronavirus (COVID-19) pandemic affects the financial markets, institutions, and the real economy. Economic growth is stimulated by a well functioning banking system (Levine and Zervos, 1998; Beck and Levine, 2004), vie liquidity provision in general (e.g., Berger and Sedunov, 2017), and - credit allocation in particular (e.g., Jayaratne and Strahan, 1996). Central banks implemented monetary stimulus policies in response to heightened concerns about corporate solvency and liquidity during the pandemic. Several countries provided their businesses with unprecedented loan guarantees and other forms of credit support (Bennedsen et al., 2020). The purchase of corporate bonds by the government, sometimes accompanied by loan guarantees, has been a critical instrument to inject liquidity into affected businesses Alstadsaeter et al., 2020). Banks were able to accommodate the surge in liquidity demand during the coronavirus pandemic due to money from liquidity injection programs and deposits combined with high pre-shock levels of bank capital at the beginning of the pandemic (Li et al., 2020).

This article addresses the rapidly emerging literature concerning the effects of COVID-19 on the real economy and the corporate sector. Globally, increased disease incidences and severity triggered fear, anxiety, and uncertainty, resulting in a surge in risk aversion and uncertainty (Bekaert et al., 2021). The objective of those papers is to examine how banks behave during the aggregate risk episodes of a pandemic. By doing so, we contribute to the nascent literature on the effects of the COVID-19 shock on the banking sector (Acharya and Steffen, 2020; Li et al., 2020; Chodorow-Reich et al., 2020). In the 1st weeks after the pandemic, research shows that US bank loan demand experienced an initial, significant positive shock (Li et al., 2020; Chodorow-Reich et al., 2020). In the 1st weeks of the pandemic, there was an initial, significant positive shock to US bank lending. Firms began to draw down their bank credit lines and raise cash levels due to the spike in uncertainty and risk (Acharya and Steffen, 2020). These studies rely heavily on the type of bank credit and borrower heterogeneity to draw their conclusions. The authors, for example, Li et al. (2020), Chodorow-Reich et al. (2020), used supervisory data from a subset of commercial and industrial loans to demonstrate significant heterogeneities between loan types and corporate borrowers during the first two quarters of the pandemic. However, the differences became more pronounced over time. According to Acharya and Steffen (2020) and Li et al. (2020), their findings suggest that total loans for all US banks decreased during the first quarter of the crisis. We add to their results by demonstrating that, on average, global loan growth shrank during the first three quarters. As Demirguc-Kunt et al. (2020) showed, bank stocks underperform compared to other publicly traded companies and non-financial institutions. The findings support the fact that banks are more sensitive to uncertainty. The study supports De Jonghe et al. (2019; 2020) that banks reallocate credit strategically across industries. Moreover, they showed that banks also reallocate credit over time. More specifically, bank credit growth tends to decline when uncertainty and risk suddenly and exogenously increase.

By using the daily returns of the major stock market indices in the GCC countries from April 1st, 2020 to June 26th, 2020, in light of COVID-19 confirmed cases and deaths. According to a panel data regression analysis, stock markets in the GCC countries responded significantly negatively, mainly to new and total deaths confirmed by COVID-19 but not to COVID-19 confirmed cases. Hence, during the COVID-19 outbreak in GCC countries, stock market returns decreased as confirmed deaths increased. Based on further analysis, GCC stock markets are positively impacted by crude oil (WTI) price and negatively by variations in implied volatility in the global oil and stock markets (Bahrini and Filfilan's, 2020).

Consequently, more research is needed on the financial impact of coronavirus outbreaks elsewhere in the world. Second, GCC countries are currently experiencing a double shock from the COVID-19 pandemic and the collapse of oil prices. It is essential to conduct further research on the economic effects of coronavirus outbreaks. GCC economies are still dependent on oil as their primary export and source of revenue, despite their considerable efforts to diversify (Abdullah et al., 2021). GCC countries are highly reliant on oil revenues, making them particularly vulnerable to external shocks (Al-Maadid et al., 2020).

A study was conducted to determine the effect of 2020 coronavirus-19's worldwide spread on stock markets in GCC countries. Coronavirus spread was evaluated through a combination of cumulative cases, new cases, cumulative deaths, and new deaths. Coronavirus outbreaks are measured by the number of infections per million population, whereas stock market returns are measured by the number of shares in the stock market index. The authors exploited the effects of 2020 COVID-19 worldwide spreading on stock markets. Research in this field focuses on coronavirus spread in the highly infected countries and the developed stock markets. A low level of Coronavirus infection in emerging financial markets seems less attractive to scholars concerned with Coronavirus spreading on stock markets. Due to that, the authors tried to investigate the GCC stock markets' reaction to the COVID-19 spread. During the research period, significant differences were found among stock market indices. Moreover, Coronavirus deaths appear to impact stock market returns substantially. Furthermore, there is no evidence that these effects will continue during April and May 2020 (Alber and Saleh, 2020).

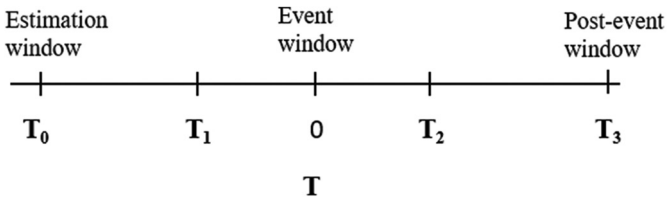
The examination of how monetary policy shocks affect the stock market of the United States (US) depending on investor sentiment. The authors used an estimator that uses high-frequency surprises as a proxy for structural monetary policy shocks, derived by integrating current shortterm rate surprises, which are least affected by information effects, into a vector autoregressive (VAR) model as an exogenous variable. The researchers found that when time-varying model parameters are considered, the negative impact of contractionary monetary policy shocks on index returns is more substantial in the state associated with higher investor sentiment. In addition to being robust to alternative sample periods (which do not include the zero lower bound) and model specifications, their results have important implications for academics, investors, and policymakers (Cepni and Gupta, 2021).

3. RESEARCH METHODOLOGY

The event study method is generally used in empirical literature to analyze the impact of event on stock markets. Market efficiency is a fundamental assumption of event study methodology. A market with an efficient mechanism will reflect the effects of the event immediately in the price of the financial market. Over a relatively short period, we will be able to observe the event's economic impact. In the event analysis, however, a t-test or other nonparametric test is used to test the null hypothesis (such as no abnormal returns on the stock market) at the time of the event. Due to the kurtosis and volatility-clustering characterization of financial time series, especially securities traded continuously in the market, this could lead to misleading results (Event Study – LAMFO, 2017).

The event window is the period during which the security prices involved in the event will be examined (Figure 1). While a post-event period that is too short might fail to show the full effects of an event, a post-event period that is too long might not yield accurate results because it could include the impact of other events that occurred during the same period. We will calculate the expected returns using the constant return model during the event period.

Figure 1: Timeline of event study



$$Rait = Rit - E(Ri) \quad (1)$$

With the constant return model (Equation 1), we can calculate expected returns every day during the event. To get the abnormal return every day in the event window, we will subtract the expected return from the actual return. Each variable for each country has a specific date for each event that should be specified in the model. There is three highlighted time: anticipation (30 days before the event), adjustment (30 days after the event), and estimation window (50 days before anticipation). In addition, calculate the return of each variable by using the constant return model. Then, calculate the average estimation window. Also, calculate the standard deviation of the whole event (estimation window, anticipation, adjustment, and event day), 30 days (anticipation) of the event, and 61 days (anticipation, adjustment, event day) of the event. The results obtained from this study are return, T. stat, and P. value for both abnormal return AR and cumulative abnormal return CAR (Equation 2).

Estimation of abnormal return:

$$AR(T1+T2)^{1} = \sum_{t}^{T2}(T1) = \text{ARit} \quad (2)$$

The event's date for each country is January 30, 2020 —this date states between anticipation and adjustment.

Multivariate time series are analyzed with Standard Vector Auto-regression (VAR) Model (Equation 3). There is a structure in which the variables are linear functions of past lags themselves and past lags of the other variables. As an example, consider the vector autoregressive model of order 1, denoted VAR (1):

$$x_{t,1} = \alpha_1 + \varnothing_{11}x_{t-1,1} + \varnothing_{12}x_{t-1,2} + \varnothing_{13}x_{t-1,3} + \omega_{t,1}$$

$$x_{t,2} = \alpha_2 + \varnothing_{21}x_{t-1,1} + \varnothing_{22}x_{t-1,2} + \varnothing_{23}x_{t-1,3} + \omega_{t,2}$$

$$x_{t,3} = \alpha_3 + \varnothing_{31}x_{t-1,1} + \varnothing_{32}x_{t-1,2} + \varnothing_{33}x_{t-1,3} + \omega_{t,3} \quad (3)$$

While X1, X2, and X3 are index returns, exchange returns, and oil returns for each country. In addition, dummy variables can add to the equation as X4, X5, and X6 to investigate the impact of these events on these three variables for each country. Vector Auto-regression is based on the idea that each time series influences the others. This means the series can be predicted based on its past values and the past values of others in the system. Before building a model, Granger's Causality Test can be used to test this relationship (Prabhakaran, 2022).

4. DATA AND PREMILITARY RESULTS

The study includes six GCC countries such as Saudi Arabia, United Arab Emirates, Kuwait, Qatar, Oman, and Bahrain. Three important variables as chosen, namely, daily index returns and daily exchange returns of each country, and daily oil returns.

Daily index return is calculated using the daily return formula; ln (Pt/Pt-1), Pt is the index's price today, and Pt-1 was the index's price yesterday. Additionally, daily exchange return is calculated for EUR with each local currency price converted to return using the same formula as daily index return. The reason from using EUR currency not USD because GCC currencies are begged on USD currency, regardless USD currency is the most popular forging currency in GCC. Oil price is listed in the stock market by USD price, so first, it's required to convert USD price to local price by using daily USD/(SAR, AED, KWD, QAR, OMR OR BHD) price and multiplying it with USD oil price then calculate daily oil return.

This research will deal with each country's time series data COVID-19 event considered as a dummy variable. The Table 1 represents each country's variables and Table 2 shows the time of the event.

However, COVID-19 is a pandemic that has publicly announced as pandemic on June 30, 2020. This data was collected from the Bloomberg database and Investing.com, providing the most accurate and detailed information on the GCC economy.

5. PRELIMINARY ANALYSIS

Figure 2 illustrates the returns of three variables graphically and it shows that the exchange return for all GCC has more volatility than index return and oil return. Time series plots of data series. This graph is plotted by computing the index's returns, exchange with EUR, and oil for each country alone. For all, the return series exhibit volatility clustering, and their trend is stationary.

5.1. Descriptive Analysis

The summary of Saudi Arabia's descriptive statistics indicates that the average exchange return (the proxy of risk aversion) is −1.89E-05%, with a maximum return of 0.0459% and a minimum of −0.0481%. Moreover, the mean oil return is 0.00179%, with a total return of 1.054% and a minimum of −0.259%. However, the mean index return is 0.001275%, with a maximum return of 0.478% and a minimum of −0.175%. The variables of Saudi Arabia rank based on more risky variables, which have the highest standard deviation are: oil return, index return then exchange return. The rest of the tables represent the mean, median, maximum, and minimum values of each variable for each country (Table 3).

6. EMPIRICAL RESULT

6.1. Event Study and Standard vector Auto-regression model

The following table represents that VAR studied the long-time impact while event study studied the short time impact. The t-State hypothesis represents the significance:

- H_0: Data series is not substantial when the t-state is <2
- H_1: Data series is significant when the t-state is more than 2

While the P-value represent the stationarity of the data, and its hypothesis is:

- H_0: Data series is not stationary when the P-value is more than 5%
- H_1: Data series is stationary when the P < 5%

The P-value of VAR is estimated by using VAR Granger Causality/ Block Exogeneity Wald Tests.

In the case of Saudi Arabia, from Table 4 one can see that the index return and exchange return are significant and stationary during the COVID19 period in the event study but not significant and not stationary in the long term. This means that COVID-19 impacts the index return and exchange return in the short term but has no impact in the long term. The data represent that oil return is insignificant and not stationary during the COVID19 period in the two models. This means that COVID-19 has no impact on oil return in both short and long terms.

In UAE, Table 5 shows exchange return is significant and stationary at the COVID-19 period in the event study but not significant and not stationary in the long term. This means that COVID-19 impacts the exchange return in the short term but has no impact in a long time. The data represent that index return and oil return are insignificant and not stationary during the COVID-19 period in the two models. This means that COVID-19 has no impact on index and oil returns in both short and long terms.

In Kuwait, from Table 6 one can tell that the exchange return is significant and stationary during the COVID-19 period in the event study but not significant and not stationary in the VAR model. This means that COVID19 impacts the exchange return in the short term but has no impact in the long term. The data represent that index return, and oil return are not significant and not stationary during the COVID19 period in the two models. This means that COVID-19 has no impact on index and oil returns in both short and long terms.

Table 1: GCC variables

Country	Variables	Country	Variables	Country	Variables
SA	TASI Index Return	Kuwait	BKA Index Return	Qatar	QSI Index Return
	EUR/SAR Return		EUR/KWD Return		EUR/QAR Return
	Oil Return		Oil Return		Oil Return
UAE	ADXG Index Return	Oman	MSM Index Return	Bahrain	BAX Index Return
	EUR/AED Return		EUR/OMR Return		EUR/BHD Return
	Oil Return		Oil Return		Oil Return

In Qatar, Table 7 illustrates exchange return is significant and stationary during the COVID-19 period in the event study but not significant and not stationary in the VAR model. This means that COVID-19 impacts the exchange return in the short term but has no impact in a long time. The data represent that index return and oil return are insignificant and not stationary during the COVID-19 period in the two models. This means that COVID-19 has no impact on index return and oil return in both the short term and long term.

In Oman, from Table 8 one can derive that the exchange return is significant and stationary during the COVID-19 period in the event study but not significant and not stationary in the VAR model. This means that COVID-19 impacts the exchange return in the short term but has no impact in the long term. The data represent that index return and oil return are insignificant and not stationary during the COVID-19 period in the two models. This means that COVID-19 has no impact on index and oil returns in both short and long terms.

In Bahrain, the data represent that all variables are not significant and not stationary at the COVID-19 period in the two models. This means that COVID-19 has no impact on these three variables in both the short term and long term (Table 9).

Table 2: GCC dummy variable

Event	Before	Event time	After
COVID-19	01/12/2014	30/01/2020	10/02/2022

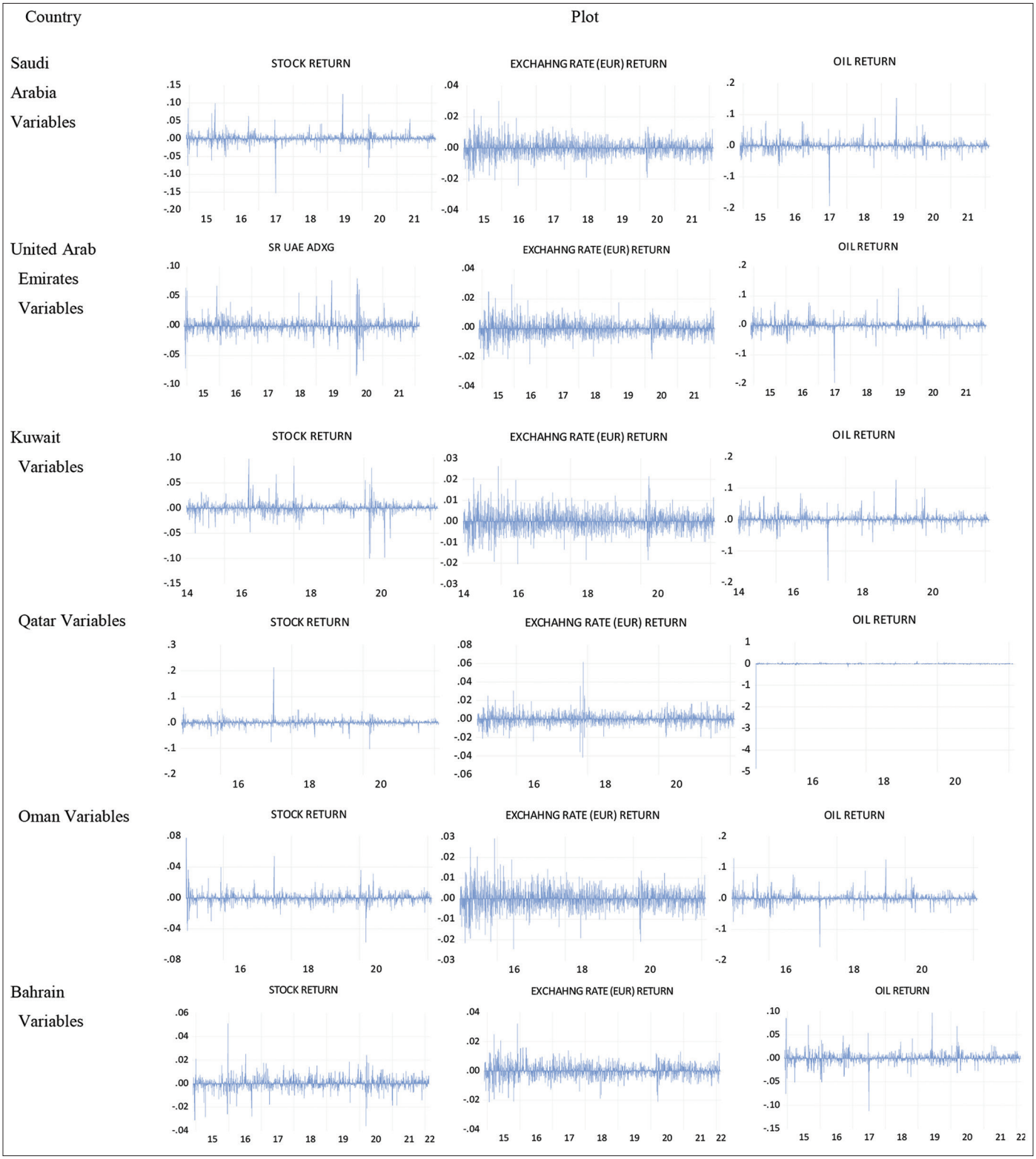
6.2. Standard Vector Autoregression and VAR Granger Causality/Block Exogeneity Wald Tests

The reason for using the VAR model is to see the impact of the dummy variable on each variable and the effect of each variable on the other variables. In other words, The reason for using the VAR model is not only to see the impact of CT, VAT, and COVID-19 on index return, exchange return, and oil return but also to see

Table 3: GCC descriptive analysis

Country	Saudi Arabia			UAE		
Variable	SR	ER	OR	SR	ER	OR
Mean	9.79E-04	−8.23E-05	0.001271	0.000695	−6.51E-05	0.001011
Median	0.000896	−6.86E-05	0.000949	0.000661	−2.36E-05	0.000942
Maximum	0.125217	0.030052	0.153225	0.080762	0.029892	0.125326
Minimum	−0.152506	−0.0241	−0.192697	−0.08406	−0.02408	−0.19387
Std. Dev.	0.013875	0.005071	0.016987	0.012094	0.005112	0.01626
Skewness	−0.107505	0.024325	−0.4563	0.279547	0.041528	−1.1263
Kurtosis	28.23808	5.49708	28.68914	15.62775	5.478749	28.85818
Jarque-Bera	39892.57	390.6407	41380.38	10105.62	389.0566	42612.78
Probability	0	0	0	0	0	0
Sum	1.470819	−0.123753	1.909818	1.05566	−0.09888	1.535031
Sum Sq. Dev.	0.289171	0.038621	0.433434	0.221885	0.039636	0.40106
Observations	1503	1503	1503	1518	1518	1518
Country	KUWAIT			QATAR		
Variable	SR	ER	OR	SR	ER	OR
Mean	0.000404	−3.10E-05	0.001223	0.000238	−3.22E-05	−0.00198
Median	0.000525	0	0.001051	8.36E-05	−0.00026	0.001031
Maximum	0.097556	0.026245	0.125546	0.212668	0.061451	0.125217
Minimum	−0.099984	−0.020352	−0.19371	−0.10208	−0.04154	−4.87055
Std. Dev.	0.012034	0.004747	0.016804	0.01372	0.006126	0.126668
Skewness	−0.172879	0.14896	−0.833002	3.638822	0.579443	−37.7902
Kurtosis	22.38182	5.120086	26.87723	62.94744	13.48454	1453.028
Jarque-Bera	23595.52	287.8068	35973.19	228524	6972.835	1.32E+08
Probability	0	0	0	0	0	0
Sum	0.609561	−0.046653	1.842462	0.357672	−0.04849	−2.97677
Sum Sq. Dev.	0.218112	0.033941	0.425236	0.282921	0.056401	24.11518
Observations	1507	1507	1507	1504	1504	1504
Country	OMAN			BAHRAIN		
Variable	SR	ER	OR	SR	ER	OR
Mean	−4.24E-05	−0.000113	0.001052	0.000404	−3.28E-05	0.000969
Median	−0.000235	0	0.000823	0.000302	0	0.00089
Maximum	0.077605	0.029162	0.129712	0.051187	0.032257	0.096943
Minimum	−0.05735	−0.02447	−0.157181	−0.03617	−0.02124	−0.11236
Std. Dev.	0.00709	0.005094	0.015786	0.005716	0.005177	0.012316
Skewness	1.410235	0.011011	0.245386	0.024825	0.116218	−0.0274
Kurtosis	23.65011	5.445859	21.78821	13.70849	5.891267	19.93773
Jarque-Bera	27221.28	374.9164	22136.23	5389.685	395.4323	13483.82
Probability	0	0	0	0	0	0
Sum	−0.063823	−0.169498	1.582387	0.455575	−0.03698	1.093214
Sum Sq. Dev.	0.07556	0.039004	0.374532	0.036827	0.030201	0.170935
Observations	1504	1504	1504	1128	1128	1128

Figure 2: Daily returns of three variables



the impact of these variables (index return, exchange return, and oil return) together.

We can derive the following important findings from Table 10:

Saudi Arabia variables, the Index return is dependent on the oil return but not with exchange return. However, the exchange return is not stationary and not significant with any Independent variables. The oil return is dependent on the exchange return. There is a negative relationship between oil return and exchange return.

UAE, the Index return is dependent on the exchange return and oil return. There is a negative relationship between index return and exchange return. There is a positive relationship between index

Table 4: Saudi Arabia event study and VAR

Time Horizon	Country	SA		
	Event	COVID-19		
	variable	IR	ER	OR
Short term				
Event study	t-stat (CAR)	(2.59)	(2.34)	0.41
	t-stat (BHAR)	(2.76)	(2.33)	0.31
Long term				
VAR	t-stat	0.51	(0.02)	(0.16)
Short term				
Event study	P-Value (CAR)	0.0124	0.02346	0.68560
	P-Value (BHAR)	0.0082	0.02389	0.75605
Long term				
VAR	P-Value	0.86450	0.90360	0.84880

Table 5: UAE event study and VAR

Time Horizon	Country	UAE		
	Event	COVID-19		
	Variable	IR	ER	OR
Short term				
Event study	t-stat (CAR)	(1.55)	(2.53)	0.86
	t-stat (BHAR)	(1.47)	(2.52)	0.74
Long term				
VAR	t-stat	−0.01	−0.02	0.33
Short term				
Event study	P-value (CAR)	0.1276	0.0147	0.3963
	P-value (BHAR)	0.1486	0.0152	0.4616
Long term				
VAR	P-value	0.9993	0.9981	0.9275

Table 6: Kuwait event study and VAR

Time Horizon	Country	Kuwait		
	Event	COVID-19		
	Variable	IR	ER	OR
Short term				
Event study	t-stat (CAR)	(0.20)	(1.93)	1.38
	t-stat (BHAR)	(0.17)	(1.96)	1.26
Long term				
VAR	t-stat	−0.59	−0.17	0.62
Short term				
Event study	P-value (CAR)	0.8426	0.0597	0.1750
	P-value (BHAR)	0.8672	0.0557	0.2135
Long term				
VAR	P-value	0.8341	0.9568	0.5053

Table 7: Qatar event study and VAR

Time Horizon	Country	Qatar		
	Event	COVID-19		
	Variable	IR	ER	OR
Short term				
Event study	t-stat (CAR)	(0.75)	(2.03)	1.11
	t-stat (BHAR)	(0.75)	(2.16)	1.04
Long term				
VAR	t-stat	0.02	(0.07)	0.09
Short term				
Event study	P-value (CAR)	0.4581	0.0482	0.2724
	P-value (BHAR)	0.4556	0.0360	0.3020
Long term				
VAR	P-value	0.9903	0.9644	0.8770

Table 8: Oman event study and VAR

Time Horizon	Country	Oman		
	Event	COVID-19		
	Variable	IR	ER	OR
Short term				
Event study	t-stat (CAR)	(0.23)	(2.61)	0.87
	t-stat (BHAR)	(0.15)	(2.61)	0.76
Long term				
VAR	t-stat	(0.64)	(0.13)	0.30
Short term				
Event study	P- value (CAR)	0.8185	0.0119	0.3885
	P- value (BHAR)	0.8775	0.0121	0.4515
Long term				
VAR	P-value	0.7856	0.9888	0.8982

Table 9: Bahrain event study and VAR

Time Horizon	Country	Bahrain		
	Event	COVID-18		
	Variable	IR	ER	OR
Short term				
Event study	t-stat (CAR)	0.34	(1.16)	0.81
	t-stat (BHAR)	0.46	(1.13)	2.27
Long term				
VAR	t-stat	0.21	(0.06)	(0.28)
Short term				
Event study	P-value (CAR)	0.7383	0.2500	0.4203
	P-value (BHAR)	0.6449	0.2654	0.0279
Long term				
VAR	P-value	0.9419	0.998	0.8552

return and oil return. However, exchange return and oil return are not stationary and not significant with any independent variables.

Kuwait, index return, and exchange return are not stationary and insignificant with independent variables. Although, the oil return is dependent on the exchange return. There is a negative relationship between oil return and exchange return.

Qatar, index return, exchange return, and oil return are not stationary and not significant with any independent variables.

In Oman, the Index return is dependent on the exchange return. There is a positive relationship between index return and oil return. Exchange return is not stationary and not significant with any independent variables. Although, the oil return is dependent on the exchange return. There is a negative relationship between oil return and exchange return.

Bahrain, index return, and exchange return are not stationary and insignificant with independent variables. Although, the oil return is dependent on the index return. There is a negative relationship between oil return and index return.

6.3. Impulse Response

Impulse response allows to trace out the time path of the variables in the model to the one unit raise in the current value of one VAR error. However, the impulse response is applied in the main matrix in Eviews. The following figures represent the impact of each variable on the others. The magnitude of the shock is one standard deviation shock. However, red dots are the standard error

Table 10: GCC Standard vector auto regression and VAR granger causality/block exogeneity wald tests

Country	SA					
Dependend V	IR		ER		OR	
Independend V	ER	OR	IR	OR	IR	ER
T-stat	1.08896	2.89524	0.42144	−1.08310	0.06360	−2.84237
P-value	0.2149	0.014	0.6581	0.3823	0.9087	0.0071
Country	UAE					
Dependend V	IR		ER		OR	
Independend V	ER	OR	IR	OR	IR	ER
T-stat	−2.24198	2.78629	−0.85705	−1.88083	1.82051	−1.92875
P-value	0.0007	0	0.6525	0.1543	0.0556	0.0561
Country	Kuwait					
Dependend V	IR		ER		OR	
Independend V	ER	OR	IR	OR	IR	ER
T-stat	0.34830	1.92007	0.94550	−1.67246	−2.94595	−2.21184
P-value	0.9411	0.0798	0.1568	0.2321	0.0108	0.0231
Country	QATAR					
Dependend V	IR		ER		OR	
Independend V	ER	OR	IR	OR	IR	ER
T-stat	0.56301	0.31476	−0.58766	0.80324	0.73091	0.20269
P-value	0.1148	0.9185	0.7278	0.6634	0.4024	0.8579
Country	Oman					
Dependend V	IR		ER		OR	
Independend V	ER	OR	IR	OR	IR	ER
T-stat	1.69253	2.59304	−1.18726	−0.55049	6.65346	−2.95010
P-value	0.0678	0.0005	0.4405	0.5792	0	0.0127
Country	Bahrain					
Dependend V	IR		ER		OR	
Independend V	ER	OR	IR	OR	IR	ER
T-stat	0.41720	0.64632	1.37539	−0.36962	−3.04479	−0.49017
P-value	0.8738	0.5091	0.2745	0.8572	0.0052	0.4934

confidence bands. This confidence interval is computed by ±2SE confidence bands; and X-axis represents the period (daily), and the Y represents the variation in percentage (Stock and Watson, 2001).

For Saudi Arabia (Figure 3), the shock of index return is one standard deviation shock on index return (response of index return to index return). In addition, the shock of exchange return is one standard deviation shock on index return (response of index return to exchange return). Also, the shock of oil return is one standard deviation shock on index return (response of index return to oil return). Figure 1 10 represents Saudi Arabia's impulse response; the results suggest that Index return creates a steep decline effect. That can be interpreted as when a shock is introduced by Index return; the index returns will decrease sharply. This reaction will become safe after 7 days. In addition, the results show that exchange return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the index returns will increase on the 1st day and then decrease slightly up to the 5th day. The results show that oil return creates a transposed "Ushape". That can be interpreted as when a shock is introduced by oil return; the index returns will increase up to the 5th day.

The results show that index return creates a transposed "line shape" from an exchange return perspective". That can be interpreted as when a shock is introduced by index return; the exchange returns will stay stable. The results suggest that exchange return creates a steep decline effect. That can be interpreted as when a shock is introduced by exchange return; the exchange returns will decrease sharply. This reaction will become safe after 4 days. The results show that oil return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by oil return; the exchange return will decrease on the 2nd day, increase on the third, and rise after 4 days.

The results show that index return creates a transposed "U-shape" from the oil return perspective. That can be interpreted as when a shock is introduced by index return; the oil returns decrease on day 1, then it will stay stable. The results show that exchange returns create a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the oil return will decrease in the first 3 days, increase on day 4, and become stable. The results suggest that oil return creates a steep decline effect. That can be interpreted as when a shock is introduced by oil return; the oil returns will decrease sharply. This reaction will become safe after 4 days.

For UAE (Figure 4), the shock of index return is one standard deviation shock on index return (response of index return to index return). In addition, the shock of exchange return is one standard deviation shock on index return (answer of index return to exchange return). Also, the shock of oil return is one standard deviation shock on index return (response of index return to oil return). Figure 1 11 represents UAE impulse response; the

Figure 3: Saudi arabia impulse response

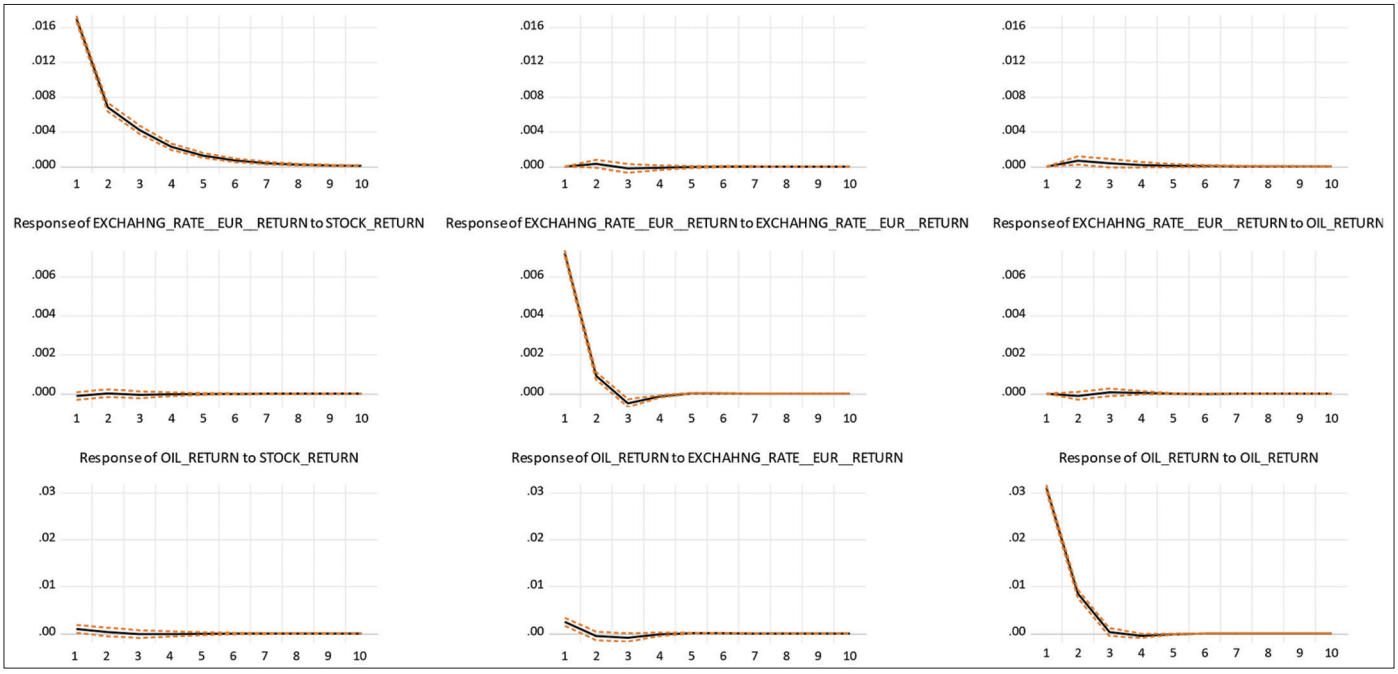
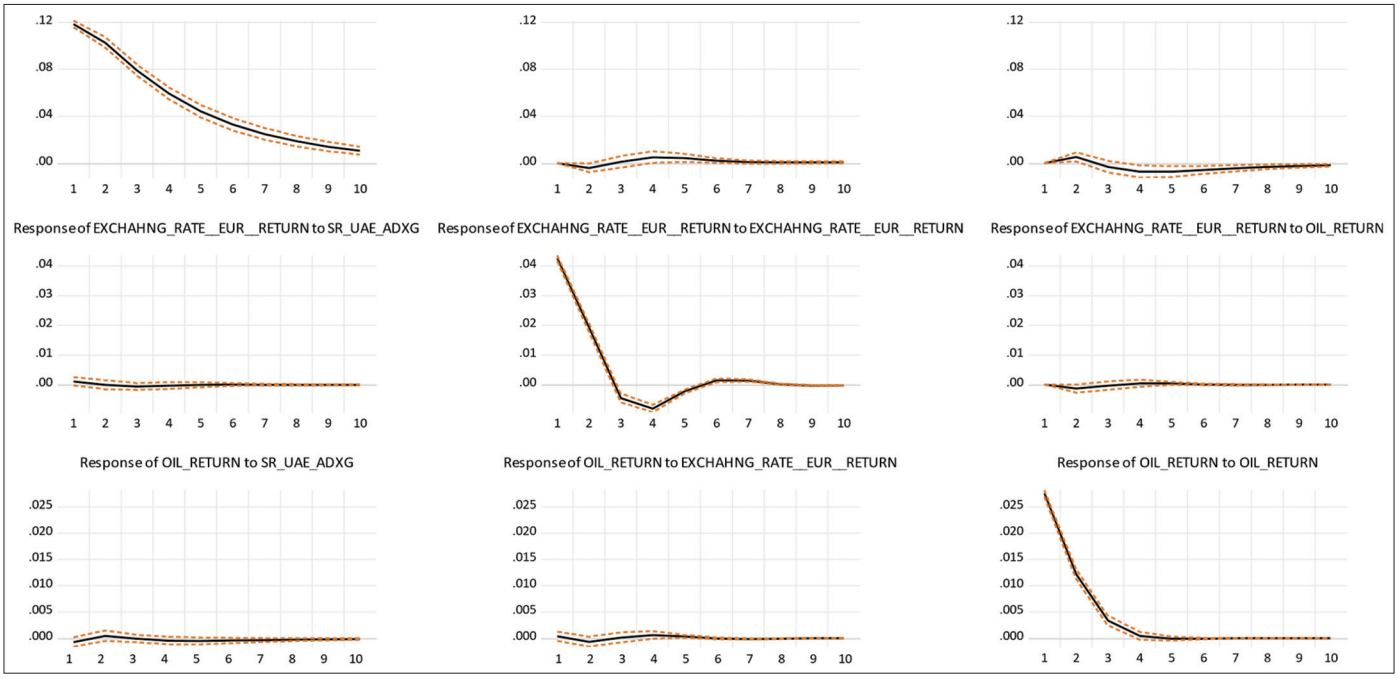


Figure 4: UAE impulse response



results suggest that Index return creates a steep decline effect. That can be interpreted as when a shock is introduced by Index return; the index returns will decrease sharply up to day 10. In addition, the results show that exchange return creats a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the index returns will decrease in the first 2 days and then increase up to day 6, then become stable. The results show that oil return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by oil return; the index returns will increase in the first 2 days then decrees slightly up to 10 days.

From an exchange return perspective, the results show that index return creates a transposed "line shape". That can be interpreted as when a shock is introduced by index return; the exchange returns will stay stable. The results suggest that exchange return creates a steep decline effect. That can be interpreted as when a shock is introduced by exchange return; the exchange returns will decrease sharply. This reaction will become safe after 6 days. The results show that oil return creates a transposed "line shape". That can be interpreted as when a shock is introduced by oil return; the exchange return will stay stable.

For the oil return perspective, the results show that index return creates a transposed "line shape". That can be interpreted as when a shock is introduced by index return; the oil returns will stay stable. The results show that exchange return creates a transposed "line shape". That can be interpreted as when a shock is introduced by exchange return; the oil return will stay stable. The results suggest that oil return creates a steep decline effect. That can be interpreted as when a shock is introduced by oil return; the oil returns will decrease sharply. This reaction will become safe after 4 days.

For Kuwait, the shock of index return is one standard deviation shock on index return (response of index return to index return) (Figure 5). In addition, the shock of exchange return is one standard deviation shock on index return (response of index returns to exchange return). Also, the shock of oil return is one standard deviation shock on index return (response of index returns to oil return). Figure 1 12 represents Kuwait's impulse response; the results suggest that Index return creates a steep decline effect. That can be interpreted as when a shock is introduced by Index return; the index returns will decrease sharply. This reaction will become safe after 5 days. In addition, the results show that exchange return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the index returns will increase slightly in the 1st days and then becomes stable after day 5. The results show that oil return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by oil return; the index returns will increase slightly in the 1st days then becomes stable after day 5.

The results show that index return creates a transposed "U-shape" from an exchange return perspective. That can be interpreted as when a shock is introduced by index return, the exchange returns decrease on the 2nd day, increase on the 4th day, and become stable. The results suggest that exchange return creates a steep decline effect. That can be interpreted as when a shock is introduced by exchange return; the exchange returns will decrease sharply. This reaction will become safe after 3 days. The results show that oil return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by oil return; the exchange return will decrease on the 2nd day, increase on the third and then increase after 4 days.

From an oil return perspective, the index return results create a transposed "U-shape". That can be interpreted as when a shock is introduced by index return; the oil returns decrease on day 2, then become stable. The results show that exchange returns create a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the oil return will decrease in the first 3 days, increase on day 4, and become stable. The results suggest that oil return creates a steep decline effect. That can be interpreted as when a shock is introduced by oil return; the oil returns will decrease sharply. This reaction will become safe after 5 days.

For Qatar, we can observe from Figure 6 that the shock of index return is one standard deviation shock on index return (response of index return to index return). In addition, the shock of exchange return is one standard deviation shock on index return (response of index returns to exchange return). Also, the shock of oil return is one standard deviation shock on index return (response of index returns to oil return). Figure 1 13 represents Qatar impulse response; the results suggest that Index return creates a steep decline effect. That can be interpreted as when a shock is introduced by Index return; the index returns will decrease sharply. This reaction will become safe after 5 days. In addition, the results show that exchange return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the index returns will increase on day three and then become stable. The results show that oil return creates a transposed "line shape". That can be interpreted as when a shock is introduced by oil return; the index returns will stay stable.

Figure 5: Kuwait impulse response

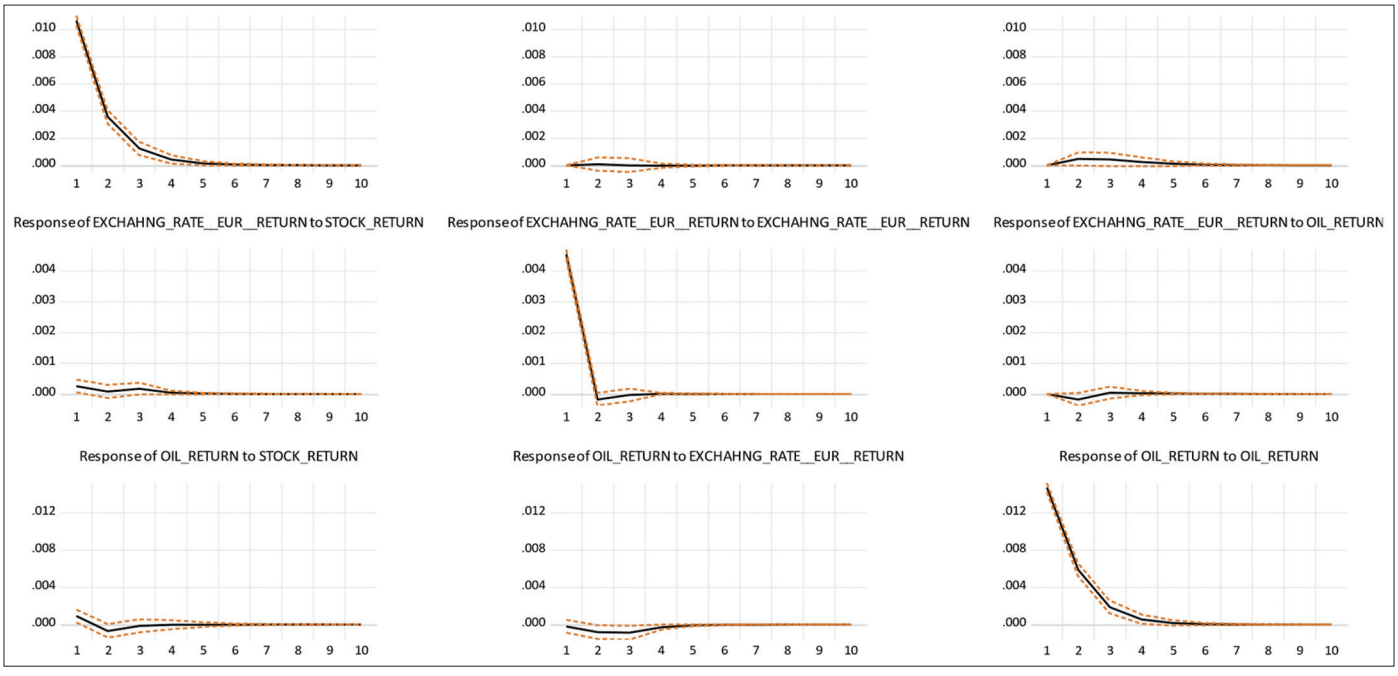
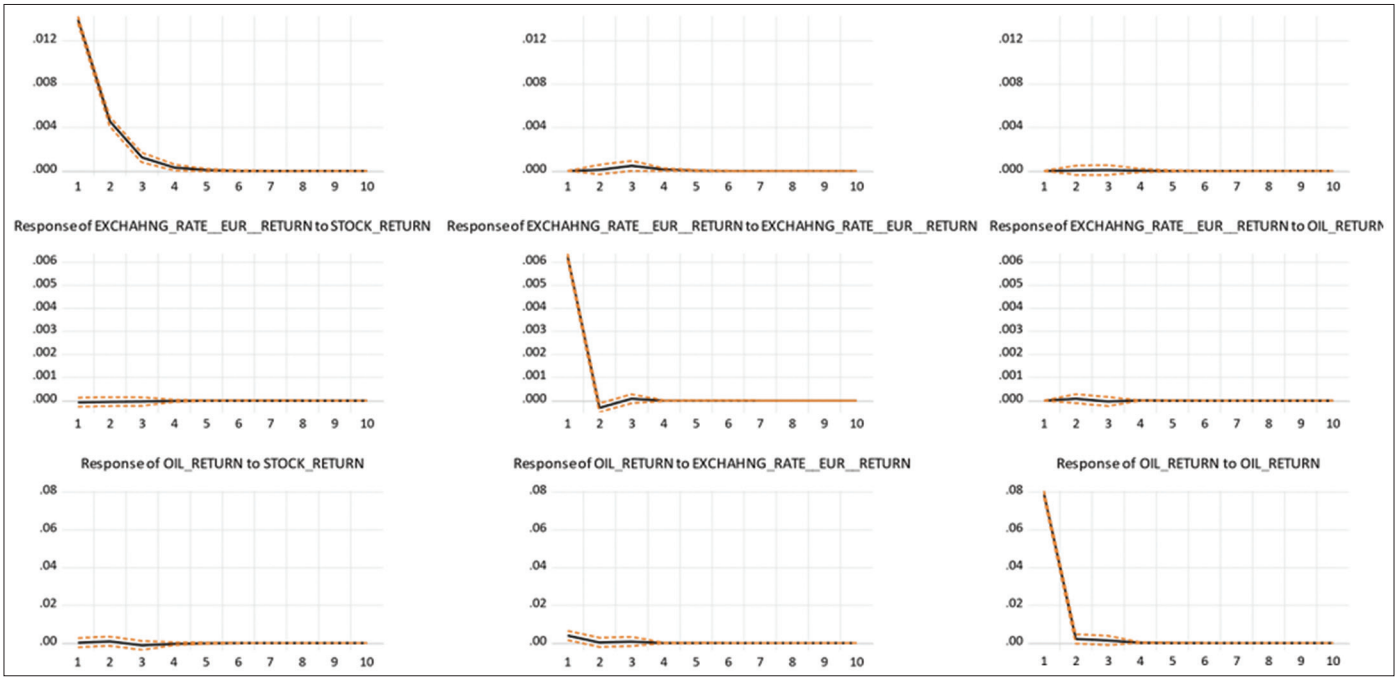


Figure 6: Qatar impulse response



The results show that index return creates a transposed "line-shape" from an exchange return perspective. That can be interpreted as when a shock is introduced by index return; the exchange returns will stay stable. The results suggest that exchange return creates a steep decline effect. That can be interpreted as when a shock is introduced by exchange return; the exchange returns will decrease sharply up to the 2nd day and then becomes stable. This reaction will become safe after 3 days. The results show that oil return creates a transposed "line shape". That can be interpreted as when a shock is introduced by oil return; the exchange return will stay stable.

The results show that index return creates a transposed "line shape" from an oil return perspective. That can be interpreted as when a shock is introduced by index return; the oil returns will become stable. The results show that exchange returns create a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the oil return will decrease in the 1st day and then become stable. The results suggest that oil return creates a steep decline effect. That can be interpreted as when a shock is introduced by oil return; the oil returns will decrease sharply. This reaction will become safe after day 2.

For Oman, the shock of index return is one standard deviation shock on index return (response of index returns to index return) (Figure 7). In addition, the shock of exchange return is one standard deviation shock on index return (response of index returns to exchange return). Also, the shock of oil return is one standard deviation shock on index return (response of index return to oil return). Figure 1 14 represents Oman's impulse response; the results suggest that Index return creates a steep decline effect. That can be interpreted as when a shock is introduced by Index return; the index returns will decrease sharply. This reaction will become safe after 4 days. In addition, the results show that exchange return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the index returns will increase on days 2 and 3 and then become stable. The results show that oil return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by oil return, the index returns increase on the 1st day, decrease on the 3rd day, and then become stable.

The results show that index return creates a transposed "line shape" from an exchange return perspective. That can be interpreted as when a shock is introduced by index return; the exchange returns will stay stable. The results suggest that exchange return creates a steep decline effect. That can be interpreted as when a shock is introduced by exchange return; the exchange returns will decrease sharply up to the 2nd day and then becomes stable. This reaction will become safe after 3 days. The results show that oil return creates a transposed "line shape". That can be interpreted as when a shock is introduced by oil return; the exchange return will stay stable.

The results show that index return creates a transposed "U-shape" from an oil return perspective. That can be interpreted as when a shock is introduced by index return; the oil returns will increase on day 2, decrease up to day 4, then become stable. The results show that exchange return creates a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the oil return will decrease in the 1st day and then become stable. The results suggest that oil return creates a steep decline effect. That can be interpreted as when a shock is introduced by oil return; the oil returns will decrease sharply. This reaction will become safe after day 4.

Last but not the least, in the case of Bahrain, Figure 8 illustrates that the shock of index return is one standard deviation shock on index return (response of index return to index return). In addition, the shock of exchange return is one standard deviation shock on index return (response of index return to exchange return). Also,

Figure 7: Oman impulse response

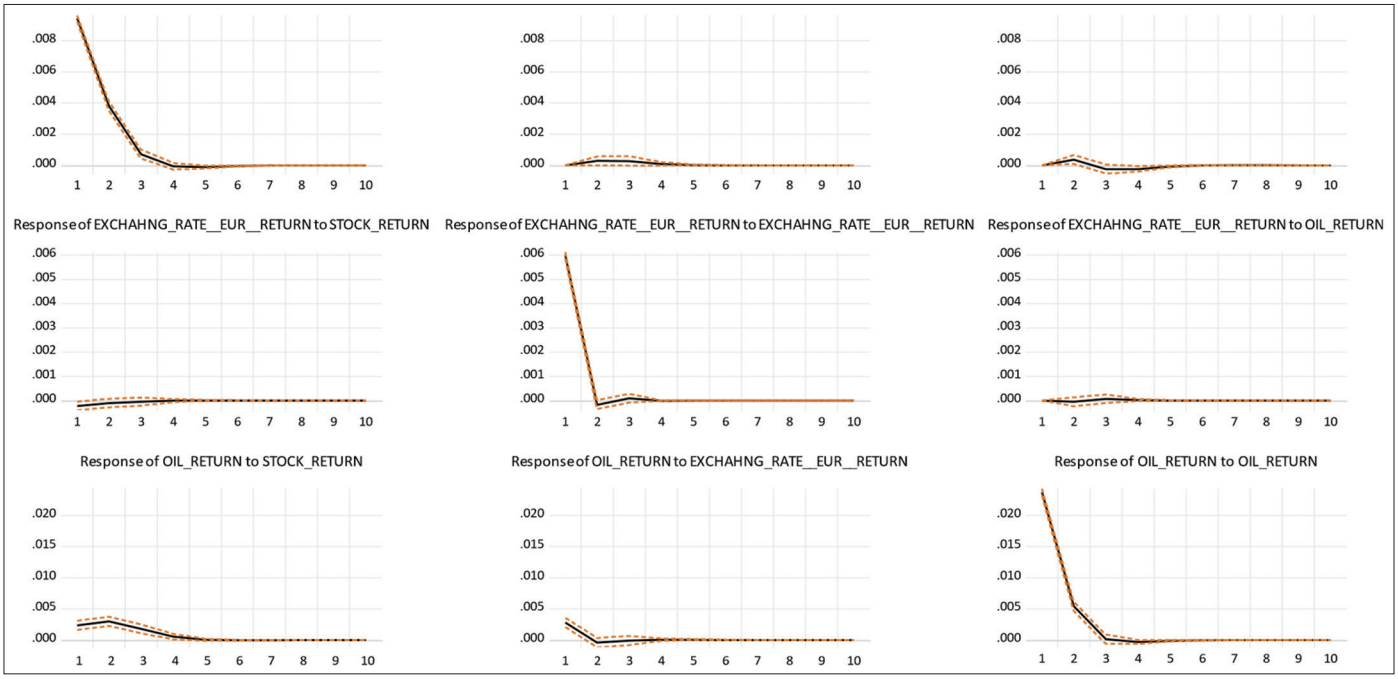
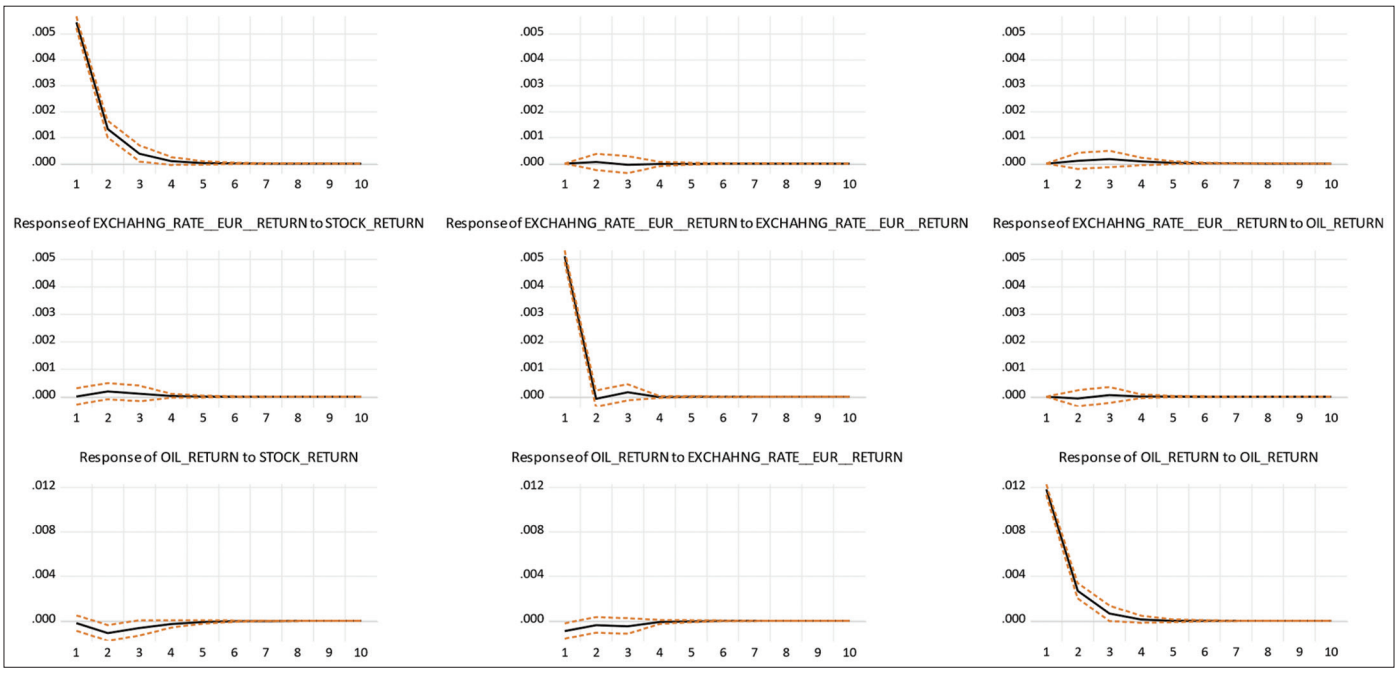


Figure 8: Bahrain impulse response



the shock of oil return is one standard deviation shock on index return (response of index return to oil return). Figure1 14 represents Bahrain's impulse response; the results suggest that Index return creates a steep decline effect. That can be interpreted as when a shock is introduced by Index return; the index returns will decrease sharply. This reaction will become safe after 4 days. In addition, the results show that exchange returns create a transposed "line shape". That can be interpreted as when a shock is introduced by exchange return; the index returns will stay stable. The results show that oil return creates a transposed "line shape". That can be interpreted as when a shock is introduced by oil return; the index returns will stay stable.

The exchange return perspective shows that index return creates a transposed "line shape". That can be interpreted as when a shock is introduced by index return; the exchange returns will stay stable. The results suggest that exchange return creates a steep decline effect. That can be interpreted as when a shock is introduced by exchange return; the exchange returns will decrease sharply up to the 2nd day, increase on day 3, and then becomes stable. This reaction will become safe after 3 days. The results show that oil return creates a transposed "line shape".

That can be interpreted as when a shock is introduced by oil return; the exchange return will stay stable.

Table 11: Results of the study

	Event	COVID-19					
	Method	Event Study (Short Term)			VAR (long term)		
	Variables	IR	ER	OR	IR	ER	OR
Country	SA	✓	✓	×	×	×	×
	UAE	×	✓	×	×	×	×
	Kuwait	×	✓	×	×	×	×
	Qatar	×	✓	×	×	×	×
	Oman	×	✓	×	×	×	×
	Bahrain	×	×	×	×	×	×

The results show that index return creates a transposed "U-shape" from an oil return perspective. That can be interpreted as when a shock is introduced by index return; the oil returns will decrease on day 2, increase up to day 4, and then become stable. The results show that exchange returns create a transposed "U-shape". That can be interpreted as when a shock is introduced by exchange return; the oil return will increase on the 1st day, decrease on day 3, and become stable. The results suggest that oil return creates a steep decline effect. That can be interpreted as when a shock is introduced by oil return; the oil returns will decrease sharply. This reaction will become safe after day 4.

7. RESULTS AND CONCLUDING REMARKS

The present study investigates the Impact of COVID-19 on the GCC index, exchange rate, and oil return. COVID-19's impact on the three variables, an event study (constant return model) and standard vector auto-regression are shown. This was done by comparing exchange rates, oil prices, and daily index returns for COVID-19. This part presents the study's main findings, the research's limitations, and recommendations for future studies.

The following table (19) represent the impact of COVID-19 in all GCC variables, Index return, exchange return, and Oil return of SA, UAE, Kuwait, Qatar, Oman, and Bahrain. Sign × represents that we accept the Null Hypothesis. In other words, the event has no impact on the return of a specific variable of a particular country. Sign ✓ represents that we reject the Null Hypothesis. In other words, the event impacts the return of a specific variable of a particular country (Table 11).

COVID-19 has a short-term impact on the index return of SA, and it has a short-term effect on the exchange return of SA, UAE, Kuwait, Qatar, and Oman. Although, COVID-19 has no long-term impact on GCC Variables. Conversely, exchange return is not stationary nor significant with any independent variables. Exchange returns influence oil returns. A negative relationship exists between the oil return and the exchange return. In the UAE, Index return is affected by the exchange rate and oil return. Despite this, exchange and oil returns are neither stationary nor significant when analyzed 65 with independent variables. In Kuwait, returns on the index and exchange are not stationary and insignificant with independent variables. However, oil return depends on exchange return. Qatar, exchange rates, and oil returns are not stationary or significant with any independent variables. Index returns in Oman are affected by the exchange rate. The return on exchange is not stationary and not significant with any independent variable. However, oil return is dependent on exchange return. Bahrain's index return and exchange return do not show statistical significance with independent variables. However, the oil return is dependent on the index return.

REFERENCES

Abdullah, A. M., Saiti, B., & Masih, M. (2016), The impact of crude oil price on Islamic stock indices of South East Asian countries: Evidence from MGARCH-DCC and wavelet approaches. Borsa Istanbul Review, 16(4), 219-232.

Acharya, V.V., Steffen, S. (2020), The risk of being a fallen angel and the corporate dash for cash in the Midst of COVID-19. The Review of Corporate Finance Studies, 9, 430-471.

Ahmar, A.S., del Val, E.B. (2020), SutteARIMA: Short-term forecasting method, a case: COVID-19 and stock market in Spain. Science of the Total Environment, 729, 138883.

Al-Awadhi, A.M., Al-Saifi, K., Al-Awadhi, A., Alhamadi, S. (2020), Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. Journal of Behavioral and Experimental Finance, 27, 100326.

Alber, N., Saleh, A. (2020), The impact of COVID-19 spread on stock markets: The case of the GCC countries. International Business Research, 13(11), 1-16.

Al-Maadid, A., Caporale, G. M., Spagnolo, F., & Spagnolo, N. (2020), The impact of business and political news on the GCC stock markets. Research in International Business and Finance, 52, 101102.

Alshammari, A.A., Alhabshi, S.M., Saiti, B. (2019), The impact of oil prices and the financial market on cost efficiency in the insurance and takaful sectors: Evidence from a stochastic frontier analysis. Economic Systems, 43(3-4), 100716.

Altarturi, B. H., Alshammri, A. A., Hussin, T. M. T. T., & Saiti, B. (2016), Oil price and exchange rates: A wavelet analysis for organisation of oil exporting countries members. International Journal of Energy Economics and Policy, 6(3), 421-430.

Ashraf, B.N. (2020), Stock markets' reaction to COVID-19: Cases or fatalities? Research in International Business and Finance 54, 101249.

Bahrini, R., & Filfilan, A. (2020), Impact of the novel coronavirus on stock market returns: Evidence from GCC countries. Quantitative Finance and Economics, 4(4), 640-652.

Bash, A., Alsaifi, K. (2019), Fear from uncertainty: An event study of Khashoggi and stock market returns. Journal of Behavioral and Experimental Finance, 23, 54-58.

Beck, T., Levine, R. (2004), Stock markets, banks, and growth: Panel evidence. Journal of Banking & Finance, 28(3), 423-442.

Bekaert, G., Engstrom, E.C., Xu, N.R. (2021) The Time Variation in Risk Appetite and Uncertainty. Columbia Business School Research Paper

Series, No. 17-108.
Bennedsen, M., Larsen, B., Schmutte, I., Scur, D. (2020), Preserving job matches during the COVID-19 Pandemic: Firm-level evidence on the Role of Government Aid. GLO Discussion Paper No. 588. Global Labor Organization.
Benvenuto, D., Giovanetti, M., Vassallo, L., Angeletti, S., Ciccozzi, M. (2020), Application of the ARIMA model on the COVID-2019 epidemic dataset. Data in Brief, 29, 105340.
Berger, A.N., Sedunov, J. (2017), Bank liquidity creation and real economic output. Journal of Banking and Finance, 81, 1-19.
Buhagiar, R., Cortis, D., Newall, P.W. (2018), Why do some soccer bettors lose more money than others? Journal of Behavioral and Experimental Finance, 18, 85-93.
Carlsson-Szlezak, P., Reeves, M., Swartz, P. (2020), What coronavirus could mean for the global economy. Harvard Business Review, 3(10), 1-10.
Cepni, O., Gupta, R. (2021), Time-varying impact of monetary policy shocks on US index returns: The role of investor sentiment. The North American Journal of Economics and Finance, 58, 101550.
Chodorow-Reich, G., Darmouni, O., Luck, S., Plosser, M. (2020), Bank Liquidity Provision Across the Firm Size Distribution. Federal Reserve Bank of New York Staff Reports, No. 942.
Çolak, G., Öztekin, Ö. (2021), The impact of COVID-19 pandemic on bank lending around the world. Journal of Banking and Finance, 133, 106207.
Corbet, S., Hou, Y., Hu, Y., Lucey, B., & Oxley, L. (2021), Aye Corona! The contagion effects of being named Corona during the COVID-19 pandemic. Finance Research Letters, 38, 101591.
De Jonghe, O., Dewachter, H., Mulier, K., Ongena, S., Schepens, G. (2019), Some borrowers are more equal than others: Bank funding shocks and credit reallocation. Review of Finance, 24, 1-43.
De Jonghe, O., Dewachter, Ongena, S. (2020), Bank capital (requirements) and credit supply: Evidence from pillar 2 decisions. Journal of Corporate Finance, 60, 101518.
Demirgüç-Kunt, A., Pedraza, A., & Ruiz-Ortega, C. (2021), Banking sector performance during the COVID-19 crisis. Journal of Banking & Finance, 133, 106305.
Eichenbaum, M.S., Rebelo, S., Trabandt, M. (2020), The Macroeconomics of Epidemics. NBER Working Papers 26882. National Bureau of Economic Research.
Elgin, C., Basbug, G., Yalaman, A. (2020), Economic Policy Responses to a Pandemic: Developing the COVID-19 Economic Stimulus Index. Covid Economics, Vetted and Real-Time Papers, 3. p4053.
Event Study - LAMFO. (2017), LAMFO. Available from: https://lamfounb.github.io/2017/08/17/teste-de-eventos-en
Fanelli, D., Piazza, F. (2020), Analysis and forecast of COVID-19 spreading in China, Italy and France. Chaos, Solitons Fractals, 134, 109761.
Fasano, U. (2022), GCC Countries: From Oil Dependence to Diversification. United States: International Monetary Fund.
Fernandez-Perez, A., Fuertes, A.M., Miffre, J. (2023), The negative pricing of the May 2020 WTI contract. The Energy Journal, 44(1), 119-142.
Global Investment Outlook. (2019b), ASI. Available from: https://www.abrdn.com/en/uk/wealthmanager/insights-thinking-aloud/articlepage/global-outlook-july-2019
Goodell, J.W. (2020), COVID-19 and finance: Agendas for future research. Finance Research Letters, 35, 101512.
Hasan, M.B., Hassan, M.K., Rashid, M.M., Alhenawi, Y. (2021), Are safe haven assets really safe during the 2008 global financial crisis and COVID-19 pandemic? Global Finance Journal, 50, 100668.
Jayaratne, J., Strahan, P.E. (1996), The finance-growth nexus: Evidence from bank branch deregulation. The Quarterly Journal of Economics, 111(3), 639-670.
Koczkodaj, W.W., Mansournia, M.A., Pedrycz, W., Wolny-Dominiak, A., Zabrodskii, P.F., Strzaška, D., Armstrong, T., Zolfaghari, A.H., Debski, M., Mazurek, J. (2020), 1,000,000 cases of COVID-19 outside of China: The date predicted by a simple heuristic. Global Epidemiology, 2, 100023.
Kowalewski, O., Śpiewanowski, P. (2020), Stock market response to potash mine disasters. Journal of Commodity Markets, 20, 100124.
Le, T.H., Le, A.T., Le, H.C. (2021), The historic oil price fluctuation during the COVID-19 pandemic: What are the causes? Research in International Business and Finance, 58, 101489.
Levine, R., Zervos, S. (1998), Stock markets, banks, and economic growth. The American Economic Review, 88(3), 537-558.
Li, X., Wu, P., & Wang, W. (2020), Incorporating stock prices and news sentiments for stock market prediction: A case of Hong Kong. Information Processing & Management, 57(5), 102212.
Li, L., Strahan, P.E., Zhang, S. (2020), Banks as lenders of first resort: Evidence from the COVID-19 Crisis. The Review of Corporate Finance Studies, 9(3), 472-500.
Liu, L., Geng, Q., Zhang, Y., Wang, Y. (2021), Investors' perspective on forecasting crude oil return volatility: Where do we stand today? Journal of Management Science and Engineering, 7, 423-438.
Ma, C., Rogers, J. H., & Zhou, S. (2020), Global economic and financial effects of 21st century pandemics and epidemics. Covid Economics, 5, 56-78.
Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, R. (2020), The socio-economic implications of the coronavirus and COVID-19 pandemic: A review. International Journal of Surgery, 78, 185-193.
Prabhakaran, S. (2022), Vector Autoregression (VAR) - Comprehensive Guide with Examples in Python. Machine Learning Plus. Available from: https://www.machinelearningplus.com/time-series/vector-autoregression-examplespython
Ramelli, S., Wagner, A.F. (2020), Feverish stock price reactions to COVID-19. CEPR Discussion Paper No. DP14511.
Reiche, D. (2010), Energy Policies of Gulf Cooperation Council (GCC) countries-possibilities and limitations of ecological modernization in rentier states. Energy Policy, 38(5), 2395-2403.
Roosa, K., Lee, Y., Luo, R., Kirpich, A., Rothenberg, R., Hyman, J.M., Yan, P., Chowell, G. (2020), Real-time forecasts of the COVID-19 epidemic in China from February 5th to February 24th, 2020. Infectious Disease Modelling, 5, 256-263.
Shanaev, S., Ghimire, B. (2019), Is all politics local? Regional political risk in Russia and the panel of stock returns. Journal of Behavioral and Experimental Finance, 21, 70-82.
Shehabi, M. (2022), Modeling long-term impacts of the COVID-19 pandemic and oil price declines on gulf oil economies. Economic Modelling, 2022, 105849.
Statista. (2022), Impact of COVID-19 on the Global Financial Markets - Statistics & Facts. Available from: https://www.statista.com/topics/6170/impact-of-covid-19-on-the-globalfinancial-markets/#dossierkeyfigures
Stock, J.H., Watson, M.W. (2001), Vector autoregressions. Journal of Economic Perspectives, 15(4), 101-115.
Topcu, M., Gulal, O.S. (2020), The impact of COVID-19 on emerging stock markets. Finance Research Letters, 36, 101691-101691.
Yarovaya, L., Matkovskyy, R., Jalan, A. (2020), The Effects of A 'Black Swan' Event (COVID-19) On Herding Behavior in Cryptocurrency Markets: Evidence from Cryptocurrency USD, EUR, JPY and KRW Markets. Available from: https://ssrn.com/abstract=358651 [Last accessed on 2020 Apr 27].
Zhang, D., Hu, M., Ji, Q. (2020), Financial markets under the global pandemic of COVID-19. Finance Research Letters, 36, 101528-101528.