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COVID-19 Pandemic and the Reaction of Asian Stock Markets: Empirical Evidence from Saudi Arabia*

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Abstract

The study examines the influence of COVID-19 on the stock market returns of Saudi Arabia. The data was analyzed through event study methodology using daily price data of Tadawul All Share Index (TASI). The study examines the behavior pattern of the Saudi Arabian stock market in different phases during the event period by selecting six-event windows with a range of 10 days. The results report a negative Abnormal Return (AR) of -0.003 on the event date, while the abnormal returns reversed the next day to 0.005 positively. The result of Cumulative Abnormal Return (CAR) is negative and significant at the 1 percent level in all the six-event windows starting from the event date to day 59 after the event for the TASI index. Even though the influence of the COVID-19 pandemic decreased after 30 days of the event date, it increased during the last ten days of the event window. The stock market volatility of Saudi Arabia increased during the post-event period compared to the pre-event period with a negative mean return of -0.326 and a greater standard deviation. In a conclusion, the study found a significant influence of the COVID-19 pandemic on the stock market returns of TASI.

Keywords: Stock Returns, Event Study, Event Windows, Abnormal Return, Cumulative Abnormal Return

JEL Classification Code: G14, G15, G41

1. Introduction

The impact of significant events on stock market returns has received great attention in contemporary research. A large body of existing literature has focused on the movement of stock market prices according to several events happening in the world (Smales, 2014; Shi & Ho, 2020). A common perception is that information about several uncertain events received from different sources significantly impacts the stock market constituents.

The COVID-19 disease was initially discovered at the end of December 2019 in Wuhan city of China and is a

contagious disease that spreads through human-to-human (Bahrini & Filfilan, 2020). The first death of COVID-19 was reported in China on 11 January 2020 (Al-Awadhi et al. 2020). The World Health Organization (WHO) declared the novel coronavirus as an epidemic on 30 January 2020. The COVID-19 pandemic caused considerable losses to business activities worldwide due to strict measures imposed by several countries in the form of lockdowns and national and international travel.

Because uncertain events affect financial markets, the news of the COVID-19 pandemic has made the world financial markets suffer tremendous losses during the first quarter of 2020. As a result, the important global stock market indices, such as the Dow Jones Industrial Average (DJIA) and Standard & Poor's 500 indexes, have plunged largely (Bahrini & Filfilan, 2020). Moreover, there was a significant effect of COVID-19 on the financial markets of Asia, Africa, and Europe (Bahrini & Filfilan, 2020; Zhang et al., 2020). Therefore, many studies ventured to investigate the effect of COVID-19 on the stock market returns of affected countries.

The study examines the impact of the COVID-19 pandemic on the stock market returns of Saudi Arabia for two reasons. Firstly, the Saudi Arabian stock market has different characteristic features than global markets; they might

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respond differently during the pandemic shock. Secondly, the previous studies examining the impact of COVID-19 on Saudi Arabian stock market returns are meager.

2. Literature Review

Chiang et al. (2007) analyzed the dynamic correlation of Asian financial distress in two phases during the period 1993 to 2003 by using a dynamic conditional-correlation model. They reported an increase in correlation of financial distress during the first phase and a high correlation during the herding period. A similar study by Syllignakies and Kouretas (2011) examined the financial contagion using the Dynamic Conditional Correlation multivariate GARCH model and found a significant positive conditional correlation of US and German stock returns during the 2007–2009 financial crisis. A similar study by Morales and Andreosso-O’Callaghan (2012) examined the effect of the financial crisis on Asian stock markets regarding contagion and interdependence. They reported that the US financial crisis might trigger the financial crisis in other Asian countries, but the financial problems in these economies are due to interlinkages between them and not due to contagion effects.

Anwar et al. (2017) analyzed the impact of cash dividend announcements on the BSE stock market returns using the event study approach. They found a significant positive association between them, hence relating to the signaling and information content hypothesis. Ahmar and Val (2020) studied the forecasting COVID-19 confirmed cases and Spain stock market (IBEX) using the SutteARIMA method. They conducted the forecast for three future periods starting for both COVID-19 and IBEX. They reported the results based on ARIMA and SutteARIMA. They concluded that the later forecasting method is better than the former to calculate the COVID-19 confirmed cases and the IBEX stock market in Spain. Zhang et al. (2020) examined the COVID-19 effect on the worldwide financial markets. The results show that the world financial markets faced a high risk in response to the COVID-19 pandemic. The risk is associated with the severity of pandemic outbreaks in each country, making markets highly volatile.

Similarly, Mirza et al. (2020) examined the COVID-19 effect on the price and volatility of European Investment Funds. They reported a robust performance of these funds during the pandemic period and associated this stability with social enterprises’ investment. Lyocsa and Molnar (2020) examined the S&P 500 market index movements during the COVID-19 pandemic period. They reported a negative autocorrelation during the crisis and correlated this to COVID-19 fear and stock market uncertainty.

Alzyadat and Asfoura (2021) studied the impact of the COVID-19 pandemic on the Saudi Arabian financial

markets. They reported a negative impact of the pandemic on the stock market returns. Nguyen (2021) examined different determinants affecting Vietnam’s real estate growth during the COVID-19 pandemic. He found a positive influence of the pandemic linking to the support provided by the Vietnam government to the real estate market. A study by Phuong (2021) on the significant impact of the COVID-19 pandemic on the petroleum industry of Vietnam found a positive influence during the first phase of the outbreak where the CAR was significantly positive, while the opposite was true during the second phase.

The study reviewed the past literature examining the impact of COVID-19 on the stock market returns of global financial markets. The reported results show that the COVID-19 pandemic had a similar effect on the stock markets globally. The government of Saudi Arabia responded quickly to the pandemic, hence played a significant role in controlling it. Further, the studies examining the effect of the COVID-19 pandemic on the stock returns of Tadawul are meager. Therefore, the study finds it significant to investigate the impact of the COVID-19 pandemic on the stock market returns of Tadawul. The study formulates the following hypothesis.

H0: *The COVID-19 pandemic influences the stock market returns of Saudi Arabia.*

3. Methodology

The current study uses event study methodology to study financial markets’ behavior, specifically the Saudi Arabian market, after the news breakout of the coronavirus epidemic. The event study methodology is assumed to be one of the effective methods to study the impact of different financial market securities events. Event studies help determine the behavior pattern of indices in association with the announcement of an event. The event study methodology was suggested as an appropriate technique to estimate Abnormal Returns (ARs) around the announcement date due to the feasibility of preparing estimation and event windows (Bowman, 1983).

The current study intends to examine the impact of COVID-19 on the stock market of Saudi Arabia, i.e. the Tadawul All Share Index (TASI henceforth). From among the six GCC nations, the study selects Saudi Arabia due to data availability. The index-specific daily price data has been taken from the website of investing.com. To calculate the abnormal return, the daily closing price of the respective indices has been used.

There is no rule of thumb for selecting the number of days for estimation window and event windows to examine the impact, but different researchers have adopted different time periods. Based on the previous literature

(Anwar et al. 2017), the study has adopted 180 days (–180 days to –1) as the estimation period before the date of the pandemic announcement. The null hypothesis is that the cumulative abnormal return (CAR) should be zero during the event period.

3.1. Announcement Date

Several studies attempted to examine the short-term effect of the COVID-19 pandemic on stock market returns (Zhang et al. 2020) and used the pandemic outbreak news given by the Chinese media, i.e., 20th January 2020. The Ministry of Health and Prevention of UAE reported the first four COVID-19 cases on 29 January 2020 in the GCC countries, and the other GCC countries, such as Bahrain, Kuwait, Oman, Iraq, and Qatar reported in the middle of February 2020, while Saudi Arabia declared its first case on 2 March 2020. Nevertheless, the reporting dates of COVID-19 are different among the GCC countries, and they started taking precautionary measures after the first announcement made by the UAE. Therefore, the current study chose 29 January 2020 as the announcement date (AD).

3.2. Event Windows

The current study examines the impact of COVID-19 on the Saudi Arabian stock index by selecting an event window of 60 days, including the announcement date. The study assumes the COVID-19 impact to be longer; hence, it chose the 60 days' event period. Further, the study examines the behavior pattern of stock markets in different phases during the event period by selecting six-event windows with a range of 10 days, such as (0–10), (11–20), (21–30), (31–40), (41–50), and (51–59).

3.3. Calculation of Abnormal Return

The impact of COVID-19 on stock market returns is examined by observing the behavior of abnormal returns after the pandemic announcement. The daily abnormal return is the excess return on the index on day t over the global emerging market index (MSCI EMA is selected as a proxy for the global emerging market index). The daily return on the index is calculated as:

$$R_{i,t} = \ln \left(\frac{p_t}{p_{t-1}} \right) \quad (1)$$

Where p_t is the index closing price on the current day t , while p_{t-1} is the index closing price on the previous day $t-1$. The expected mean return is calculated with the help of the following market model.

$$\bar{R}_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad (2)$$

Where t is the estimation period of 180 days before the date of the pandemic announcement. The abnormal returns are calculated by using Eq (3).

$$AR_{i,t} = R_{i,t} - \bar{R}_{i,t} \quad (3)$$

The Cumulative Abnormal Return (CAR) of the index i over the event window ($t_0 - t_n$) is calculated using Eq (4).

$$CAR_{i,t(t_0-t_n)} = \sum_{t=t_0}^{t_n} AR_{i,t} \quad (4)$$

The Mean Abnormal Returns (MARs) are computed over the indices at time t with the help of Eq (5).

$$MAR_t = \frac{1}{N} \sum_{i=1}^N AR_{i,t} \quad (5)$$

The Cumulative Mean Abnormal Return (CMAR) of the index i over the event window ($t_0 - t_n$) is calculated using Eq (6).

$$CMAR_{i(t_0-t_n)} = \sum_{t=t_0}^{t_n} MAR_t \quad (6)$$

The significance of Cumulative Abnormal Return (CAR) and Cumulative Mean Abnormal Return (CMAR) is calculated using standard t -statistic.

4. Results

This section discusses the study results by reporting mean and standard deviation of index returns, Cumulative Abnormal Return (CAR) of TASI during different event windows, and Cumulative Mean Abnormal Return (CMAR) during different event windows.

Table 1 reports the mean and standard deviation of index returns during the pre-event and post-event periods. The results of the pre-event period report negative mean returns before the COVID-19 pandemic outbreak for TASI. The post-event mean returns are negative, with a high standard deviation compared to the pre-event period, indicating increased volatility in the sample stock markets. The stock market of Saudi Arabia experienced a more significant impact with mean returns of –0.326.

Table 1: Mean Index Return and Standard Deviation

Indices	No. of Trading Days	Mean Index Return (%)	Standard Deviation (%)
The Pre-event period from 28.02.2019 to 28.01.2020			
TASI	180 days	-0.013	1.156
The Post-event period from 29.01.2020 to 12.05.2020			
TASI	60 days	-0.326	2.67

Table 2: Abnormal Return and Average Abnormal Return of TASI on t_0 and t_1

Event Days	Abnormal Return (%)
t_0	-0.003
t_1	0.005

4.1. Abnormal Returns of Selected GCC Indices

Table 2 reports the Abnormal Return (AR) on the event day (t_0) and the day next to the event day (t_1). Again, the results document a negative AR on the event day, while the returns are positive on the following day.

4.2. Cumulative Abnormal Returns (CARs) of TASI

The study reports Cumulative Abnormal Returns (CARs) of TASI in six different event windows starting from the event date to day 59 after the event. Table 3 presents the CARs during three event windows starting from 0–10 to 21–30 days. The TASI evidence negative CARs during the 0–10 window period, significant at the 1% significance level (Figure 1). A similar kind of result is evidenced during the 11–20 and 21–30 days period, significant at the 1% level. The movement of CARs is evidenced in Figures 1A, 1B, and 1C.

Table 4 presents the CARs during three event windows starting from 31–40 to 51–59 days. The TASI evidence negative CARs during the 31–40 window periods, significant at the 1% significance level (Figure 2). A similar kind of result is evidenced during the 41–50 and 51–59 days period, significant at the 1% level. The movement of CARs is evidenced in Figures 2A, 2B, and 2C.

5. Discussion

The current study examined the impact of the COVID-19 pandemic on the market returns of TASI, a Saudi Arabian stock index using the event study approach. The reported results showed a negative Abnormal

Table 3: Cumulative Abnormal Return (CAR) of TASI During Different Event Windows

Windows	CAR _{<i>t</i>}	<i>t</i> -Statistic
0–10 days	-0.037	-6.69***
11–20 days	-0.035	-7.03***
21–30 days	-0.096	-8.85***

Note: *, ** and *** indicates significance at the 10%, 5% and 1% level.

Return (AR) when the first COVID-19 case was reported in GCC nations, followed by a reversal the next day. The reason might be that the news of COVID-19 in the national and international media could not weaken the investors' confidence in Saudi Arabia. Further, the study reports Cumulative Abnormal Returns (CARs) over six different event windows. The reported results show a negative and significant CAR during the whole event period starting from the event date to day 59 after the event for the TASI index.

Nevertheless, the impact of COVID-19 decreased after 30 days of the event announcement, and there was an increase in the effect during the last event window, i.e., 51–59 days. During the first 30 days of the event announcement, a negative impact might be due to the fear of COVID-19 spread among investors of the GCC stock markets. As a result, the stock market volatility of Saudi Arabia increased during the post-event period with a negative mean return of -0.326 and a more significant standard deviation.

The adverse effects of COVID-19 on Saudi Arabian stock markets might be due to an increase in the number of coronavirus cases during this period. The quick response of the stock market to COVID-19 was not limited to Saudi Arabia, but it is similar to other financial markets globally. Nonetheless, the reaction of the Saudi government to COVID-19 played a significant role in controlling the pandemic effect throughout the Kingdom. The study supports the null hypothesis that the COVID-19 pandemic influences the stock market returns of Saudi Arabia. The results of the current study are in line with the previous studies

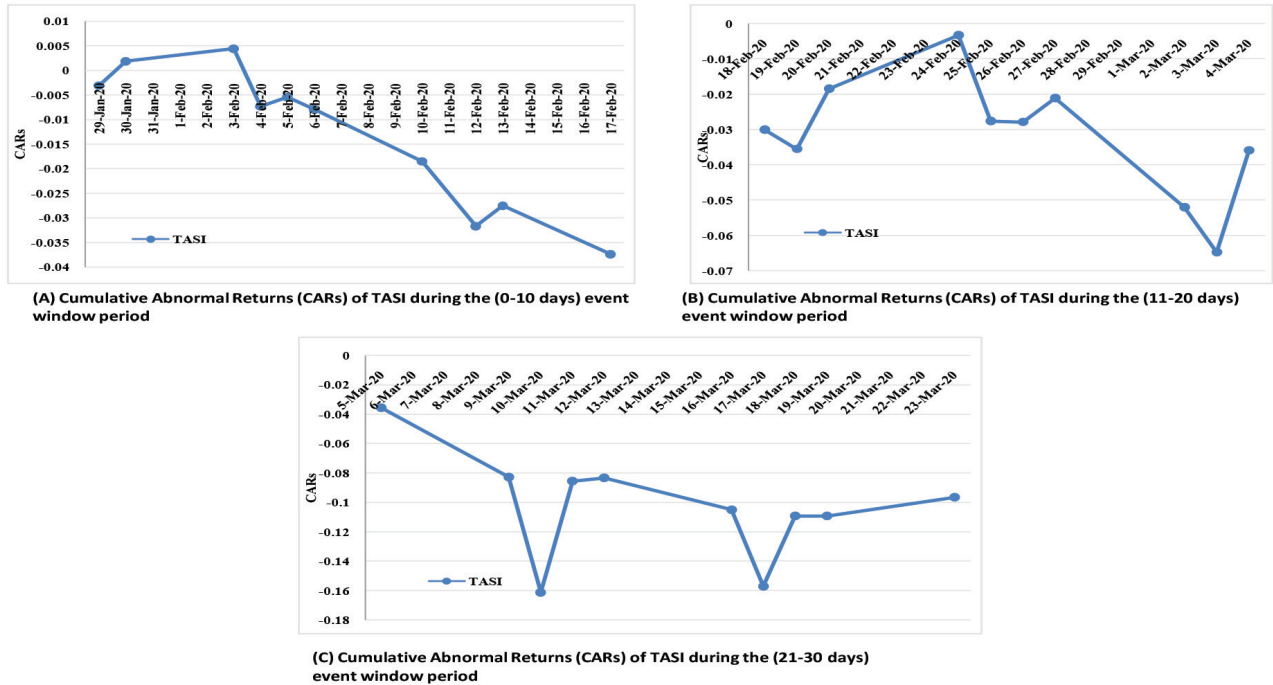


Figure 1: Cumulative Abnormal Returns (CARs) of TASI During the Event Window Period of 0–10 days, 11–20 days, and 21–30 Days

Table 4: Cumulative Abnormal Return (CAR) of TASI During Different Event Windows

Windows	CAR _i	t-Statistic
31–40 days	-0.029	-7.03***
41–50 days	-0.046	-10.24***
51–59 days	-0.088	-11.85***

Note: *, ** and *** indicates significance at the 10%, 5% and 1% level.

(Smales, 2018; Bahrini & Filfilan, 2020; Zhang et al. 2020; Mirza et al., 2020; Shi & 2020; Phuong, 2021; Nguyen, 2021; Lyocsa & Molnar, 2020).

6. Conclusion

The current study examined the effect of the COVID-19 pandemic on the stock market returns of Saudi Arabia. The daily price data was taken from the financial website of investing.com. The study employed event study methodology to examine the COVID-19 effect on stock returns by selecting an event window period of 60 days, including the

announcement date (AD). Moreover, the study examined the behavior of the Saudi stock market during the pandemic period in different phases of the event period by selecting six-event windows with a ten-day range. The results report a negative Abnormal Return (AR) on the event date, i.e., the announcement of the first COVID-19 case followed by a reversal to positive abnormal return.

Further, the results report negative and significant Cumulative Abnormal Returns (CAR) during the event window periods 0–10, 11–20, 21–30, 31–40, 41–50, and 51–59 for TASI. Even though the pandemic effect decreased after 30 days of the event period, there was again an increase during the last event window period of 51–59 days. The study found the Saudi Arabian stock market to be more volatile during the post-event period than the pre-event period, with a high standard deviation. Finally, the study supports the hypothesis, that the COVID-19 pandemic affects the stock market returns of TASI. The results of the current study are helpful to policymakers, investors, and academicians. However, the study has certain limitations and directions for future research. First, it is limited to the Saudi Arabia stock market, i.e., TASI, and future studies should be addressed by examining other GCC indices. Secondly, the study used index prices to explore the impact, while future studies can extend it by including volume data.

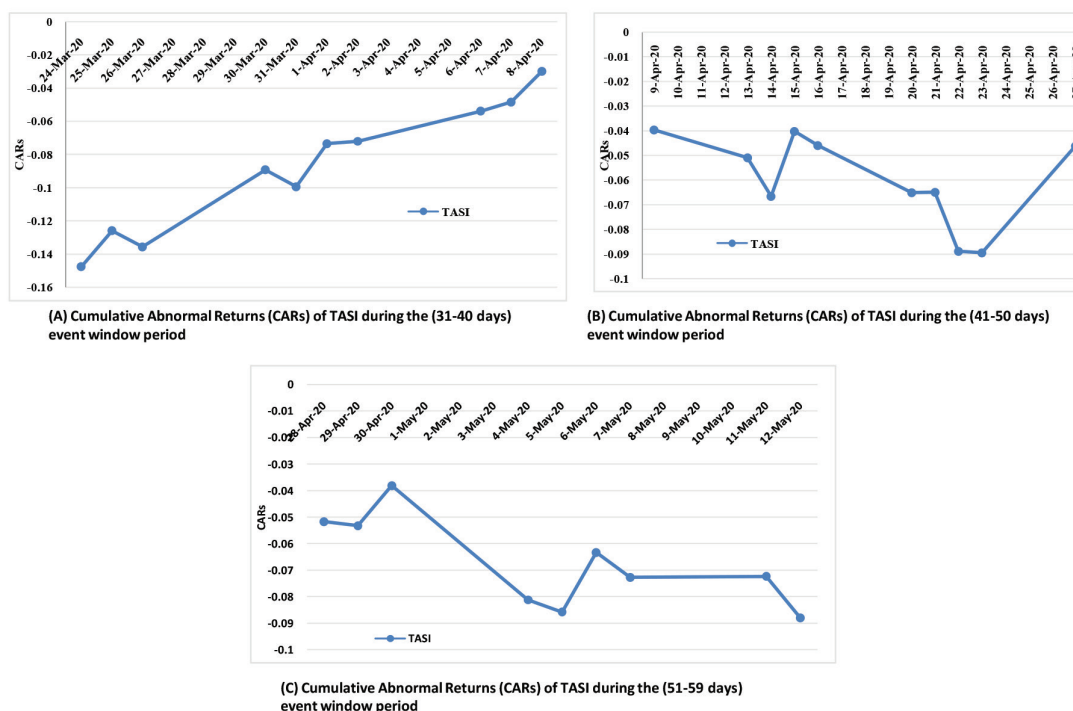


Figure 2: Cumulative Abnormal Returns (CARs) of TASI During the Event Window Period of 31–40 Days, 41–50 Days, and 51–59 Days

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