Fear of COVID-19 and Financial Sector of Tadawul Stock Exchange

Ahmad Fraz (PhD)

Assistant Professor, Pakistan Institute of Development Economics, Islamabad, Pakistan, ahmad.fraz@pide.edu.pk

ABSTRACT

The objective of this study is to analyze the effect of the COVID-19 outbreak on the financial sector's equity returns, specifically focusing on Sukuk & Bonds (TSBI), Diversified Financials (TDFI), Banks (TBNI), Insurance (TISII), and the Tadawul All Share (TASI) Index. This is done through the utilization of t-test and event study technique. The event takes place from December 2018 to March 2020. The estimation period covers the time frame from December 2018 to December 2019. The pre-announcement phase of the WHO notice spans the month of January 2020, while the post-announcement phase encompasses February 2020 to March 2020. The study suggests that, prior to the alarm given by the WHO, the majority of the financial sector exhibits positive returns, with the exception of Banks. The results validate the substantial and adverse influence of the COVID-19 epidemic on Diversified Financials (TDFI), Banks (TBNI), and Insurance (TISII) following the global alert notice by the World Health Organization (WHO). The study indicates that the Sukuk & Bonds (TSBI) sector remains unaffected by the epidemic and shows a favorable influence on returns. This industry provides a fixed interest rate and does not influence the expectations of investors. Saudi Arabia's government announces a stimulus package of $18.7 billion on March 20, 2020. The adverse consequences suggest that the policymakers fail to foresee this issue and do not take timely action. This study recommends that effective policies must be designed by policymakers in anticipation of such pandemic outbreaks to help investors devise diversification strategies.

***Key Words*: *P*andemic, *F*inancial sector, *C*OVID-19, *E*vent Study,**

INTRODUCTION

Coronavirus (COVID-19) first appears in Wuhan, China and China has issued public alert on December 31, 2019. The spread of the novel coronavirus (COVID-19) has officially been declared a pandemic by the WHO on January 30, 2020 and global economy has been widely discussed that the virus has spread all over the world (Wei & Han 2021; Ullah, 2023 and Harjoto & Rossi 2023). It's already claimed more than 7,010,568 deaths worldwide are reported by December 31, 20231. The global impact of the coronavirus pandemic is significantly severe, surpassing the scale of the Great Financial Crisis of 2007–08. Such high figure indicates that the pandemic is spreading much faster than the past epidemics like swine flu, Ebola, and SARS. As this virus is spreading across the world, the impacts on economic growth are seen everywhere, already impacting numerous sectors from aviation to retail industry, tourism to hospitality sector, slowdown already costing the industry a huge amount of lost revenue.

The emergence of the coronavirus has caused a significant decline in the global economy, putting both consumption and tourism at risk. The oil markets have been crashed due to lockdowns around the world and demand of the commodity brings the prices of oil contract to deep down even negative value of WTI oil contracts. Consumers have been advised to refrain from gathering in large groups and focus on purchasing essential items due to public health concerns and travel restrictions, both domestically and internationally. These factors have significantly influenced consumer behaviour. A substantial portion of the stock market has displayed worrisome volatility in reaction to the COVID-19 pandemic (Zhou et al.,

[1] https://data.who.int/dashboards/covid19/deaths?n=c

2024). This phenomenon occurs as traders engage in panic-selling due to a prevalent sense of anxiety and fear. The Covid-19 pandemic has caused volatility in the world markets and created a feeling of uncertainty among investors.

The fluctuation in stock markets is causing uncertainty in the economic projection and creating major anxiety among investors. As a result of this panic the market has reacted as an exceptional drops and world-wide circuit-breakers triggered many times to prevent panic-trading. Since reaching its all-time high on March 16, 2020, the S&P 500 has fallen 12% and more than 30%. The Dow Jones Industrial Average fell nearly 13%, the Russell 2000 fell more than 14%, the MSCI Emerging Market Index fell 6.3%, the MSCI Asia Pacific Index fell 3.7%, and the price of one barrel of Brent oil fell below $30 for the first time since 2016. The European stock markets, including the FTSE (UK), DAX (Germany), CAC (France), and Italian stock markets, are all experiencing dramatic declines2.

The occurrence of COVID-19 and other pandemics can have a significant influence on financial markets, particularly those in Saudi Arabia. The economic repercussions of COVID-19 in Saudi Arabia may have adversely affected investor confidence in the financial sector and investment decisions. Saudi financial markets have a significant global influence as a result of overseas investments. Saudi Arabia, a prominent economy in the Middle East, appeals to international investors looking for lucrative business opportunities. The inclusion of Japan and the US in initiatives such as the NEOM development enhances the attractiveness of the country. In 2022, the Red Sea Development Company recorded a total of $30 billion in investments for the project. The Red Sea Development Project, which entails collaboration between France and China, exemplifies the nation's resourcefulness and commitment to sustainability. The 2023 evaluation conducted by the Saudi General Investment Authority (SAGIA) revealed that a total of $500 billion had been invested in the NEOM project.

Numerous governments employ monetary and fiscal measures to mitigate the economic repercussions of the pandemic. After the White House declared a $2 trillion stimulus package, the US market, including the S&P, Dow Jones, and Nasdaq, has witnessed a significant surge3. The Asian market, comprising Nikkei, Kospi, Hang Seng, and Shanghai, witnessed a positive trajectory this week as a result of a decline in the number of COVID-19 cases in China. Furthermore, European markets have successfully adopted measures comparable to those in the United States and have managed to generate significant momentum. The Saudi Arabian Monetary Authority (SAMA) implemented measures in response to the COVID-19 pandemic that potentially had adverse effects on financial markets (SAMA, 2020). Nevertheless, the surging number of newly reported instances of the coronavirus and the resulting fatalities have led to a decline in momentum for these markets once more.

The study especially examines the consequences of the COVID-19 outbreak on the financial industry in Saudi Arabia. The impact for investors on stock returns of financial sector have received less attention compared to other sectors, it is important to examine the implications of such virus on other industries such as financial industry (Harjoto & Rossi, 2023). The economic downturn leads to a decrease in future investment in capital projects, resulting in a reduction in finance needs. Consequently, there is a decrease in the demand for funding, leading to a reduction in profit for the financial industry. The analysis provides important insights into the market concern that exists before the WHO's global alert and highlights the significant responsiveness of financial markets to events related to pandemics.

[2] https://pide.org.pk/research/covid-19-and-worlds-financial-markets/

[3] https://www.nasdaq.com/articles/markets-focus-shifts-to-whats-in-the-stimulus-bill-2020-03-25

A large number of studies have looked into how COVID-19 affects stock performance and returns. (i.e., Herwany et al., 2021; Dharani et al., 2023; Malini, 2020; Hasan et al., 2022). Whereas the financial sector of Saudi Arabia is specifically ignored. Investors with a diversified portfolio must monitor the performance of stocks, bonds, and real estate markets. Saudi Arabia's financial stability and growth potential make it an attractive destination for global investors, fostering economic advancement and international cooperation. This is achieved by employing rigorous analytical approaches and closely examining daily returns. Pandemics like as COVID-19 can have a significant impact on financial markets, particularly those in Saudi Arabia. The findings provide valuable insights for policymakers and investors, emphasizing the significance of implementing proactive actions to decrease the probability of future risks and enhance the market's ability to withstand challenging circumstances.

The study is divided into four components, and this section proceeds with the second section to provide a comprehensive evaluation of existing literature. Section 3 examines the data and methodology employed to study the impact of COVID-19 on Saudi Arabia's financial sector, while Section 4 evaluates the empirical results for several models. Section 5 concludes the research and offers policy recommendations.

LITERATURE REVIEW

The fundamental premise of this investigation is grounded in the idea of market efficiency, also known as the efficient market hypothesis (EMH), and the theory of rational expectations (Fama, 1970; Merton, 1973; Chen, Roll, & Ross, 1986). Based on the concept, the price should accurately reflect all pertinent information. According to Fama, if a market is efficient and correctly reflect prices of all stocks, it is more beneficial to allocate resources. This is the scenario that occurs when the market operates efficiently. Security markets exhibit a high level of information efficiency, meaning they effectively incorporate all relevant information, such as individual security and stock market activity (Fama, 1970). Consequently, this indicates a potentially significant correlation between COVID-19 and market pricing. The current study shed light on the behavior and price movement of the stocks of financial sector and prepare businesses under the situation of such epidemics.

Since the introduction of the Efficient Market Hypothesis (EMH), researchers have carefully examined the relationship between stock market performance and changes in the overall economy. During the time that the COVID-19 epidemic was quickly spreading across the globe, governments implemented various policy measures such as stay-at-home mandates and travel limitations, which had a substantial impact on the behavior of consumers and it will impact all business (Alexander & Karger, 2023). Following the COVID-19 epidemic, there has been extensive academic discussion on how the financial sector has reacted. Numerous studies have been conducted to evaluate the effects of the outbreak on different financial products and markets (Otenko et al., 2023). The investigations have covered assessments of volatility, analyses of commodity markets, dynamics of the real estate market, fluctuations in exchange rates, and the impact on cryptocurrencies.

Stock prices will be adequately adjusted in response to impartial behavior toward the general public, facilitated by journals and newspapers, and referred to as semi-strong form efficiency. Fama (1970) defined the semi-strong form efficiency, which asserts that share prices do not follow patterns based on publicly available information and cannot be forecast using this information. Historical prices, corporate financial records, and macroeconomic indicators are all examples of publicly available data. According to EMH, these events cannot result in anomalous returns (Malkiel, 2003). The semi-strong version of efficiency examines how markets react to various economic events and how quickly stock values fluctuate as a result of these events (Jensen, 1978). Li et al. (2022) emphasized the substantial fluctuations in stock

prices resulting from the pandemic, while Salisu et al. (2019) contended that defensive stocks serve as effective safeguards against the uncertainty induced by COVID-19. Bash and Al-Awadhi (2023) found that stock market returns are negative during economic downturns.

The emergence of COVID-19 in the latter part of 2019 and the beginning of 2020 provoked a worldwide crisis, significantly impacting both public health and economic stability (Zhou et al., 2021). COVID-19, the third major coronavirus outbreak in the twenty-first century following SARS and MERS, has led to unprecedented levels of uncertainty and danger, leading in a significant decline in global economic activity (Padhan & Prabheesh, 2021). In addition to anticipated market occurrences, there are other unforeseen events that can potentially influence stock prices.

Numerous prior studies have recorded the impacts of these disasters and events, and their findings have consistently indicated that the effects are significant. The researchers considered hurricanes (Lamb, 1995, 1998; Angbazo and Narayanan, 1996), geomagnetic storms (Krivelyova and Robotti, 2003), and earthquakes (Shelor, Anderson, and Cross, 1992). Furthermore, these experts have documented that such occurrences have a significant impact on the pricing of insurance companies specializing in covering losses and damages. Albala-Bertrand (1993) argues that the decline in output growth was less pronounced than anticipated by the general public. Additionally, Akhtaruzzaman et al. (2021) investigated the role of gold as a hedge during the pandemic they were studying. Furthermore, the negative consequences of COVID-19 extended to the performance of firms and industries (Fu and Shen, 2020) as well as the insurance business (Wang et al., 2020), which exacerbated financial risks on a worldwide scale (Phan and Narayan, 2021). The study has the following hypothesis:

H0: The COVID-19 pandemic has no impact on stock returns of Saudi Arabia's financial sector.

H1: The COVID-19 pandemic has no impact on stock returns of Saudi Arabia's financial sector.

To summarize, it is evident that the COVID-19 outbreaks have significantly affected the banking industry. In this work, we have thoroughly investigated the relationship between the COVID-19 epidemic and the stock returns of Saudi Arabia's financial sector.

METHODOLOGY

This study aims to assess the effect of the COVID-19 epidemic on the equity returns of the financial sector in Saudi Arabia's stock market. The Tadawul All Share (TASI) Index and four financial sector indices, namely Sukuk & Bonds (TSBI), Diversified Financials (TDFI), Banks (TBNI), and Insurance (TISII), are employed to evaluate the effects of COVID-19. The daily closing prices for all indexes are collected from December 2018 to March 2020. The analysis in the study employed two methodologies: the t-test and the event study methodology.

The study examines the influence of COVID-19 on indices by using an independent t-test to compare the average returns of each indicator before and after the disease was announced, as well as a period when the indexes were unaffected. An independent sample t-test is used to make the comparisons. The impact of COVID-19 on these stock indexes is assessed by comparing the average returns of the indices during the disease-affected period to the period without the disease. In next step the study uses a comparison period and two sub-periods to compare the mean returns by using the methodology of (Nippani & Washer, 2004). The comparable period spans from December 31, 2018 to December 31, 2019, while the total duration of this study is from December 31, 2018 to March 31, 2020. The times that are to come are further separated into two time periods. The initial phase spans from January 1, 2020, to January 31, 2020, and is designated as the pre-announcement period. This period commences one month prior to the issuance of the

WHO global notification. The period that occurs after the announcement, starting on February 1, 2020 and ending on March 31, 2020, is called the post-announcement period. Subsequently, a comparison was conducted between the two sub-periods and the corresponding period for the purpose of analysis. According to the hypothesis, the revelation of the outbreak is believed to have a negative impact on financial indexes.

During the second phase, event study methodology is employed to assess the impact of a specific event on performance (Naveed et al., 2024). The methodology for examining occurrences is as outlined below. When it comes to market efficiency research, the frameworks that are utilised the most frequently are considered to be expected return efficient market models. The anticipated yield can be computed utilising many valuation frameworks, such as the Capital Assets Pricing Model (CAPM), Market Model, Mean Adjusted Return, Market Adjusted Return, Market and Risk Adjusted Return, Fama-MacBeth Residual, and Control Portfolio. This section provides a comprehensive description of the first four models. For further in-depth information on the remaining models, please refer to the study conducted by Brown and Warner in 1980.

The current work has employed three distinct models. The first is the Market Model, the second is Mean Adjusted Return, and the third is Market Adjusted Return approaches to evaluate the abnormal return (AR) and cumulative abnormal return (CAR) in the sector affected by pandemic breakouts. AR refers to the difference between the actual return and the expected return, as calculated by the models discussed before, whereas CAR is the total of AR across the event window. The Market Model, a fundamental idea in empirical accounting research, was developed by Sharp (1964), suggesting that the returns on securities are in line with the rate of return on the market portfolio. Investors, who are risk-averse and seek to maximise their expected utility of terminal wealth within a single period, construct their portfolios by considering the mean and variance of the return distribution (Dyckman and Morse, 1986). In addition, Strong (1992) explained more reasons for using the market model, emphasising its ability to produce lower variances of abnormal return compared to raw return. This improves the reliability of statistical tests and is consistent with traditional statistical methods.

The mean adjusted return is based on the assumption that the expected return for security i is equal to a constant Ki, which can vary among different securities (Brown and Warner, 1980). Market Adjusted Return indicates that the expected return is consistent among stocks, while it may vary for a particular investment. This relationship suggests that the market portfolio for risky assets is a combination of all securities in a linear manner.

The event window covers the time period from January 1, 2019, to March 31, 2020. The estimating period is from January 1, 2019, to December 31, 2019. According to MacKinlay (1997), it is common practice to prolong the time frame of an event beyond a certain period of interest. This timeframe is divided into two separate periods. The initial period, known as the pre-announcement phase, spans from January 1st, 2020 to January 31st, 2020, leading up to the issuing of the WHO worldwide alert. The post-announcement phase refers to the time period between February 1, 2020, and March 31, 2020. The formulation of AR and CAR is provided below for the mean return adjusted model.

$$R_{j,t} = \alpha_j + \beta_j R_{m,t} + \varepsilon_{j,t}, \quad (1)$$

The daily return of financial sector indices j at time t is denoted by the symbol $R_{j,t}$

For the above equation the $R_{j,t}$ and $R_{m,t}$ are calculated by used the formulas given in the equation 2 and equation 3 respectively.

$$R_{j,t} = ln\left(\frac{P_{j,t}}{P_{j,t-1}}\right) * 100, \quad (2)$$

where $P_{j,t}$ represents the daily closing financial indices *j* on time *t* and $P_{j,t-1}$ represents the daily closing financial indices *j* on time *t-1*.

$$R_{m,t} = ln\left(\frac{MP_t}{MP_{t-1}}\right) * 100, \quad (3)$$

The market portfolio's TASI daily closing price on time *t* is represented as MP_t, while its daily closing price on time *t-1*is represented as MP_{t-1}.

The equation employs the parameters α_j and β_j, with ε_{jt} representing the random error term for financial indices *j* at day *t*.

$$AR_{j,t} = R_{j,t} - ER_{j,t}, \quad (4)$$

$$ER_{j,t} = \hat{\alpha}_j + \hat{\beta}_j R_{m,t}, \quad (5)$$

$$CAR_{it} = \sum_{t=0}^{n} AR_{jt}, \quad (6)$$

The notation $AR_{j,t}$ indicates the abnormal return for financial indices *j* on day *t*. $R_{j,t}$ represents the actual return for financial indices *j* on day *t*. $ER_{j,t}$ represents the expected return for financial indices *j* on day *t*. : $\hat{\alpha}_j$ and $\hat{\beta}$represent the estimated values of the actual parameters.

According to the research conducted by Brown and Warner (1980), the MAM model proposes that the anticipated yield of a stock remains constant throughout time. The projected return of a stock is determined by its historical average return, which can vary among different financial series. To calculate the AR and CAR for the MAM model, the following procedure is followed:

$$AR_{j,t} = R_{j,t} - ER_{j,t}, \quad (7)$$

$$CAR_{it} = \sum_{t=0}^{n} AR_{jt}, \quad (8)$$

The notation $AR_{j,t}$ indicates the abnormal return for financial indices *j* on day *t*. $R_{j,t}$ represents the actual return for financial indices *j* on day *t*. $ER_{j,t}$ represents the average return of financial indices *j* over the estimation window period t

The MMAM ensures that the stock maintains an equal expected return. The predicted return is derived from the historical average return of the market portfolio. The MMAM consistently applies this assumption to all other equities, although it is not mandatory to maintain this uniformity. From this relationship, it may be inferred that the market portfolio of risky assets is a linear combination of all securities.

$$AR_{j,t} = R_{j,t} - ER_{m,t}, \quad (10)$$

$$CAR_{it} = \sum_{t=0}^{n} AR_{jt}, \quad (11)$$

where $AR_{j,t}$ is abnormal return for financial indices *j* at day *t*, $R_{j,t}$ is actual return for financial indices *j* at day *t* and $ER_{j,t}$ is the average return of market portfolio TASI over the estimation window period t.

ANALYSIS AND RESULTS

Table 4.1 reports the dispersion in the returns of each of the index. The results indicate that volatility of all the financial sector indices and Tadawul all share index is higher in post announcement period for all indices. The losses are also higher as compare to pre annoucement and comparison period. The Diversified Financials sector is less volatile as compare to the other indices including Tadawul all shares.

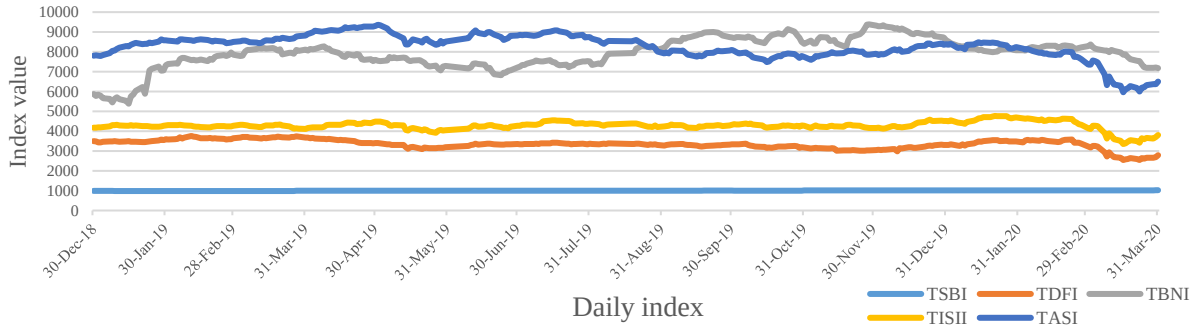
Table: 4.1 Dispersion in Indices for the event window

	Overall Period 31/12/2018 -31/03/2020				
		Sukuk & Bonds	Diversified Financials	Banks	Insurance
	Tadawul All Share (TASI)	(TSBI)	(TDFI)	(TBNI)	(TISII)
Max	6.83%	0.45%	7.10%	9.36%	6.87%
Min	-8.68%	-0.07%	-9.34%	-5.62%	-8.50%
STD	1.30%	0.05%	1.38%	1.50%	1.42%
	Comparison Period 1/1/2019 -31/12/2019				
		Sukuk & Bonds	Diversified Financials	Banks	Insurance
	Tadawul All Share (TASI)	(TSBI)	(TDFI)	(TBNI)	(TISII)
Max	0.28%	5.01%	9.36%	2.72%	2.41%
Min	-0.05%	-4.03%	-5.62%	-5.15%	-3.62%
STD	0.03%	0.92%	1.62%	0.98%	0.89%
	Pre-announcement Period 1/1/2020 -31/1/2020				
		Sukuk & Bonds	Diversified Financials	Banks	Insurance
	Tadawul All Share (TASI)	(TSBI)	(TDFI)	(TBNI)	(TISII)
Max	0.21%	2.42%	1.33%	2.11%	2.69%
Min	-0.05%	-4.30%	-1.57%	-2.89%	-3.00%
STD	0.05%	1.27%	0.67%	1.07%	0.93%
	Post-announcement Period 1/2/2020 -13/3/2020				
		Sukuk & Bonds	Diversified Financials	Banks	Insurance
	Tadawul All Share (TASI)	(TSBI)	(TDFI)	(TBNI)	(TISII)
Max	0.45%	7.10%	1.36%	6.87%	6.83%
Min	-0.07%	-9.34%	-2.25%	-8.50%	-8.68%
STD	0.12%	3.66%	0.91%	3.84%	3.54%

During the period after the announcement, the Sukuk & Bonds sector experienced the most significant daily profit and the most significant daily loss, with gains of 7.10% and losses of -9.34% respectively. In contrast, the Diversified Financials sector had the lowest daily profit and lowest daily loss, with rates of 1.36% and -2.25% respectively. Remarkably, the Tadawul All Share Index exhibited relatively less fluctuation, indicating the smallest gain and smallest decline in the banking sector, with percentages of -0.45% and 0.07% respectively. This is consistent with the conclusions of well-known experts in the field, such as Elnahass et al. (2021) and Johnson et al. (2020), who have also noted differing degrees of instability in various sectors of the financial system. In addition, graphical depictions demonstrate that Bank (TBNI) stocks display increased volatility, whilst Sukuk & Bonds (TSBI) demonstrate comparatively reduced

volatility in relation to other indexes, which aligns with the findings of Wen et al. (2021) and Patel et al. (2024).

Fig 1: All financial indices and Tadawul all index behavior for the sample period



Source: https://www.investing.com | and graph constructed by author

The average returns daily returns for all the financial indices and Tadawul all share index are compare using all the sub-periods. The results of the t-tests to show the performance of all the selected indices during pre-announcement window period is given in Table 4.2.

Table 4.2 Difference in Mean Returns of event window before and after announcement of Pandemic

	Mean Returns	Mean Returns	t-Stat	p-value	t-Stat	p-value
	31/12/2018 - 31/12/2019	1/1/2020 -31/1/2020	Homoscedastic		Heteroscedastic	
Tadawul All Share (TASI)	0.03%	-0.08%	0.53	0.59	1.16	0.25
Sukuk & Bonds (TSBI)	0.01%	0.01%	-0.40	0.69	-0.31	0.76
Diversified Financials (TDFI)	-0.02%	0.23%	-1.21	0.23	-0.99	0.33
Banks (TBNI)	0.15%	-0.27%	1.22	0.22	2.42	0.02
Insurance (TISII)	0.03%	0.18%	-0.69	0.49	-0.65	0.52

The results of Table 4.2 indicate that in comparison period all the indices except Diversified Financials sector show positive average daily returns. It indicates that all the indices are performing well before COVID-10 outbreak. The average daily returns show a different behavior in the month of January 2020, as Tadawul all share index and Banking sector reports negative returns and Diversified Financials sector shows positive returns. But overall there is no significant difference in the mean returns except banking sector. The findings are consistent with previous studies by Patel et al. (2024) and Chen and Wang (2020), which revealed that different industries experience varying degrees of return during periods of market volatility. The results of all the indices are consistent with both assumptions of homoscedasticity and herteroscedasticity except banking sector. The banking sector returns are significantly different with the assumption of heteroscedasticity. It means with the assumption of unequal variance the banking returns less as compare to the mean returns. This difference aligns to research carried out by Szczygielski et al. (2022) and Batten et al., (2023) which emphasized the distinct patterns of volatility frequently observed in the returns of the banking industry.

Table 4.3 presents the results of the difference in mean returns for all indices over the period after the announcement, considering both the assumptions of homoscedasticity and herteroscedasticity.

Significantly, all indexes, with the exception of Sukuk & Bonds (TSBI), showed negative returns after the World Health Organization's publication of a global alert for COVID-19, showing detrimental impacts on financial markets. The results of this study confirm the findings of Insaidoo et al. (2021), who similarly identified evidence of the adverse impact of pandemic on the performance of financial markets.

Table 4.3 Difference in Mean Returns of event window before and after announcement of Pandemic

	Mean Returns 31/12/2018 - 31/12/2019	Mean Returns 1/1/2020 - 31/1/2020	t-Stat Homoscedastic	p-value Homoscedastic	t-Stat Heteroscedastic	p-value Heteroscedastic
Tadawul All Share (TASI)	0.03%	-0.55%	2.68	0.01	1.40	0.17
Sukuk & Bonds (TSBI)	0.01%	0.03%	-2.66	0.01	-1.38	0.17
Diversified Financials (TDFI)	-0.02%	-0.51%	2.12	0.04	1.09	0.28
Banks (TBNI)	0.15%	-0.27%	1.68	0.09	2.53	0.01
Insurance (TISII)	0.03%	-0.50%	2.22	0.03	1.17	0.25

The results reported in Table 4.3 clearly indicates that in post announcement all the indices report significant different mean returns to comparison window and underperform in that period. The results for both the assumptions are different under the homoscedastic assumption all the indices report difference in mean except banking sector, whereas banking sector show significant difference in mean in heteroscedastic assumption.

The event study methodology is further used to compare the returns for pre-announcement and post announcement period, results are given by using three model these are market model, mean adjusted returns and market-adjusted. The market model and market adjusted model cannot be applied on Tadawul All Share (TASI), because it is market and for Tadawul All Share (TASI) only mean adjusted model is used. The results for AAR and CAR estimated through the market model are reported in Table 4.4.

Table 4.4 AARs by using Market model of event window before and after announcement of Pandemic
Before announcement period (1/1/2020 -31/1/2020) and after announcement period (1/2/2020 -31/3/2020)

		AAR	**t-stat**	**Sig**	**CAR**	**t-stat**	**Sig**
Sukuk & Bonds (TSBI)	Pre announcement	0.00%	0.29	INSIG	0.06%	6.37	SIG
	Post announcement	0.02%	1.29	INSIG	0.91%	59.35	SIG
Diversified Financials (TDFI)	Pre announcement	0.29%	1.57	INSIG	6.42%	34.47	SIG
	Post announcement	-0.21%	-0.83	INSIG	-2.39%	-9.65	SIG
Banks (TBNI)	Pre announcement	-0.45%	-3.18	SIG	-9.82%	-70.03	SIG
	Post announcement	-0.48%	-3.64	SIG	-30.59%	-230.33	SIG
Insurance (TISII)	Pre announcement	0.24%	2.00	SIG	5.24%	43.94	SIG
	Post announcement	-0.09%	-0.46	INSIG	1.42%	7.40	SIG

The results reported in Table 4.4 suggest that results of banking sector and insurance sector are significantly different from the average daily returns of estimation period i.e 31st December 2018 to 31st December 2019. In only banking sector average abnormal returns are different for post announcement period. However, the Cumulative average returns for all the financial indices are significantly different in both pre and post announcement period and are lower for banking and Diversified Financials sector. The results for AAR and CAR estimated through the market mean adjusted model are reported in Table 4.5.

Table 4.5 AARs by using Market mean adjusted model of event window before and after announcement of Pandemic

Before announcement period (1/1/2020 -31/1/2020) and after announcement period (1/2/2020 -31/3/2020)

		AAR	t-stat	Sig	CAR	t-stat	Sig
Sukuk & Bonds (TSBI)	Pre announcement	0.00%	0.32	INSIG	0.07%	6.93	SIG
	Post announcement	0.02%	1.40	INSIG	0.97%	64.40	SIG
Diversified Financials (TDFI)	Pre announcement	0.26%	1.02	INSIG	5.63%	22.45	SIG
	Post announcement	-0.49%	-1.10	INSIG	-15.27%	-34.68	SIG
Banks (TBNI)	Pre announcement	-0.43%	-2.97	SIG	-9.38%	-65.43	SIG
	Post announcement	-0.43%	-3.19	SIG	-27.68%	-207.31	SIG
Insurance (TISII)	Pre announcement	0.15%	0.67	INSIG	3.34%	14.74	SIG
	Post announcement	-0.53%	-1.18	INSIG	-19.28%	-43.22	SIG

The results reported in Table 4.5 suggest that results of all indices except banking sector for pre and post announcement are insignificant, which means there is no significant difference in the average daily returns of estimation period i.e 31st December 2018 to 31st December 2019.

However, the Cumulative average returns for all the financial indices are significantly different in both pre and post announcement period. The cumulative abnormal returns of banking sector, Diversified Financials sector and insurance sector are found significantly lower in post announcement period. The results for AAR and CAR estimated through the mean adjusted model are reported in Table 4.6.

The results reported in Table 4.6 suggest that results of all indices except banking sector for pre and post announcement are insignificant, which means there is no significant difference in the average daily returns of estimation period i.e 31st December 2018 to 31st December 2019.

However, the Cumulative average returns for all the financial indices are significantly different in both pre and post announcement period. The cumulative abnormal returns of Diversified Financials sector, insurance sector and Tadawul all share are found significantly lower in pre-announcement period. The post announcement period all the indices report positive and significance difference whereas Tadawul all share is found significant and negative.

Overall results indicate that in general COVID-19 has significant and negative impact of Saudi Arabia stock market and all financial indices negatively.

Table 4.6 AARs by using Mean adjusted model of event window before and after announcement of Pandemic

Before announcement period (1/1/2020 -31/1/2020) and after announcement period (1/2/2020 -31/3/2020)

		AAR	t-stat	Sig	CAR	t-stat	Sig
Sukuk & Bonds (TSBI)	Pre announcement	0.02%	1.87	INSIG	0.39%	41.12	SIG
	Post announcement	0.00%	-0.01	INSIG	0.39%	25.68	SIG
Diversified Financials (TDFI)	Pre announcement	-0.21%	-0.82	INSIG	-4.51%	-17.99	SIG
	Post announcement	0.54%	1.22	INSIG	18.57%	42.19	SIG
Banks (TBNI)	Pre announcement	0.30%	2.11	SIG	6.67%	46.53	SIG
	Post announcement	0.30%	2.27	SIG	19.68%	147.37	SIG
Insurance (TISII)	Pre announcement	-0.15%	-0.68	INSIG	-3.40%	-14.97	SIG
	Post announcement	0.52%	1.17	INSIG	19.12%	42.87	SIG
Tadawul All Share (TASI)	Pre announcement	-0.11%	-0.51	INSIG	-2.34%	-11.13	SIG
	Post announcement	-0.58%	-1.41	INSIG	-27.29%	-66.40	SIG

CONCLUSION

This study examines the impact of the COVID-19 pandemic on the financial indices performance, with a particular emphasis on Sukuk & Bonds, Diversified Financials, Banks, Insurance, and the Tadawul All Share Index of Saudi Arabia. The study employs two statistical tests, specifically the t-test and event study methodology, employing daily returns data from December 31, 2018, to March 31, 2020. The pre-announcement phase of the WHO notice occurs during January 2020, while the post-announcement phase covers the period from February 2020 to March 2020. The findings indicate that, before the WHO issued a warning, most of the financial industry experienced favourable returns, except for Banks. The findings confirm the significant and negative impact of the COVID-19 pandemic on Diversified Financials, Banks, and Insurance sectors, in response to the global warning issued by the World Health Organisation (WHO). The epidemic has adversely impacted the pricing of Sukuk and Bonds in the TSBI sector, but the Sukuk & Bonds sector has remained largely unscathed and has exhibited a positive impact on returns. The event study approach yields further findings that verify the results of the t-test, indicating the presence of significant and consistent negative cumulative average returns. On March 20, 2020, the Saudi Arabian government unveiled an economic stimulus programme amounting to $18.7 billion. The negative outcomes indicate that policymakers did not anticipate this problem and did not act promptly. Based on these findings, policymakers should give priority to several essential policy ideas. Primarily, it is essential to formulate strategies and approaches for preventing and responding to pandemics. This includes creating comprehensive backup plans and allocating resources effectively to minimise the impact on financial markets. Additionally, it is imperative to closely monitor alerts and updates from global health organisations in order to promptly respond to health emergencies and ensure stability in financial markets. Furthermore, placing emphasis on investor education might facilitate individuals in comprehending the impact of

pandemics on financial markets and encourage the adoption of diversification and risk management strategies during challenging periods. Government agencies, financial institutions, and regulatory authorities should collaborate to effectively manage the economic consequences of the epidemic and create more targeted policy measures. These policies will assist investors in formulating diversification strategies.

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