

The Threshold Effect of Covid19 on Shariah Indices: an Empirical Analysis of GCC Countries

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ABSTARCT

This paper examines the volatility of Shariah indices of the gulf cooperative council due to coronavirus. Do GCC Shariah indices that are affected by the bad news of coronavirus? and attempts to analyze the impact of (Cov-NC) and (Cov-DC) on the movements of Shariah indices. The study used the GCC Shariah Indices viz., S&P Domestic Shariah of each country separately. New corona cases (Cov-NC) and new death cases (Cov-DC) are the dependent and independent variables used from Jan 1, 2020, to Dec. 31, 2020. The threshold-GARCH model is used to make the study more significant in terms of volatility in stock index prices due to the outbreak of the pandemic. The analysis shows that there is a negative leverage effect of bad news has more than the impact on conditional variance than good news. Here, GCC Shariah Indices are impacted due to coronavirus (Covid- New cases, Covid death cases) news spread in the market. Diagnostic analysis is based on AIC, SIC, and HQC criteria. Bahrain, Kuwait, Oman Shariah indices are lower values in comparison to the higher values of Qatar, Saudi Arabia and UAE Shariah indices. At-last T-GARCH model is more suitable for Bahrain, Oman, and Kuwait Islamic indices.

ملخص

تستكشف هذه الورقة البحثية تقلبات المؤشرات الشرعية لدول مجلس التعاون الخليجي بسبب فيروس كورونا. هل تأثرت المؤشرات الشرعية لدول مجلس التعاون الخليجي بأخبار فيروس كورونا؟ وتحاول تحليل تأثير حالات كورونا الجديدة (Cov-NC) و وفيات كورونا الجديدة (Cov-DC) على تحركات هذه المؤشرات. واستخدمت الدراسة المؤشرات الشرعية لدول مجلس التعاون الخليجي، وهي مؤشر الشريعة المحلية ستاندرد آند بورز لكل دولة على حدة. وتعتبر حالات كورونا الجديدة ووفيات كورونا الجديدة المتغيرات المستقلة وغير المستقلة المستخدمة من 1 يناير 2020 إلى 31 ديسمبر

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2020. ويستخدم نموذج العتبة-غراتش لتكون الدراسة أكثر جدوى من حيث التقلب في أسعار مؤشر الأسهم بسبب تفشي الوباء. ويُظهر التحليل أن هناك تأثيراً سلبياً للرافعة المالية للأخبار السيئة التي لها تأثير أكبر على التباين الشرطي أكثر من تأثير الأخبار الجيدة. وهنا، تتأثر المؤشرات الشرعية لدول مجلس التعاون الخليجي بسبب انتشار أخبار فيروس كورونا (حالات كورونا الجديدة، وفيات كورونا الجديدة) في السوق. ويعتمد التحليل التشخيصي على معايير SIC (معيار معلومات Schwarz) و AIC (معيار معلومات Akaike) و HQC (معيار معلومات Hannan-Quinn). وتعتبر مؤشرات الشريعة الإسلامية في البحرين والكويت وعمان ذات قيم أقل بالمقارنة مع القيم الأعلى لمؤشرات الشريعة الإسلامية في قطر والمملكة العربية السعودية والإمارات العربية المتحدة. كما يعتبر نموذج T-GARCH أكثر ملاءمة للمؤشرات الإسلامية في البحرين وعمان والكويت.

ABSTRAITE

Ce document examine la volatilité des indices de la charia du conseil coopératif du Golfe en raison du coronavirus. Les indices Sharia du GCC sont-ils affectés par les mauvaises nouvelles du coronavirus ? et tente d'analyser l'impact de (Cov-NC) et (Cov-DC) sur les mouvements des indices Sharia. L'étude a utilisé les indices Sharia du CCG, à savoir le S&P Domestic Shariah de chaque pays séparément. Les nouveaux cas de corona (Cov-NC) et les nouveaux cas de décès (Cov-DC) sont les variables dépendantes et indépendantes utilisées du 1er janvier 2020 au 31 décembre 2020. Le modèle GARCH à seuil est utilisé pour rendre l'étude plus significative en termes de volatilité des prix des indices boursiers en raison de l'apparition de la pandémie. L'analyse montre qu'il existe un effet de levier négatif des mauvaises nouvelles qui a plus d'impact sur la variance conditionnelle que les bonnes nouvelles. Ici, les indices Sharia du CCG sont affectés par les nouvelles concernant le coronavirus (Covid- nouveaux cas, Covid cas de décès) diffusées sur le marché. L'analyse diagnostique est basée sur les critères AIC, SIC et HQC. Les indices Sharia de Bahreïn, du Koweït et d'Oman sont inférieurs aux valeurs plus élevées des indices Sharia du Qatar, de l'Arabie Saoudite et des EAU. Le dernier modèle T-GARCH est plus adapté aux indices islamiques de Bahreïn, d'Oman et du Koweït.

JEL Classifications: C22, C51, C58, G15

Keywords: Covid19, GCC Shariah Indices, T-GARCH models, Volatility, and Forecasting.

1. Introduction

As 11 March 2020, the announcement date of coronavirus (Covid19), the World Health Organization (WHO) officially declared the coronavirus as a Nobel disease and breakout to be a global pandemic. The cases of coronavirus were surpassed 500,000 and it rises continue. The whole world suffering from this disease, over 170 countries confirmed the cases of coronavirus (WHO, 2020). The Covid19 breakout has had clearly identified the significant impact on the world economy. Different countries were applying different strategies to protect their people, resources, and the economy as well (Albulescu, 2020). Some countries applied short-term quarantine policies strictly followed it and blocked all-economy resources throughout the country. It observed in long-term mass unemployment, industrial breakdown, business failure, aviation, and tourism stuck thought the world. The people certainly faced hardships due to coronavirus (Zhang, Hu, & Ji, 2020). The new regime work on the intraday volatility play role in the substantially, the historical volatility is going slow in the covid19 event. The coronavirus has reduced the global price of oil. Saudi Arabia has begun the war of oil pricing against Russia on 9 March 2020 flooding markets full of oil, it was the 20% downfall in the Oil price market, which creates pressure on the financial market (Arezki, Fan & Nguyen, 2020) and (Gaffen,2020). Covid19 transmission in GCC and European Union countries focused on the various strategies applied to control the spread of coronavirus. The government is enhancing an integrated approach to support the user-centric preventive strategies, motivation, and blend of awareness creation (Alanzi, et al., 2021). Although, Covid19 has a high recovery rate, creating the strategies which suppressed the coronavirus cases and containment zone in GCC nations (Malek, 2020). Bahrain was the first country to react to the coronavirus cases transmission, all Covid19 cases as emergencies Feb 2019. UAE received the coronavirus case on the 29 Jan 2019, UAE government announced covid19 as pandemic (Alandijany, Faizo, & Azhar, 2020).

The Effects of coronavirus has not given space to the GCC countries as well, so research has to check the threshold effect of covid19 on the GCC Shariah Indices. The economy of all six countries going down but recovery fast. Some of the glimpses are incorporated. GDP of Bahrain stated the clear picture of the downturn, which is 2.1 in Jan 2020 going to slip to -3.2 in April 2020. Bahrain and UAE banks are extended the deferment on monthly loan payments. On the positive side of Bahrain is

the highest recovery rate of the Covid-19, with more than 51% as of May 3, 2020. It will also face pressure on its economy as the coronavirus spreads. Bahrain's economy is expected to grow in 2020 by -2.5%, down by 4.6 percentage points as compared with the earlier forecast (World Bank, 2020). It observed that the S&P Bahrain Shariah index started to fall as the Covid19. Kuwait's economy is expected to grow in 2020 by -3.5%, down by 2.5 percentages. If we look at consideration of GDP of Oman, it was Jan 2020, 3.7, and -2.5 April 2020. Oman tries to gear up from the corona crisis, there two full-fledged Islamic finance banks, Bank Nizwa and Alizz Islamic Banks are working during the coronavirus. The expected GDP of Qatar was 2 it's down by -2.6. Saudi- Arabia's GDP was 1.9 in Jan 2020; it slips to -2.3 in April 2020. Saudi banks also give the three months deferred payment loan to the client. Saudi Arabia's market struggled 18.33% due to the spread of coronavirus, it is working hard to come from the corona crisis. The kingdom of Saudi Arabia, as a powerhouse of Islamic finance has taken maximum measures to stabilize its finance industry. UAE growing GDP was 2.6 in the month of January 2020 downturn to -3.5 in the April 2020 (Hidayat, Farooq, & Alim, 2020).

The study investigated the financial uncertainty of financial factors of conventional and Islamic indices. Shariah indices screening the Riba, Gharar, and Mysir. The outcome suggests that Islamic indices are less uncertain than the conventional indices. The financial uncertainties have no impact on their Islamic and conventional indices. Islamic indices are low volatile in comparison to the conventional indices. Short-term relationship predicted in the indices. Which has given the benefits to the investors to select the portfolio (Alahouel & Loukil, 2020).

GCC financial market focused on the three reasons. First, previous studies considered East Asia, the USA, and Europe. So that there is a need to identify the coronavirus outbreak impact on the GCC Shariah financial market. Second, GCC nation, now facing dual problem, covid19 and oil price crisis (Al-Maadid et al., 2020). Third, the revenue of export and import of oil, which has a direct impact on the GCC Economies, GCC stock market directly respond to the coronavirus cases and oil prices volatility. Even though, GCC countries are mainly dominated by domestic investors as well. And also, a significant share on the basis of profit and loss sharing is limited opportunities (Istiak and Alam, 2020).

Recently, numerous studies have been published on the coronavirus, as we are aware about the covid19 impact is dearth study on several sectors like Oil price, economic parameters, financial markets, sustainability in crisis, the downturn of currency, etc. This study focused on the GCC Shariah indices that are affected by the bad news of coronavirus in the Gulf countries. This paper attempts to analyze the impact of (Cov-NC) and (Cov-DC) on the moments of Shariah indices of Golf countries. The objective of the study is as follows: -

To investigate the impact of Coronavirus on Gulf Cooperative cooperation (GCC) Shariah Indices.

To measure the impact (Cov-NC) and GCC Shariah Indices.

To identify that impact (Cov-DC) and GCC Shariah Indices.

2. Literature review

A number of previous studies have been conducted related to the crisis, which is a subprime crisis, financial crisis, world hunger, poverty, global warming, and Terrorism. The impact of these crises on the world economy. In continuation of the world crisis, the Covid-19 pandemic provides the most compelling explanation for its unprecedented stock market impact. There is a lack of empirical studies on Shariah investment in the GCC Nation. It constrains the possibility of finding many studies examining the forecasting and volatility of the stock market along with the Corona crisis.

2.1 Background of Theory

The measurement of volatility, Arch family has been used, in which event study has been taken place for concluding the objectives of the study. T-Garch model is to divide into two parts first is mean-variance, second conditional variance, it also disjoints and intervals, it is also known for the piecewise linear function for the conditional standard deviation (Zakoian, 1991). The conditional variance discussed by (Glosten et al. 1993). The influence of positive and negative innovations (news) on the volatility is differentiated. It will be the impact of good and bad news on the other things. An extended version of threshold Garch including the lagged conditional standard deviations as a regressor (Rabemananjara and Zakoian 1993), is the reason known as the T-Garch model. It also gives

the co-variance stationery instead of a piecewise linear function of volatility (Gouriéroux and Monfort 1992), Antoniou et al (1997). (Majid & Kassim, 2010) the study has ethical investment to diversify the portfolio of Islamic stock market. This portfolio has given the economic grouping of developed and developing countries. The study inferences the limited benefits to diversifying the investment within the same economic grouping. Islam et al. (2012) this study examined the diagnostic analysis, to check the forecasting by using the ARCH family model. Another hand researcher has also checked the volatility on the behalf of based root models like MSE, MAPE, Theil-U, and Linex loss the functional criteria. A non-linear model of volatility used like GARCH, EGARCH, and TARARCH also failed to check the volatility. The last simple moving average model fit for the two months to check the volatility of the Dhaka stock exchange. Alam et al. (2013) paper used forecasting volatility of DSE20 and DSE General Indices using the ARCH Family Model on daily basis panel data from 2001 to 2008 and 2008-2011. The return wise both the indices are significant. Results of the study have interpreted that past information influenced future information in the terms of volatility. In the pre-panel data of DSE20 and DSE General, ARCH and PARARCH are best-fitted model. Post-panel data EGARCH is a best-fitted model in both indices.

2.2 The Incremental Contribution of the Literature Review

Examined the Covid-19 impact on the GCC nations, its shows that Islamic financial institutions are less exposed to the reflection of the COVID-19 outbreak. GCC Shariah and conventional window financial institutions in Bahrain, Oman, Qatar, Saudi Arabia, and UAE. The outcomes of Saudi Arabia and Oman have not been affected by the COVID-19 outbreak (Akkas & Al Samman, 2021).

It is very early stated that might be other factor contribute to reducing the cases of coronavirus and death cases are also going to high in GCC countries, even though Bacille Calmette Guerin (BCG) vaccination scheduled has been started in addition to the infectivity, morbidity, and mortality (Miller, et al., 2020), (Berg, M.K., et al., 2020). The study investigates the GCC nations wake the global financial crisis and low oil prices using annual data from 2000 to 2016. The outcome revealed that the GCC countries meet the macroeconomic convergence, have greater co-movement of these variables in the GCC. The co-movements increase

during the financial crisis and recent low oil prices, which signifies the synchronization of shocks (Cham, 2020).

Covid19 cases are going to increase for the analysis point of view researcher has been used SEIR-PAD model. To check the susceptible, exposed, infected, recovered, super-spreader, asymptomatic infected, and deceased populations in GCC countries. The outcome indicates that covid19 terminated after 200-300 days from the outbreak. It has a strong prediction of coronavirus disease so that health policymakers will take advantage of it (Sedaghat, Oloomi, Malayer, & Mosavi, 2020). The novel coronavirus is economically the costliest pandemic in history, it is more than the financial crisis. This pandemic also heavily declined the equity market of the world. Researchers investigate the new cases and death cases on the daily returns of GCC countries. Results found that new cases are not significant to the return, in spite of its death cases are significant to the returns of the GCC countries (Bahrini & Filfilan, 2020).

Shariah compliant has a viable investment portfolio for the investors to reduce the risk and high returns. Conventional stocks are fit in the efficient portfolio. Shariah and conventional stocks do not improve kurtosis reduction. Shariah compliant stocks are efficient portfolio to sensitize the risk and returns. Islamic stocks are optimum portfolios selection in the normal condition also (Mounir, 2021). The kernel function of spot volatility has been used in the paper to check the microstructure noise in the data. Itosemi-martingale model has proved that Central Limit Theorems (CLT) for the estimation error with an optimal rate. The problems of optimal bandwidth and kernel selection. Observed that the asymptotic variance of the pre-averaging. The study explores the sentiments of GCC stock market and its spillover effect the other stock market into the region. GARCH model has been used for the study, to check the volatility along with the co-integration of GCC stock market applied the Granger causality test. Results of impulse response suggested that Kuwait and Qatar have heterogenetic in the nature. Outcome of the Saudi Arabia and UAE are well integrated in the region, also sentiments of investors are significantly affected by each other (Chowdhury, 2020), (Bora & Basistha, 2020), (Yousef, 2020). The study focused on the Shariah and non-Shariah complaint firms of Malaysia that will provide the profit and loss sharing for the investors. Shariah-compliant has firms value and profitability (Saba, Ariff, & Mohd Rasid, 2021), (Figuerola Lopez & Wu, 2020), (Albulescu, 2020) Sharmin (2019) study focused on

the significant impact on the relationship on the sentiments and returns in the GCC stock markets. The result approaches only the behavior aspect of the GCC stock market, avoidance its influence on stock prices. All are aware about all GCC nations have similar cultures and buying behavior of consumers. GCC country's spillover sentiment is potential for foreign investors. This study explores the spillover effects on the GCC stock market by using the VAR-GARCH model. UAE has two separate stock exchanges (Abu Dhabi and Dubai), to check the financial interdependence effect of the 2014 oil crisis, the outcome does not find relationship between (Abu Dhabi and Dubai stock exchanges. In opposite to the Saudi Arabia and Qatar have significant spillover effects. GCC nations have strong positive spillover effects of the 2014 oil crisis on smaller to the large markets (Arin, Caporale, Kyriacou, & Spagnolo, 2019). The study is related to the volatility of the GCC nation, the outcomes show that Islamic indices are less risky than conventional indices. The Garch model of Bahrain stated that less affected by the crisis in comparison to all GCC countries. The financial crisis has impacted the Kuwait and UAE. Islamic indices were not affected by the bad news in the market, meaning that the Shariah index did not observe the low volatility (Miniaoui, Sayani, & Chaibi, 2015). The outcomes of the T-Garch model observed that was not asymmetry in the returns of Bahrain and Oman in comparison to all Shariah indices in the GCC nation. Another hand E-Garch model is significantly working in Bahrain, Saudi Arabia, Qatar, and UAE, which play the negative coefficient meaning that negative news influences the market more than positive news (P.P. & Deo, 2013). This study related to the GCC nation to find out the volatility on the behalf of the Arch and Garch model, which carried a crisis period, the result stated that crisis can significantly impact Bahrain, basically in both conventional and Shariah indexes. It happened because of Bahrain has been exposing to the financial sector of an overseas country (Sukmana & Hidayat, 2012).

3. Research methodology

The study used the GCC Shariah Indices viz., S&P Domestic Shariah of each country separately. The standard and poor consultancy has given the data of all selected Shariah Indices of the GCC nation (Irfan, 2021). Another hand we have new corona cases (Cov-NC) and new death cases due to coronavirus (Cov-Dc). Threshold-GARCH model is used to make the study more significant in terms of volatility in stock index prices due to the outbreak of the pandemic and lockdown policy adopted by the GCC

government. Major findings of the study reveal the volatile nature of GCC Shariah, Cov-NC, and Cov-DC.

3.1 Data

The study aims to investigate forecasting volatility for GCC Shariah Indices, Cov-NC, and Cov-Dc. The study period covers from Jan 1, 2020, to Dec 31, 2020, along with time-series data. The coronavirus new cases and death cases series of all GCC nations collected from the Oxford Martin Programme on Global Development, which is a collaborative database of the University of Oxford researchers and Global Change Data Lab (Our World in Data Organization, 2020).

Table 1: Data Collection of GCC Shariah Indices.

Ticker	GCC Indices (S&P Domestic Shariah)	Data Source	Web Sources
SPSHDB HD	Bahrain	S&P Global	https://www.spglobal.com/spdji/en/indices/equity/sp-bahrain-domestic-shariah/#overview
SPSHD KWD	Kuwait	S&P Global	https://www.spglobal.com/spdji/en/indices/equity/sp-kuwait-domestic-shariah/#overview
SPSHD QAD	Qatar	S&P Global	https://www.spglobal.com/spdji/en/indices/equity/sp-qatar-shariah-domestic-price-index-in-us-dollar/#overview
SPSHD OMD	Oman	S&P Global	https://www.spglobal.com/spdji/en/indices/equity/sp-oman-domestic-shariah/#overview
SPSHDS AD	Saudi Arabia	S&P Global	https://www.spglobal.com/spdji/en/indices/equity/sp-saudi-arabia-domestic-shariah/#overview
SPSHD AAP	UAE	S&P Global	https://www.spglobal.com/spdji/en/indices/equity/sp-uae-domestic-shariah-liquid-35-20-capped-index/

Sources: Authors' estimates

3.2 Methods

In general, the movements of the GCC Shariah indices series are non-stationary, quite random, and not appropriate for the study purpose. The series of GCC Shariah are transformed into returns by using the following equation:

Where:

$$R_t = \text{Log} (P_t/P_{t-1}) * 100$$

R_t = the rate of return at time

P_t = the stock index at time t

P_{t-1} = the stock index just period to the t

ADF test: To check the stationary of data, then just go to used ADF test (Augmented Dickey-Fuller Test Statistic), Significance of ADF test, standardized that T-test statistic is more than the critical value and p-value is less than 5% (Irfan, 2017), ADF test is necessary to run before doing the Arch family model (Ibrahim, 2019).

$$\Delta y_t = \alpha + \gamma y_{t-1} + \sum_{i=1}^p \Delta y_{t-i} + \varepsilon_t$$

Where y_t is being tested series and γ_{t-i} is the 1st difference in the series. Therefore, $H_0: \gamma = 0$ and $H_1: \gamma < 0$, these hypotheses are respectively used as null and alternative that the series has a unit root, meaning that it is non-stationary when the ADF test vale is less that critical value (Irfan, 2016), (Enders, 1995).

TARCH Model: This is an extended model of the Garch model, here leverage effect of the bad and good news is analyzed. A Threshold-Garch model with an additional term added to account for possible asymmetries (Brooks, 2008) T-Garch model finds the negative correlation between the past returns and future volatility of the returns. Negative news will affect more than the good news concern Zakoian (1990) and Glosten et al (1993). T-Garch have divided into two parts, mean-variance and conditional variance, meaning that asymmetric response arrival of bad and good news (P.P. & Deo, 2013). The conditional variance is now given by:

$$\sigma_t^2 = \omega + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 + \sum_{i=1}^q \alpha_i u_{t-i}^2 + \sum_{k=1}^r \gamma_k u_{t-k}^2 I_{t-k}$$

4. Results and analysis

Tables 2: ADF Test of GCC Shariah Nation with Cov-NC, Cov-DC.

GCC Nation	Name of Variables	Level	t-test	P-value	coefficient	1% level	5% level	10% level
Bahrain	Bahrain Shariah Index	After 1st difference	-3.681	0.005	-0.078	-3.460	-2.874	-2.574
	Covid New Case (Cov-NC)		-13.507	0.000	-3.579	-3.460	-2.875	-2.574
	Covid Death Case (Cov-DC)		-13.966	0.000	-3.551	-3.460	-2.875	-2.574
Qatar	Qatar Shariah Index	After 1st difference	-14.960	0.000	-1.009	-3.461	-2.875	-2.574
	Covid New Case (Cov-NC)		-15.485	0.000	-1.720	-3.461	-2.875	-2.574
	Covid Death Case (Cov-DC)		-11.878	0.000	-2.737	-3.461	-2.875	-2.574
Kuwait	Kuwait Shariah Index	After 1st difference	-16.950	0.000	-1.137	-3.460	-2.874	-2.574
	Covid New Case (Cov-NC)		-10.083	0.000	-2.965	-3.461	-2.875	-2.574
	Covid Death Case (Cov-DC)		-11.075	0.000	-3.292	-3.461	-2.875	-2.574
Saudi Arabia	Saudi Arabia Shariah Index	After 1st difference	-17.458	0.000	-1.184	-3.461	-2.875	-2.574
	Covid New Case (Cov-NC)		-7.049	0.000	-0.910	-3.461	-2.875	-2.574
	Covid Death Case (Cov-DC)		-13.799	0.000	-2.382	-3.461	-2.875	-2.574
Oman	Oman Shariah Index	After 1st difference	-17.135	0.000	-1.149	-3.460	-2.875	-2.574
	Covid New Case (Cov-NC)		-5.247	0.000	-2.359	-3.461	-2.875	-2.574
	Covid Death Case (Cov-DC)		-11.857	0.000	-6.368	-3.461	-2.875	-2.574
UAE	UAE Shariah Index	After 1st difference	-7.854	0.000	-0.857	-3.457	-2.873	-2.573
	Covid New Case (Cov-NC)		-20.796	0.000	-1.276	-3.457	-2.873	-2.573
	Covid Death Case (Cov-DC)		-16.300	0.000	-1.728	-3.457	-2.873	-2.573

Sources: Authors' estimates

Table 2 shows that the values of the ADF test statistic, -32.8119 , is less than its test critical value, -3.4134 , at 5%, level of significance which implies that all variables are stationary after the 1st difference (Irfan, 2016). The outcomes of ADF test confirms that all GCC Shariah Indices returns series and Cov-NC, Cov-DC are also stationary, because the values of the ADF test statistic is less than its test critical value (Irfan, 2020). The study, which is, reflected the bubbles in the random walk of GCC stock markets, these bubbles are reflected due to the random walk of stock prices. (Manap, Turkhan Ali, Ali, & Azmi, 2014).

Figure 1: Residuals of GCC Shariah Nations.

In the non-linear model, the researcher will try to find out the Arch effect in the data. The volatility in the data will find the prolonged period of the low volatility and prolong period of high volatility in the data so that run the Arch family model (Brooks, 2008).

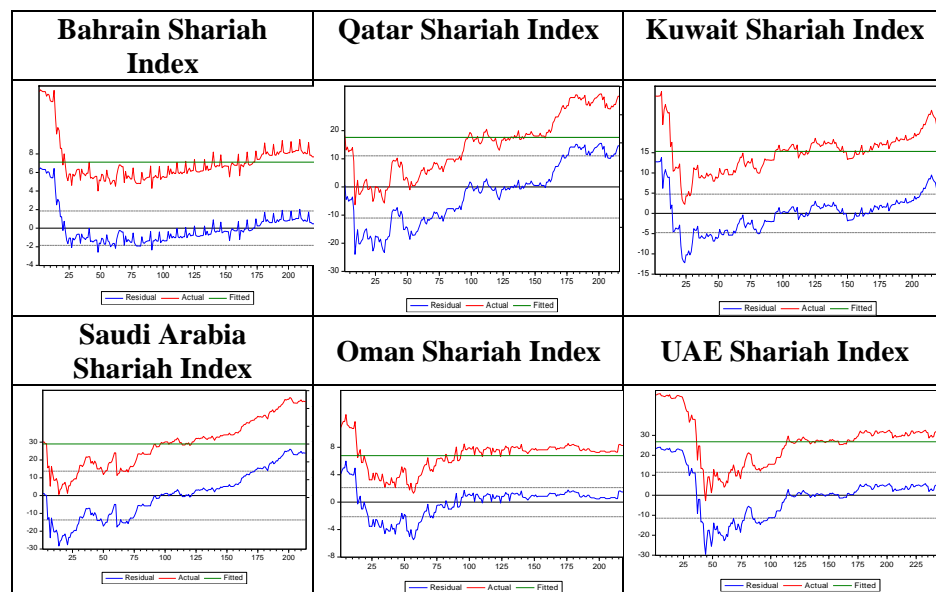


Figure 1 clearly shows that residuals of low volatility followed by another low volatility for a prolonged period, high volatility residuals are followed by high volatility for a prolonged period. The Arch effect in GCC Shariah indices, in the list of Bahrain, Kuwait, and Oman Shariah index have a prolonged period of low and prolog periods of high volatility. In the case of Qatar, Saudi Arabia, and the UAE Shariah index have a prolonged

period of high. Meaning that there is Arch effect on all six Shariah indexes of GCC countries from Jan-Oct 2020.

Table 3: Heteroscedasticity Test of Shariah Index of GCC Nation.

Bahrain	F-statistic	2591.82	Prob. F(1,219)	0.00
	Obs*R-squared	203.78	Prob. Chi-Square(1)	0.00
Qatar	F-statistic	1108.05	Prob. F(1,213)	0.00
	Obs*R-squared	180.33	Prob. Chi-Square(1)	0.00
Kuwait	F-statistic	1028.28	Prob. F(1,219)	0.00
	Obs*R-squared	182.20	Prob. Chi-Square(1)	0.00
Saudi Arabia	F-statistic	1979.59	Prob. F(1,211)	0.00
	Obs*R-squared	192.48	Prob. Chi-Square(1)	0.00
Oman	F-statistic	851.14	Prob. F(1,218)	0.00
	Obs*R-squared	175.14	Prob. Chi-Square(1)	0.00
UAE	F-statistic	2252.80	Prob. F(1,247)	0.00
	Obs*R-squared	224.40	Prob. Chi-Square(1)	0.00

Sources: Authors' estimates

Table 3, the output of Arch Model shows, Null hypothesis is there is no Arch effect, an alternative hypothesis is Arch effect. Therefore, P-value is less than 5% we fail to reject the null hypothesis, accept the alternative hypothesis there is an Arch effect in the GCC Shariah Countr

Table 4: TARCh Model of Covid19 and GCC Shariah Indices

Bahrain Shariah				Qatar Shariah			Kuwait Shariah			SA Shariah			Oman Shariah			UAE Shariah		
Variable	COEF	z-Stat	Prob.	COEF	z-Stat	Prob.	COEF	z-Stat	Prob.	COEF	z-Stat	Prob.	COEF	z-Stat	Prob.	COEF	z-Stat	Prob.
Conditional Mean Equation																		
C	15.99	191	0.00	173.2	624.8	0.00	56.82	390.1	0.00	146.6	254.3	0.00	51.43	817.3	0.00	128.7	333.8	0.00
Conditional Variance Equation																		
C	0.21	3.62	0.00	0.41	2.70	0.01	1.13	3.95	0.00	1.78	1.51	0.13	0.02	1.78	0.08	0.61	2.82	0.00
RESID(-1)^2	0.81	2.58	0.01	1.06	2.32	0.02	0.88	3.25	0.00	0.73	3.18	0.00	0.45	1.83	0.07	0.60	1.60	0.11
Cov-NC	0.01	2.49	0.01	0.00	-6.65	0.00	0.01	20.46	0.00	0.00	-4.85	0.00	0.00	-2.38	0.02	0.00	-2.42	0.02
Cov-DC	0.10	2.62	0.01	0.01	0.14	0.06	-0.02	-0.38	0.70	0.55	20.06	0.00	0.01	1.01	0.31	-0.52	-4.47	0.00
Log likelihood			-294.6			-685.99			-505.43			-692.82			-290.11			-752
Akaike info criterion			2.717			6.417			4.616			6.540			2.689			6.072
Schwarz criterion			2.825			6.526			4.724			6.650			2.796			6.171
Hannan-Quinn criter.			2.761			6.461			4.660			6.585			2.732			6.112

Table 4, An outcome of the TARARCH model represents that the terms, C , are statistically significant in all the indices in conditionally mean equations. The variance equation describes that the $\text{RESID}(-1)^2$, which are statistically significant in All GCC Shariah Indices, implies that past volatility of All GCC Shariah indices is significantly not influencing current volatility. T-GARCH model is also confirming the coefficient positive significance at the 5% level (Sayed & Auret, 2020). The analysis shows that there is a negative leverage effect of bad news has more than the impact on conditional variance than good news. Here, GCC Shariah Indices are impacted due to coronavirus (Covid- New cases, Covid death cases) news spread in the market. Another diagnostic analysis is based on the different criteria like Akaike info criterion (AIC), Schwarz criterion (SIC), and Hannan-Quinn criteria (HQC), all these criteria have lowered the value better will result meaning that Bahrain, Kuwait, Oman Shariah indices are lower values in comparison to the higher values of Qatar, Saudi Arabia, and UAE Shariah indices. At-last T-GArch model is more suitable for Bahrain, Oman, and Kuwait Islamic indices (Nurdany, Ibrahim, & Romadoni, 2021).

4.1 Robustness test of Diagnostic Parameter of Best Fitted T-Garch Model

Now the question is: What about the diagnostic checking of these TARCH models? Before considering, the best-fitted model out of all variables. Investigator verified the diagnostic checking based on three points.

- First, there is no Serial Correlation. Second, Third, there is no ARCH effect.

-

Table 5: Diagnostic Statistics of GCC Shariah Indices, Cov-NC, and Cov-DC

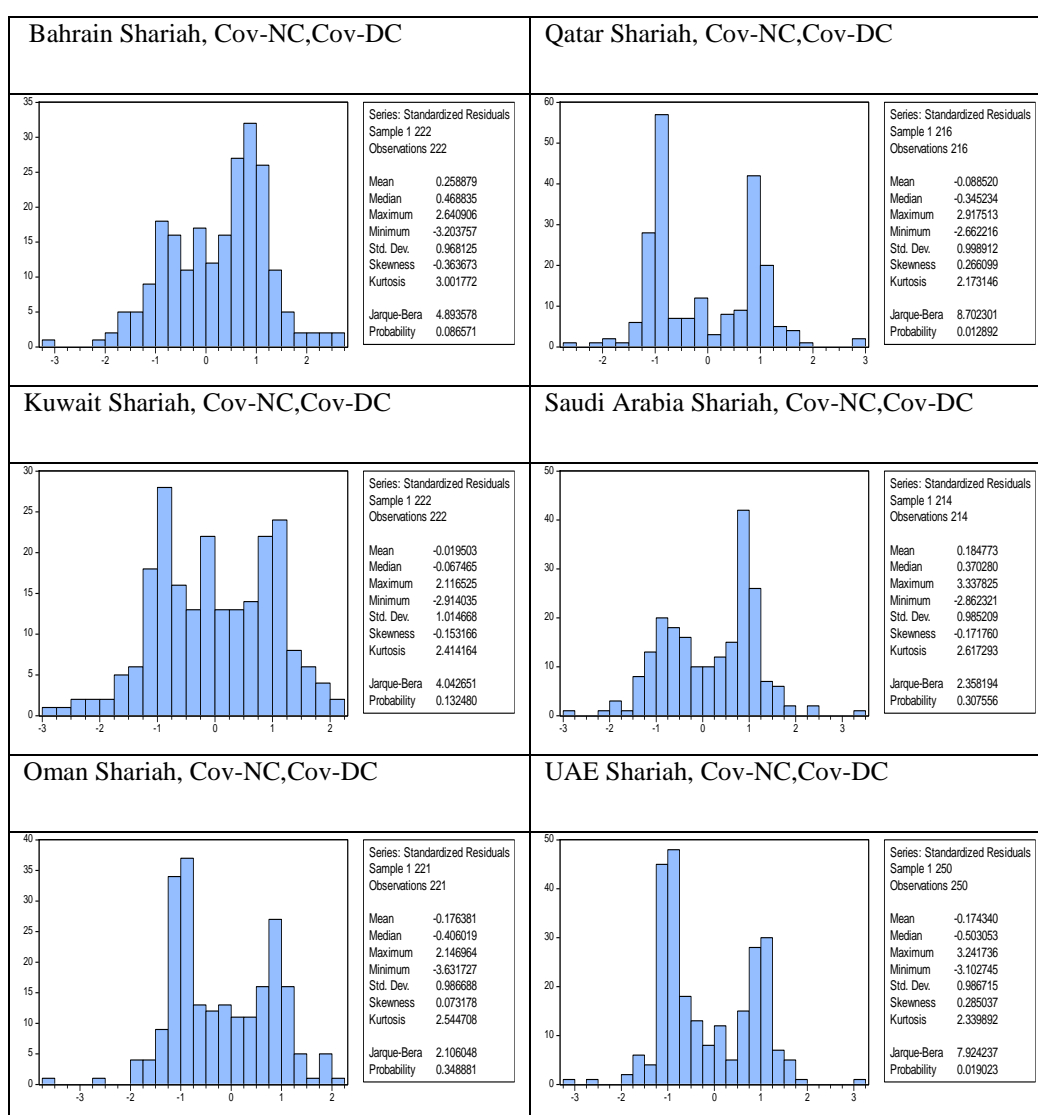
Diagnostics Test	Serial Correction		Heteroscedasticity	
	Q-Stat	Prob.	F-Statistics	P-value
Bahrain	1.650	0.199	1.619	0.205
Qatar	0.947	0.331	0.928	0.336
Kuwait	1.464	0.226	1.436	0.232
Saudi Arabia	0.904	0.951	0.004	0.952
Oman	1.499	0.473	0.000	0.999
UAE	0.045	0.832	0.044	0.834

Sources: Authors' estimates

Table 5, Correlogram of Q-statistic standardized residual squared, Null hypothesis- there is no serial correlation in the residuals of P-value is more than 5%. Researchers accept the null hypothesis, meaning that there is no serial correlation in residuals of the TARCH model, now the researcher happy about it because diagnostic point no. one is fulfilling the condition with lag 36. ARCH effect.

The researcher has used the ARCH LM model to check the diagnostic point number two null hypothesis: there is no ARCH effect, which is desirable. Here the observed P-value is (.205), meaning that which is more than 5%. So cannot reject the null hypothesis rather accept the null hypothesis. Therefore, in this model, there is no ARCH effect this is also a happy situation.

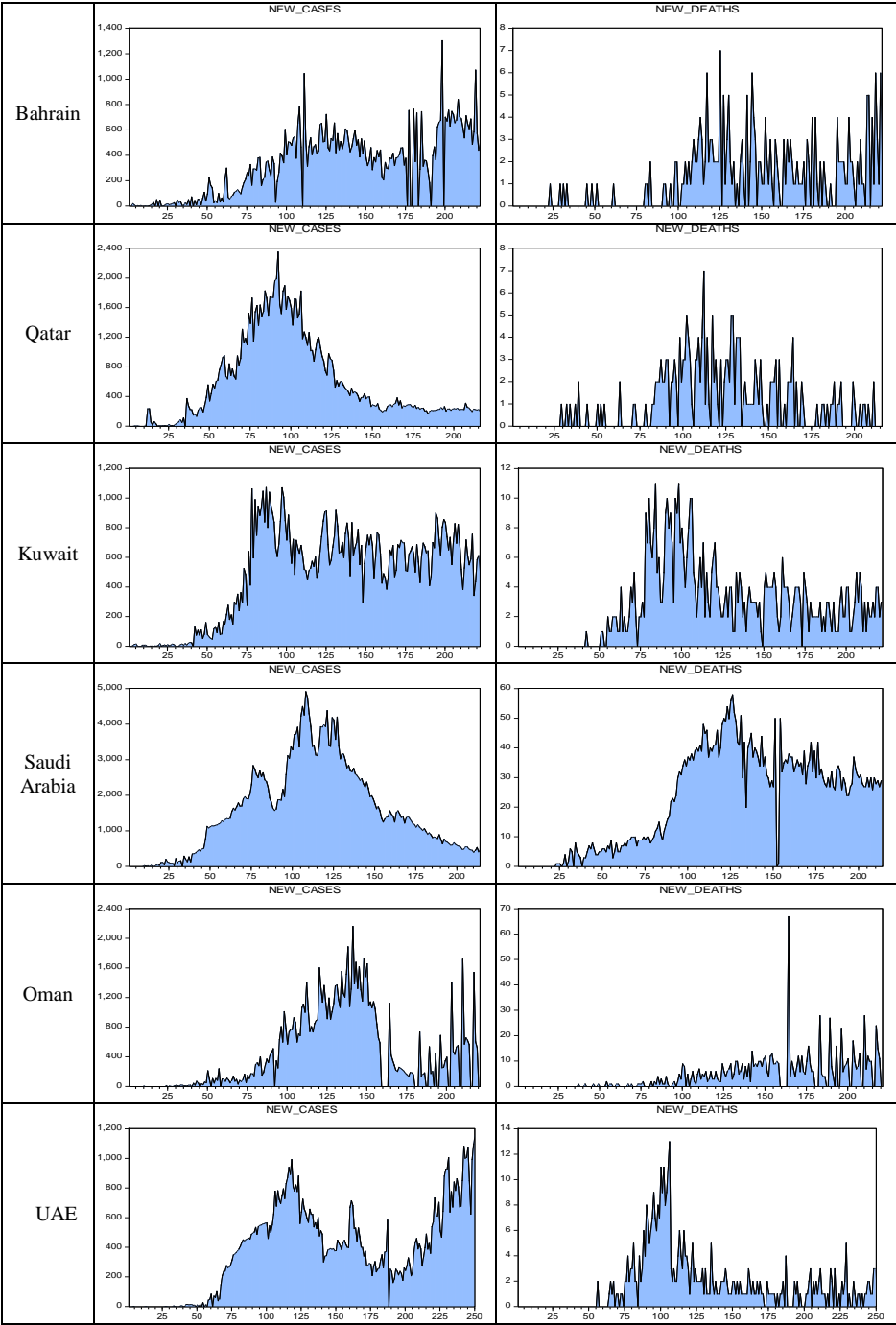
Figure 2: Normal Distribution on GCC Shariah Nation, Cov-NC, and Cov-DC



Hence this model has no serial correlation also this model has no ARCH effect so investigator is happy about it but residuals are not normally distributed so the researcher is not happy about it. However, many economists say so that all though the residuals are not normally distributed we can accept the model. This model has two good things, there is no serial correlation and there is no ARCH effect. So, we can say that a TARCH model is best fitted for the GCC Shariah indices, Cov-NC, and Cov-DC.

This is the last point of diagnostic checking of the best-fitted model in TARCH of GCC Shariah indices. This researcher check will whether the residuals are normally distributed or not? Null hypothesis: residuals are normally distributed, which is desirable. Here the P-value is (0.001992) which is less than 5%, accept the null hypothesis, meaning that residuals are not normally distributed. Here, the P-values of Bahrain, Qatar, UAE are respectively, (0.0995, 0.0128, 0.0190) less than 10%, all three Shariah indices are not normally distributed, which will be not good for the results but P-values of Kuwait, Saudi, Oman Shariah indices are (0.1324, 0.3075, 0.3488) more than 5%, meaning that residuals are normally distributed.

Figure 3: Line Diagram GCC Nations Cov-NC, and Cov-DC



These line diagrams related to the corona new cases and corona death cases from Jan 2020 to Oct 2020 of Gulf cooperation council (GCC) Countries Shariah indices like Bahrain, Qatar, Kuwait, Oman, Saudi Arabia, and UAE.

5. Conclusions

In this study, the TARARCH model is used to forecast the volatility of the GCC Shariah indices along with Cov-NC and Cov-DC. Time-series data were used from Jan 1, 2020, to Dec 31, 2020. ADF test was applied for checking the stationary in the data. The results of the TARARCH model on Bahrain, Kuwait, Oman, and UAE was positive coefficient along with 5% and 10% level of significance. Meaning that there is the effect of negative news of Cov-NC and Cov-DC on the GCC Sharia nations. The outcomes of the TARARCH model in Qatar and Saudi Arabia were negative coefficients along with insignificant levels. Meaning that there is no effect of negative news of Cov-NC and Cov-DC on the GCC Shariah Nations. The study reflected that there exists a tipping point of the finance-growth relationship. Results of the same for this study, there is threshold level results in deceleration of economic growth as excess finance is undesirable (coronavirus) in OECD countries (Manuswamy & Swamy, 2020). It is because of the relaxation added to unlock down policy by the GCC Nations government. The unprecedented pandemic has already brought a number of challenges to the world. Saudi Arabia and Qatar are less unaffected by Coronavirus. In brief, the results conclude that the Coronavirus outbreak has affected Bahrain, Kuwait, Oman, and UAE Shariah prices and increased the volatility in the four countries out of Six GCC Nations and affect the financial system. GCC government will provide the loan facilities to the small business and restructure the debt recovery police for the creditors (Hidayat, Farooq, & Alim, 2020). Policies related to liquidity support will double. Tourism industries are exempted from duties and levies for 3-6 months. Another, all industrial land rental should be exempted for the 3 months. Payment of all types of loans should be deferred from 3-6 months. Small and medium enterprises are exempted to be tenants. GCC Nation moreover based on the Oil with macro financials (Manap, Turkhan Ali, Ali, & Azmi, 2014). Industrialists observed that GCC indices are more performance in comparison to the GCC Islamic indices in 2019 respectively 8.6% and 10.06% annually. The P/E ratio of GCC Countries is 18.22 in comparison to the GCC Islamic indices is 24.50 till the date of September 2020. The beta of GCC

countries is 1, in opposition to the 1.1 of GCC Islamic (MSCI Inc., 2020). The practitioner is following the projected Price-earnings ratio of GCC Shariah indices, which is 24.13 trailing to 23.36, it shows that GCC Shariah is the fast recovery from the coronavirus effect (S&P Dow Jones Indices LLC, 2020). GCC Composite Shariah has reported that 9.82% annualized returns even though the world facing the coronavirus economic downfall. It also measured that 39.82% rose GCC Shariah indices since March-October 2020 (S&P Dow Jones Indices, 2020). Gulf Investment Corporation (GIC) said its Shariah-compliant investment vehicle, The Gulf Islamic Fund, ranked first among Shariah-compliant funds investing in the GCC with a 24.6 percent return.

No doubt, Covid19 has an impact on economies and all sectors. It investigates the diversification of the supply chain and finds new opportunities for the end-user will the product and services in the crisis. Ultimately, survival is the issue in the covid19 because it will constant alive for at least five to ten years with us. We will find a way to live with this disease name is a noble coronavirus (Research and Markets, 2020). This paper provides some useful inferences to the GCC Countries designing their financial development strategies and it will be helpful for the industrialist, academicians, practitioners, investors, and regulators.

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