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Does the Covid-19 pandemic affect faith-based investments? Evidence from global sectoral indices

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ABSTRACT

In this paper, we aim to investigate the influence of the Covid-19 on the behavior of the S&P 1200 Shariah and non-Shariah sectoral indices over the period from 1st October 2010 to 29th October 2020. We contribute to the global literature by examining the financial impact of the Covid-19 on the Shariah and non-Shariah sectoral indices. We find that the S&P 1200 Shariah Communication, consumer staples, financials, healthcare, industrials, IT, materials, and utility sectors earn higher average returns than their counterpart sectoral indices during the Covid-19 period. The study reports that on average, the volatility of the Shariah indices is less than their counterpart indices. Moreover, we further document that on average the S&P Shariah sectoral indices offer a higher return with low risk even during the Covid-19 global pandemic. We suggest that ethical investments are the best alternatives to retail, institutional, and foreign investors.

1. Introduction

After the World Health Organization declared COVID-19 as a global pandemic that will create drastic effects beyond public health (influence expansion into economics, politics, finance, etc). The necessary public health mandates and initiatives taken are met with the high opportunity cost of the slow down and/or halt of businesses from the local scale to global scale. Capital markets have responded adversely to the new Coronavirus pandemic with unpredictability drops and high volatility due to the panic-sold out by the investors. The average cases and deaths of the Covid-19 are 1144 and 26 from 31 December 2019 to 12 December 2020. We contribute to the global literature by examining the financial impact of the Covid-19 on the Shariah and non-Shariah sectoral indices. We find that the S&P 1200 Shariah Communication, consumer staples, financials, healthcare, industrials, IT, materials, and utility sectors earn higher average returns than their counterpart sectoral indices during the Covid-19 period. The study reports that on average, the volatility of the Shariah indices is less than their counterpart indices. Moreover, we further document that on average the S&P Shariah sectoral indices offer a higher return with low risk even during the Covid-19 global pandemic. We suggest that ethical investments are the best alternatives to retail, institutional, and foreign investors.
stocks) recorded higher stock returns during the pandemic period (Singh, 2020). For instance, Sherif (2020) reports that the Covid-19 insignificantly interacts with the Dow Jones Islamic index for the study period. Moreover, the government also has taken multiple policies such as stimulus packages, travel bans, and lockdowns to regulate and stabilize the crisis. As a result, the stock markets reacted positively to the government stimulus schemes in the G7 countries (Narayan et al., 2020). Nonetheless, many stocks are affected by the panic selling pressure of investors with fear during the Covid-19. For instance, petroleum, real estate, entertainment, and hospitality sectors have fallen and earned negative returns in the same period (Mazur et al., 2020). However, previous studies examined the impact of the Covid-19 on the risk and return at the stocks and indices levels. Many studies focused on the common sectoral stocks to examine the impact of the Covid-19 on the stock returns. Further, a few studies tested the influences of the Covid-19 on faith-based investment. Therefore, the present study motivates us to examine the influences of the recent Covid-19 on the faith-based sectoral indices and their counterpart indices over the period from 1st October 2010 to 29th October 2020. Additionally, the study tries to divide the study period into the overall and the pandemic period and investigates the behavior of the indices for the same period. In particular, we test whether the S&P Global 1200 Shariah sectoral indices outperform their counterpart indices during the recent pandemic period.

Faith-based stocks are screened by the Rating Intelligence Partners (RI) based on sector-based screens and accounting-based screens. Under business sector-based screens, the companies are not allowed in the business of advertising, media & entertainment, alcohol, financial, gambling, pork-related activities, pornography, tobacco, and trading of gold and silver as cash on a deferred basis. After screening the companies with sector-based screens, the remaining companies are screened with accounting-based screens. The accounting-based screens are (1) debt / market value of equity (36 months average) < 33%, (2) accounts receivables / market value of equity (36 months average) < 49%, cash and interest-bearing securities / market value of Equity (36 months average) < 33%, and non-permissible income other than interest income / revenue < 5% (source: S&P Global). Further, Islamic Finance Development report forecasts that the global Islamic finance assets grow at a rate of 14% per annum and are expected to reach USD 3.69 trillion by 2024.

The remaining paper is classified as follows: part 2 explores the review of the literature and part 3 aims to explore the data source and explain the suitable model of the study. Part 4 interprets the results with theoretical implications. Part 5 concludes our results and contribution.

2. Literature review

COVID-19 is a hot topic in literature nowadays, and the stream of research of the pandemic and its effects is growing by day. In finance and economics, much of the contemporary research is compared to previous recessions. Some of the contemporary research has found that the daily growth rate in the number of confirmed and deceased cases of the Covid-19 virus is negatively associated with the stock returns in the Chinese stock markets (Al-Awadhi et al., 2020). This holds a contagion effect and rolls into capital markets of other nations. In this context, Salisu and Vo (2020) documented that Covid-19 health news negatively and significantly affects the stock return of the top-20 affected countries during the pandemic. Cao et al. (2020) analyzed the effects of Covid-19 on the 14 stock market indices over the period from January 21, 2020, to June 30, 2020, using a panel data model and found that the stock market indices negatively responded to the Covid-19 cases during the study period. Similarly, Ashraf (2020) examined the response of the 64 stock markets due to the Covid-19 pandemic over the period from January 21, 2020, to April 17, 2020, and found that stock markets responded negatively to the growth rate in the number of confirmed cases and growth rate in the number of death of the Covid-19 pandemic. Further, Goodell and Goutte (2021) found a strong negative co-movement between bitcoin and Covid-19 using wavelet coherence analysis from 31st December 2019 to 29th April 2020.

Additionally, Ali et al. (2020) found evidence that the volatility of the US, UK, Germany, and South Korea markets increased due to the Covid-19. Similarly, Baig et al. (2020) observed evidence of the high volatility and illiquidity of the US markets due to the increase in the confirmed and deceased cases of Covid-19 during the pandemic period. Likewise, Mendez and Arias (2020) observed a high herding behavior in France, Germany, Italy, Spain, and UK markets from January to June 2020 in the European region. Further, Bai et al. (2020) supported that the volatility of the US, UK, Japan, and China markets has been increased due to the Covid-19 disease during the study period. Just and Echaust (2020) investigated the relationship between the US S&P500 stock returns and implied volatility, implied correlation, and liquidity during the Covid-19 period. They employed the two-regime Markov switching model and found that the S&P500 returns closely associated with implied volatility and implied correlation.

Thus far, the pandemic has affected the oil market more than the equity market (Salisu et al., 2020). Gharib et al. (2020) examined the impact of the Covid-19 on the causal relationship between crude oil price and gold price over the period from January 4, 2020, to May 4, 2020. They found that a bilateral contagion effect on oil and gold prices during the recent pandemic period.

Previous studies reported that the volatility of the global markets has been increased. In this context, the retail investors have sold-out the stocks with fear in the market. To support the evidence, Huo and Oiu, 2020 reported that the overreaction of the stocks due to the Covid-19 lockdown is stronger for the stocks with lower institutional investors holdings in China. On contrary, Ortmann et al. (2020) found that the trading activities of the investors have been increased by 13.9% when the Covid-19 cases increased during the pandemic period.

However, a few studies support that some sectors and faith-based stocks outperform and earn a positive return during the pandemic period. In this context, Mazur et al. (2020) examined the performance of the S&P 500 stocks during Covid-19 and found that the stocks belong to the natural gas, healthcare, food, and software sectors earn high positive returns, whereas the stocks belong to the real estate, petroleum, entertainment, and hospitality earn negative returns. Similarly, Singh (2020) explored the return spillover effects of the three different investment strategies and found that the capital flowing away from the defensive and EAFE portfolios to the ESG portfolio during the Covid-19 period. Likewise, Mirza et al. (2020) investigated the impact of Covid-19 on different types of actively
managed funds in Europe and found that the social entrepreneurship funds outperformed well their counterparts during the pandemic period. Besides, Narayan et al. (2020) documented that government response due to the Covid-19 positively affects the stock markets in the G7 countries. Interestingly, Sherif (2020) investigated the impact of Covid-19 on faith-based investment using daily data over the period from January 20, 2020, to May 20, 2020, and found that Covid-19 strongly associated with the conventional stock market index. Further, the study found that the Covid-19 does not affect the Dow Jones Islamic index, and the IT sector earns a higher return than the market counterpart.

Further, Chowdhury et al. (2021) find that Islamic markets outperform their counterparts during the Covid-19 period. Umar and Gubareva (2021) support that faith-based investment provides attractive hedging opportunities to investors during the Covid-19 period. Similarly, Arif et al. (2021) document that Islamic stocks are the safe-haven assets for the G7 stock markets during the Covid-19 pandemic period. Hassan et al. (2021) empirically report that sovereign bond indices are the strongest safe-haven during the recent crisis period in GCC markets. However, Abdullahi (2021) reports that the volatility of Islamic and the common indices is the same during the Covid-19 period.

Prior studies have thoroughly investigated the effect of the Covid-19 on the stock markets. However, a few pieces of research have been conducted to explore the impact of the Covid-19 on faith-based investments. For instance, Chowdhury et al. (2021); Umar and Gubareva (2021); Abdullahi (2021), and Arif et al. (2021) used the Shariah indices and examined the impact of the Covid-19 on the Shariah stock returns. Most of the studies consider the core Shariah indices to examine the impact of the Covid-19 on the returns. But the present study considers both Shariah and non-Shariah sectoral indices. Therefore, we aim to examine the risk and return behavior of the S&P 1200 Global Shariah and non-Shariah sectoral indices over the period from 1st October 2010 to 29th October 2020. This study tries to investigate the effect of the recent Covid-19 pandemic on the performance of the faith-based and their counterpart sectoral indices.

3. Data and methodology

We use time-series data (Table 1) of daily S&P 1200 Shariah and non-Shariah sectoral indices (retrieved from S&P Dow Jones Indices website), from 1st October 2010 to 29th October 2020. We winsorized the outliers of the indices at the bottom 1% and the top 1% of the observation. Then, the daily values of the indices are converted into the returns using Eq. 1.

\[ R_t = \ln \left( \frac{P_t}{P_{t-1}} \right) \times 100 \]  

(1)

Where \( R_t \) is the return of the S&P 1200 sectoral indices on day \( t \), \( P_t \) is the price of the indices on day \( t \), and \( P_{t-1} \) is the price of the indices on day \( t-1 \). Initially, we check the stationarity of the return series of the indices and find that the return series is stationary at level. Next, to examine the impact of the Covid-19 on the return of the sectoral indices, we frame the following equation.

\[ R_t = \alpha + \beta_{\text{Covid19}} + \varepsilon_t \]  

(2)

Where \( R_t \) stands for the returns of the sectoral indices, \( \alpha \) is the intercept of the model and represents the average return of the index during the non-Covid-19 period. The \( \beta_{\text{Covid19}} \) is a slope of the model and explains the average return of the Covid-19 period over and above the non-Covid-19 period return. Covid19 is a dummy variable that takes value 1 during the Covid-19 pandemic period and 0 otherwise. The study considers the Covid-19 pandemic period from 1st January 2020 to 29th October 2020. Next, we employ the Fama and
Fama and French (2015) five-factor model to investigate whether the S&P 1200 sectoral Shariah indices yield an abnormal return over the S&P 1200 sectoral common indices during the study period. Fama and French (2015) claim that the five-factor model is superior to the three-factor model proposed by them in early 1993. We apply the same model to our data set as below;

\[ R_t = \alpha + \beta_1 (R_{M_t} - R_{F_t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \varepsilon_t \]  

(3)

Where \( R_t \) is the return of the index, and \( \alpha \) represents the intercept of the model and explains the abnormal return of the index. The \( \beta_1 \) is the coefficient of the market factor that explains the systematic risk of the index. The market factor is created by taking the return difference between the market return and the risk-free rate of return. The \( \beta_2 \) is the coefficient of the size factor (SMB) that represents the return difference between the stocks with small market capitalization and the stocks with high market capitalization. The \( \beta_3 \) stands for the coefficient of the value factor (HML) that is the return difference between the stocks with high value and the stocks with low value. The \( \beta_4 \) explains the coefficient of the profitability factor (RMW) that is the difference in the returns between robust stocks and weak stocks. The \( \beta_5 \) reveals the coefficient of the investment factor (CMA) that is the difference between the returns of the conservative stocks and aggressive stocks. The factor variables such as market, size, value, profitability, and investment factors are extracted from Kenneth R. French’s data library. Additionally, we examine the impact of the Covid-19 on the return of the S&P 1200 Shariah and non-Shariah sectoral indices using the Fama and French (2015) five-factor model. The study employs the following model by incorporating the dummy variable;

\[ R_t = \alpha + \beta_1 (R_{M_t} - R_{F_t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_5 CMA_t + \beta_6 Covid19_t + \varepsilon_t \]  

(4)

Where \( \beta_6 \) stands for the coefficient of the Covid-19 dummy variable that takes value 1 during the Covid-19 pandemic period and 0 otherwise. Moreover, we examine the impact of the Covid-19 pandemic on the volatility of the indices using the Autoregressive Conditional Heteroskedastic (ARCH) and Generalised Autoregressive Conditional Heteroscedastic (GARCH model). The ARCH model proposed by Engle (1982) defines that the predicted variability of the stock return depends on its own squared lagged error terms. However, Bollerslev (1986) suggested the generalized version of the ARCH model and empirically documents that the predicted conditional variance of the stock return is a function of its own lagged error terms (\( \varepsilon_t^2 \)) and lagged conditional variance (\( h_t^2 \)). Moreover, Bollerslev et al. (1992) suggested that the GARCH (1,1) model is an excellent model for a wide range of financial data. Accordingly, we try to examine the influences of the Covid-19 pandemic on the volatility of the S&P 1200 Global Shariah and non-Shariah sectoral indices using the following GARCH (1,1) model.

\[ R_t = \alpha_0 + \beta_1 R_{t-1} + \beta_2 \varepsilon_{t-1} + \varepsilon_t \]  

(5)

\[ \varepsilon_t \sim (0, \sigma_t^2) \]

\[ h_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_2 h_{t-1}^2 + \lambda Covid19 + \nu_t \]  

(6)

Where \( R_t \) is the return of the index at the time \( t \), \( R_{t-1} \) is the previous day return of the index, and \( \varepsilon_t \) is the error term of Eq. 5. The \( h_{t-1}^2 \) is the conditional volatility of the model. Further, the model assumes that the coefficient \( \alpha_0 > 0, \alpha_1 > 0, \beta_1 > 0, \) and \( \alpha_1 + \beta_1 < 1 \). Moreover, the sum of the ARCH and GARCH coefficient (\( \alpha_1 + \beta_1 \)) indicates the persistence of the volatility of the indices in the future.

### Table 2

Summary statistics for the overall period.

| Sector          | Mean  | Max   | Min   | SD    | Skew | Kurt | JB   | Obs  |
|-----------------|-------|-------|-------|-------|------|------|------|------|
| Communication   | 0.017 | 2.181 | −2.455| 0.786 | −0.218| 4.03 | 135.60| 2623 |
| Consumer Disc.  | 0.051 | 2.431 | −2.740| 0.850 | −0.341| 4.52 | 303.52| 2623 |
| Consumer Staples| 0.026 | 1.816 | −2.257| 0.662 | −0.341| 4.40 | 265.12| 2623 |
| Energy          | −0.009| 3.516 | −3.767| 1.236 | −0.121| 4.27 | 182.83| 2623 |
| Financials      | 0.022 | 3.089 | −3.152| 1.004 | −0.204| 4.66 | 318.61| 2623 |
| Health Care     | 0.043 | 2.256 | −2.605| 0.802 | −0.347| 4.32 | 243.32| 2623 |
| Industrials     | 0.032 | 2.577 | −2.886| 0.880 | −0.314| 4.60 | 323.87| 2623 |
| IT              | 0.066 | 3.009 | −3.378| 1.006 | −0.368| 4.80 | 413.47| 2623 |
| Materials       | 0.016 | 3.000 | −3.028| 1.031 | −0.118| 3.97 | 109.12| 2623 |
| Utilities       | 0.013 | 2.159 | −2.774| 0.796 | −0.455| 4.56 | 356.02| 2623 |
| Shariah         | Mean  | Max   | Min   | SD    | Skew | Kurt | JB   | Obs  |
| Communication   | 0.017 | 2.698 | −2.760| 0.889 | −0.118| 4.30 | 189.71| 2623 |
| Consumer Disc.  | 0.049 | 2.416 | −2.771| 0.840 | −0.358| 4.51 | 305.09| 2623 |
| Consumer Staples| 0.031 | 1.829 | −2.131| 0.675 | −0.272| 4.06 | 154.40| 2623 |
| Energy          | −0.012| 3.864 | −3.963| 1.293 | −0.117| 4.48 | 243.94| 2623 |
| Financials      | 0.068 | 3.150 | −3.544| 1.067 | −0.273| 4.55 | 294.84| 2623 |
| Health Care     | 0.040 | 2.274 | −2.489| 0.791 | −0.280| 4.21 | 193.39| 2623 |
| Industrials     | 0.040 | 2.691 | −2.933| 0.917 | −0.295| 4.52 | 292.22| 2623 |
| IT              | 0.066 | 3.009 | −3.378| 1.031 | −0.348| 4.68 | 360.65| 2623 |
| Materials       | 0.016 | 2.885 | −2.930| 0.996 | −0.122| 4.03 | 121.96| 2623 |
| Utilities       | 0.022 | 2.037 | −2.278| 0.783 | −0.169| 3.52 | 41.76 | 2623 |

Note: Jarque-Bera is highly significant at the 1% level for the indices.
period. Besides, the size of the ARCH and GARCH coefficients measure the short-run prediction of the volatility of the return. The large GARCH coefficient indicates that the volatility of the return is persistent and the shocks to the conditional volatility take a long time to die out in the markets. The ARCH coefficient indicates that the volatility of the return responses according to the market reaction. Additionally, the \( \lambda \) represents the coefficient of the Covid-19 dummy variable and measures whether the Covid-19 pandemic affects the volatility of the S&P 1200 Global Shariah and non-Shariah indices over the study period.

4. Empirical results and discussion

4.1. Summary statistics

This section reports the summary statistics of the S&P 1200 Shariah and Non-Shariah sectoral indices over the period from 1st October 2010 to 29th October 2020. The results are presented in Tables 2 and 3. Further, the data period is divided into two parts as the overall period and the covid-19 period. We consider the Covid-19 period that covers from 1st January 2020 to 29th October 2020. Table 2 reports the summary statistics of the S&P 1200 Shariah and non-Shariah indices for the overall period. The results show that the S&P 1200 IT sector provides a higher return of 0.066 % with a standard deviation of 1.006 %, whereas the energy sector earns a lower return of -0.009 % with a standard deviation of 1.236 %. Since the government and business organizations have advised their employees to work from home, the IT sector efficiently yields a positive return. In contrast, the S&P 1200 Shariah financial sector earns a higher average return of 0.068 % with a standard deviation of 1.076 %. Further, the S&P 1200 Shariah consumer staples, financials, industrial, and utility indices provide higher returns than their counterpart indices during the overall period. The value of the skewness is negative, and the kurtosis is more than 3 for the indices. Further, the JB test is highly significant at the 1% level. It shows that the return series is not normally distributed over the study period.

Table 3 reveals the results of the S&P 1200 Shariah and non-Shariah sectoral indices during the Covid-19 period. The period starts from 1st January 2020 to 29th October 2020. The results report that the S&P 1200 consumer discretionary sector earns a higher return than other sectors during the Covid-19 period. Further, Communication, consumer discretionary, industrial, IT, and material sectors yield the positive average returns, whereas consumer staples, energy, financial, healthcare, and utilities sectors provide the negative average returns during the recent pandemic period. Besides, Table 3 reveals an interesting observation that the S&P 1200 Shariah Communication, consumer staples, financials, healthcare, industrials, IT, materials, and utilities sectors earn positive and higher average returns than their counterpart sectoral indices during the Covid-19 period. Moreover, the standard deviations of the Shariah healthcare, industrials, IT, materials, and utility indices are lower than their counterpart indices for the pandemic period. Finally, the results of Table 3 evidence that the Shariah sectoral indices outperform their counterpart indices during the world Covid-19 pandemic period. Based on the results, we suggest that ethical investment or Shariah investment is one of the safest investment alternatives to the retail and institutional investors in the world capital markets.

4.2. Test for equality of means and variances

Next, we test for the equality of means and variances of the S&P 1200 non-Shariah and Shariah indices during the overall and the Covid-19 pandemic periods. The results of Table 4 show that the means difference between the sectoral indices is insignificant for the overall and pandemic periods. Further, we observe that the variances are statistically different for the communication, energy,
financials, industrials, materials, and utility sectors. It infers that even the returns are not statistically significant, but the risk is minimized for the selected Shariah sectoral indices. In another way, we evidence that Shariah investments offer the lowest risk at the same level of returns in the global market. Further, the results confirm that ethical investment provides an opportunity for global investors to diversify their overall portfolio risk.

4.3. Covid-19 and the returns of the S&P 1200 Shariah and non-Shariah indices

Table 5 reports the results of the regression model with the Covid-19 dummy variable that examines the impact of the Covid-19 on the returns of the S&P 1200 Shariah and non-Shariah indices. The results show that the dummy coefficient of the S&P 1200 communication, consumer discretionary, IT, and materials sectors are positive and indicate that these sectors are not affected much and earn higher returns during the Covid-19 period. In the case of Shariah indices, the coefficient of the S&P 1200 Shariah communication, consumer discretionary, financials, IT, materials sectors are positive and earn higher returns during the pandemic period. Also, the results indicate that the energy sector is heavily affected during this period. Further, the study reports evidence that the Shariah sectoral indices earn a higher return than their counterpart indices during the study period. The overall results reveal that ethical investment like shariah based investment is one of the best alternatives to global investors to maximize the return and diversify the risk.

4.4. Fama and French (2015) five-factor model and the S&P 1200 Shariah and non-Shariah sectoral indices

This section reports the results of the Fama and French (2015) five-factor model that is applied to examine the performance of the S&P 1200 Shariah and non-Shariah sectoral indices over the study period. Fama and French (2015) report that the five-factor model is superior to their three-factor model. Hence, we apply this model and the results of the model for the non-Shariah sectoral indices are presented in Table 6. The estimated results show that the intercepts of the communication and energy sectors are negatively significant and suggest that asymmetric information exists in these sectors. Further, the market risk factor is positive and highly significant for all sectoral indices. Besides, the size, value, profitability, and investment factors are positively significant for some sectors and negatively significant for the rest of the sectors. It shows that the five-factor model explains the variation of the returns of the S&P 1200 sectoral indices over the study period.

Table 7 presents the results of the five-factor model for the S&P 1200 Shariah sectoral indices over the period from 1st October 2010 to 29th October 2020. The results show that the intercept is insignificant for all Shariah sectoral indices except the energy sector. We infer that information symmetry exists in the Shariah indices except for the energy sector. Further, the market risk factor of Shariah communication, consumer staples, healthcare, materials, and utility sectors are lower than their counterpart’s sectoral indices. This shows that investors may rebalance their portfolios by considering the Shariah sectoral stocks that provide a lower risk at a given level of return. Also, the coefficients of the size, value, profitability, and investment factors are significant and confirm that the five-factor model explains the variation of the sectoral indices during the study period. Table 6 and Table 7 reveal that the Shariah sectoral indices offer better returns at lower risk for the investors.

4.5. Covid-19 and five-factor asset pricing model

This section investigates the impact of the Covid-19 on the returns of the S&P 1200 Shariah and non-Shariah sectoral indices over the period from 1st October 2010 to 29th October 2020. We consider the Covid-19 period from 1st January 2020 to 29th October 2020 and assign a dummy variable 1 for the Covid-19 pandemic period and 0 otherwise. The study estimates the five-factor asset pricing model with the Covid-19 dummy and reports the results in Tables 8 and 9. The results of Table 8 show that the intercepts of the non-Shariah indices are insignificant for all indices except for the communication and energy sectors. Further, the coefficients of the Covid-19 dummy variable are negative and statistically significant for the consumer staples, energy, financials, healthcare, industrials, IT,
and utilities sectoral indices. We can assume that Covid-19 affects these sectors negatively. Therefore, we suggest the investors keep away from these sectors during the pandemic period.

Table 9 presents the results of the five-factor model with a dummy variable for the S&P 1200 Shariah sectoral indices. The results reveal that the intercepts are statistically insignificant except for the energy sector. Also, the coefficients of the Covid-19 dummy variable are negative and statistically significant for the consumer staples, energy, healthcare, industrials, and IT and indicate that these Shariah sectoral indices are affected negatively during the pandemic period. Further, the study finds that the coefficient magnitude of the Shariah sectoral indices is lower than their counterpart indices. It confirms that the Shariah sectoral indices are affected less than their counterpart indices during the Covid-19 period. Therefore, we suggest the investors to consider the Shariah stocks to maximize the returns and minimize the risk of the portfolios even during the crisis and the pandemic periods.

| Variable          | Non-Shariah Intercept | Covid-19 | Shariah Intercept | Covid-19 | Obs |
|-------------------|-----------------------|----------|-------------------|----------|-----|
| Communication     | 0.012                 | 0.063    | 0.004             | 0.154    | 2623|
| Consumer Discretionary | 0.046***             | 0.072    | 0.045***           | 0.044    | 2623|
| Consumer Staples  | 0.030***              | –0.045   | 0.033***           | –0.028   | 2623|
| Energy            | 0.007                 | –0.198** | 0.006             | –0.213** | 2623|
| Financials        | 0.029                 | –0.080   | 0.064***           | 0.053    | 2623|
| Health Care       | 0.047***              | –0.051   | 0.043***           | –0.032   | 2623|
| Industrials       | 0.035**               | –0.029   | 0.042**            | –0.020   | 2623|
| IT                | 0.062***              | 0.053    | 0.060***           | 0.065    | 2623|
| Materials         | 0.012                 | 0.050    | 0.012             | 0.051    | 2623|
| Utilities         | 0.016                 | –0.037   | 0.023             | –0.007   | 2623|

Note: *, **, and *** indicate significance at the 10 %, 5%, and 1% levels respectively. The standard error of the coefficient is reported in the parentheses.
and IT are lower than their counterpart indices over the study period. It confirms that on average, the volatility of the Shariah indices is 
magnitude of the GARCH coefficient for the Shariah sectoral indices such as consumer discretionary, energy, healthcare, industrials, 
of the Shariah and non-Shariah indices in the future.

is less than one and implies that the volatility of the indices is persistent for the future period. Therefore, we may predict the volatility 
model show that the ARCH and GARCH coefficients are highly significant at the 1% level. The sum of the ARCH and GARCH coefficient 
return series is stationary at a level and the ARCH effect exists in the series. Later, we apply the GARCH model and the results of the 

4.6. Impact of the Covid-19 on the volatility of the S&P 1200 Shariah and non-Shariah sectoral indices

In this part, we test the impact of the Covid-19 on the volatility of the S&P 1200 Shariah and non-Shariah sectoral indices using the 
GARCH (1,1) model. Bollerslev et al. (1992) empirically document that the GARCH (1,1) model is an excellent model to predict the 
volatility of the financial variables. The results of the GARCH model with the Covid-19 dummy variable are reported in Table 10.

Table 7
Shariah sectoral indices and the five-factor model.

| Shariah indices      | Intercept | MKT_RF | SMB | HML | RMW | CMA | Adj R | Obs     |
|----------------------|-----------|--------|-----|-----|-----|-----|-------|---------|
| Communication        | -0.015    | 0.436*** | -0.074*** | -0.108*** | 0.121*** | -0.196*** | 0.287 | 2623  |
| Consumer Discretionary | 0.008    | 0.635*** | 0.118*** | -0.064*** | 0.210*** | 0.069*** | 0.686 | 2623  |
| Consumer Staples     | -0.002    | 0.469*** | -0.149*** | -0.123*** | 0.106*** | 0.408*** | 0.499 | 2623  |
| Energy               | -0.048*** | 0.781*** | 0.066*** | 0.438*** | -0.257*** | 0.330*** | 0.590 | 2623  |
| Financials           | 0.020     | 0.718*** | -0.091*** | -0.140*** | -0.151*** | -0.091*  | 0.546 | 2623  |
| Health Care          | 0.000     | 0.573*** | -0.083*** | -0.249*** | -0.213*** | 0.224*** | 0.625 | 2623  |
| Industrials          | 0.000     | 0.684*** | 0.090*** | 0.062*** | 0.094*** | 0.194*** | 0.697 | 2623  |
| IT                   | 0.009     | 0.799*** | -0.084*** | -0.226*** | 0.037    | -0.496*** | 0.779 | 2623  |
| Materials            | -0.020    | 0.627*** | 0.073*** | 0.037    | 0.084*** | -0.108*** | 0.005 | 2623  |
| Utilities            | 0.007     | 0.259*** | 0.003    | 0.004    | -0.050   | 0.120**  | 0.134 | 2623  |

Note: *, **, and *** indicate significance at the 10 %, 5%, and 1% levels respectively. The standard error of the coefficient is reported in the parentheses.

Table 8
Impact of the Covid-19 on the returns of the non-Shariah sectoral indices using the five-factor model.

| Non-Shariah Indices | Intercept | MKT_RF | SMB | HML | RMW | CMA | Covid-19 | Adj R | Obs     |
|---------------------|-----------|--------|-----|-----|-----|-----|----------|-------|---------|
| Communication       | -0.015    | 0.535*** | -0.085*** | -0.053*** | 0.091*** | 0.133*** | 0.000    | 0.511  | 2623  |
| Consumer Discretionary | 0.009    | 0.637*** | 0.058*** | -0.066*** | 0.084*** | -0.108*** | 0.005    | 0.693  | 2623  |
| Consumer Staples    | 0.002     | 0.475*** | -0.114*** | -0.107*** | 0.122*** | 0.383*** | -0.107*** | 0.535  | 2623  |
| Energy              | -0.027*  | 0.729*** | 0.074**  | 0.396*** | -0.328*** | 0.330*** | -0.181*** | 0.576  | 2623  |
| Financials          | -0.001    | 0.642*** | -0.041** | 0.486*** | -0.288*** | -0.135*** | -0.069*  | 0.706  | 2623  |
| Health Care         | 0.012     | 0.593*** | -0.059** | -0.229*** | -0.191*** | 0.183*** | -0.128*** | 0.652  | 2623  |
| Industrials         | 0.001     | 0.635*** | 0.094*** | 0.099*** | 0.069*  | 0.176*** | -0.061*  | 0.671  | 2623  |
| IT                  | 0.016     | 0.787*** | -0.069*** | -0.212*** | 0.041    | -0.450*** | -0.066** | 0.785  | 2623  |
| Materials           | -0.022    | 0.640*** | 0.105*** | 0.088*** | 0.115*** | 0.247*** | 0.026    | 0.520  | 2623  |
| Utilities           | -0.010    | 0.473*** | -0.169** | -0.020   | 0.055   | 0.434*** | -0.088** | 0.387  | 2623  |

Note: *, **, and *** indicate significance at the 10 %, 5%, and 1% levels respectively. The standard error of the coefficient is reported in the parentheses.

4.6. Impact of the Covid-19 on the volatility of the S&P 1200 Shariah and non-Shariah sectoral indices

In this part, we test the impact of the Covid-19 on the volatility of the S&P 1200 Shariah and non-Shariah sectoral indices using the 
GARCH (1,1) model. Bollerslev et al. (1992) empirically document that the GARCH (1,1) model is an excellent model to predict the 
volatility of the financial variables. The results of the GARCH model with the Covid-19 dummy variable are reported in Table 10.

Before applying the GARCH model, we checked the stationarity and the ARCH effect using the ARCH LM test. We observe that the 
return series is stationary at a level and the ARCH effect exists in the series. Later, we apply the GARCH model and the results of the 
model show that the ARCH and GARCH coefficients are highly significant at the 1% level. The sum of the ARCH and GARCH coefficient 
is less than one and implies that the volatility of the indices is persistent for the future period. Therefore, we may predict the volatility 
of the Shariah and non-Shariah indices in the future.

The coefficients of the Covid-19 dummy variable are highly significant for the Shariah and non-Shariah sectoral indices. The 
magnitude of the GARCH coefficient for the Shariah sectoral indices such as consumer discretionary, energy, healthcare, industrials, 
and IT are lower than their counterpart indices over the study period. It confirms that on average, the volatility of the Shariah indices is
Shariah healthcare index has the value of ARCH (1) of 0.077*** and GARCH (1) of 0.080. The Shariah financials index has the value of ARCH (1) of during the Covid-19 pandemic period. The purpose of this estimation is to compare the volatility of the Shariah and non-Shariah

4.7. Volatility of the Shariah and non-Shariah sectoral indices during the Covid-19 period

In this section, we check the volatility of the S&P 1200 Shariah and non-Shariah sectoral indices using the GARCH (1,1) model during the Covid-19 pandemic period. The purpose of this estimation is to compare the volatility of the Shariah and non-Shariah

Table 9
Impact of the Covid-19 on the returns of the Shariah sectoral indices using the five-factor model.

| Shariah Sectoral Indices | Intercept | MKT_RF | SMB | HML | RMW | CMA | Covid-19 | Adj R | Obs |
|--------------------------|-----------|--------|-----|-----|-----|-----|---------|------|-----|
| Communication            | -0.021*** | 0.435*** | -0.073*** | -0.105*** | 0.119*** | -0.197*** | 0.084 | 0.287 | 2623 |
| Consumer Discretionary   | 0.018*** | 0.110*** | 0.862*** | 0.038*** | 0.020*** | 0.109*** | 0.150*** | -0.150*** | 0.091*** | -0.036 | 0.546 | 2623 |
| Consumer Staples         | 0.009**  | 0.635*** | 0.117*** | -0.064*** | 0.210*** | 0.070*** | -0.016 | 0.686 | 2623 |
| Energy                   | -0.032***| 0.783*** | 0.062*** | 0.433*** | 0.252*** | 0.322*** | 0.200*** | 0.592 | 2623 |
| Financials               | 0.010    | 0.009*** | 0.018*** | 0.018*** | 0.027*** | 0.027*** | 0.036*** | 0.034 | 2623 |
| Health Care              | 0.009*** | 0.574*** | -0.085*** | -0.252*** | 0.211*** | 0.225*** | -0.111*** | 0.626 | 2623 |
| Industrials              | 0.005    | 0.685*** | 0.089*** | 0.060*** | 0.096*** | 0.195*** | -0.062*** | 0.697 | 2623 |
| IT                       | 0.013    | 0.800*** | -0.085*** | -0.228*** | 0.039*** | -0.496*** | -0.060*** | 0.779 | 2623 |
| Materials                | -0.021   | 0.627*** | 0.073*** | 0.037*** | -0.124*** | 0.235*** | 0.018*** | 0.515 | 2623 |
| Utilities                | 0.009*** | 0.259*** | 0.002*** | 0.004*** | -0.049*** | 0.120*** | -0.024*** | 0.134 | 2623 |

Note: *, **, and *** indicate significance at the 10 %, 5%, and 1% levels respectively. The standard error of the coefficient is reported in the parentheses.

Table 10
Impact of the Covid-19 on the volatility of the S&P 1200 Shariah and Non-Shariah sectoral indices.

| Variable        | Non-Shariah | Shariah |
|-----------------|-------------|---------|
|                 | Intercept   | ARCH    | GARCH | Covid-19 | Intercept   | ARCH    | GARCH | Covid-19 | Obs |
| Communication   | 0.025***    | 0.084*** | 0.869*** | 0.040*** | 0.015***    | 0.064*** | 0.914*** | 0.050**   | 2623 |
| Consumer Discretionary | 0.018*** | 0.110*** | 0.862*** | 0.038*** | 0.020***    | 0.109*** | 0.859*** | 0.033***   | 2623 |
| Consumer Staples | 0.024***    | 0.110*** | 0.831*** | 0.025*** | 0.029***    | 0.113*** | 0.819*** | 0.029***   | 2623 |
| Energy*         | 0.029***    | 0.079*** | 0.756*** | 0.115*** | 0.019***    | 0.073*** | 0.913*** | 0.097***   | 2623 |
| Financials      | 0.023***    | 0.099*** | 0.873*** | 0.038*** | 0.084***    | 0.062*** | 0.622*** | 0.169***   | 2623 |
| Health Care     | 0.041***    | 0.090*** | 0.679*** | 0.059*** | 0.022***    | 0.087*** | 0.874*** | 0.029***   | 2623 |
| Industrials     | 0.021***    | 0.105*** | 0.861*** | 0.048*** | 0.025***    | 0.110*** | 0.854*** | 0.047***   | 2623 |
| IT              | 0.038***    | 0.111*** | 0.844*** | 0.097*** | 0.043***    | 0.112*** | 0.840*** | 0.108***   | 2623 |
| Materials       | 0.009***    | 0.058*** | 0.931*** | 0.024*** | 0.007***    | 0.059*** | 0.932*** | 0.022***   | 2623 |
| Utilities       | 0.016***    | 0.069*** | 0.902*** | 0.020*** | 0.013***    | 0.060*** | 0.917*** | 0.014      | 2623 |

Note: We consider the two lags for the non-Shariah energy, non-Shariah healthcare, and Shariah financial indices and we reported ARCH (2) and GARCH (2) values in the above Table. The non-Shariah energy index has the value of the ARCH (1) of 0.060*** and GARCH (1) is 0.082***. The non-Shariah healthcare index has the value of ARCH (1) of 0.077*** and GARCH (1) of 0.080. The Shariah financials index has the value of ARCH (1) of 0.119*** and the GARCH (1) of 0.108.

*, **, and *** indicate significance at the 10 %, 5%, and 1% levels respectively. The standard error of the coefficient is reported in the parentheses.

less than their counterpart indices. Also, the magnitude of the Covid-19 dummy coefficients is highly significant and lower for the Shariah consumer discretionary, energy, healthcare, industrials, materials, and utility indices than their counterpart indices. The results suggest that the volatility of these sectors is lower even during the pandemic period. We suggest the global investors consider the Shariah stocks from these sectors to rebalance their portfolio.

4.7. Volatility of the Shariah and non-Shariah sectoral indices during the Covid-19 period

In this section, we check the volatility of the S&P 1200 Shariah and non-Shariah sectoral indices using the GARCH (1,1) model during the Covid-19 pandemic period. The purpose of this estimation is to compare the volatility of the Shariah and non-Shariah
sectoral indices over the Covid-19 period starting from 1st January 2020 to 29th October 2020. The results of the estimated model are presented in Table 11 and show that the ARCH and GARCH coefficients are highly significant and confirm the forecasting ability of the model. Further, the sum of the ARCH and GARCH coefficients is less than one and reveals the persistence of the volatility. Moreover, the magnitude of the GARCH coefficients of the Shariah sectoral indices such as the communication, consumer staples, financials, industrials, materials, and utilities are less than the coefficients of their counterpart indices during the Covid-19 pandemic period. It confirms that on average, the volatility or risk of the Shariah indices is less even during the pandemic period. Finally, we suggest the investors consider an ethical investment to protect their investment during the crisis and the pandemic period.

4.8. Diagnostic test

We apply the ARCH Lagrange multiplier (LM) to check the presence of the autocorrelation on the estimated model and the results of the ARCH LM test are reported in Table 12. The results evidence that the value of the ARCH LM test is insignificant for all sectoral indices. It confirms that the serial correlation is not observed in the residual of the estimated model.

5. Conclusion

The recent Covid-19 pandemic affects all economic, business, and financial activities around the world. However, Mazur et al. (2020) report that natural gas, food, healthcare, and software stocks earn positive returns during the pandemic period. Singh (2020) empirically documents evidence that the environmental, social, and governance stocks (ESG stocks) also provides a higher return during the Covid-19 period. Interestingly, Sherif (2020) explores that the Covid-19 does not affect the Dow Jones faith-based ethical index for the study period. In this context, we examine the impact of the Covid-19 pandemic on the performance of the S&P 1200 Shariah and non-Shariah sectoral indices over the period from 1st October 2010 to 29th October 2020. The study collects the daily values for a sample of the 10 Shariah sectoral indices and their counterpart indices from the S&P Dow Jones website. We employ the Fama and French (2015) five-factor model and Bollerslev (1986) GARCH (1,1) model to investigate the risk and return performance of the S&P 1200 Shariah and non-Shariah indices during the overall and the Covid-19 pandemic period. Fama and French (2015) claim that the five-factor model is superior to the three-factor model proposed by them in early 1993. Bollerslev et al. (1992) report that the GARCH (1,1) model is an excellent model for a wide range of financial data. The study finds that the S&P 1200 Shariah Communication, consumer staples, financials, healthcare, industrials, IT, materials, and utility sectors earn higher average returns than their counterpart sectoral indices during the Covid-19 period. The magnitude of the GARCH coefficient for the Shariah sectoral indices such as consumer discretionary, energy, healthcare, industrials, and IT are lower than their counterpart indices over the study period. On average, the volatility of the Shariah indices is less than their counterpart indices. Also, the magnitude of the Covid-19 dummy coefficients is highly significant and lower for the Shariah consumer discretionary, energy, healthcare, industrials, materials, and utility indices than their counterpart indices. On average, the S&P Shariah sectoral indices provide a higher return with low risk in the global markets. We suggest investors incorporate the Shariah stocks based on the recommended sectors to their portfolios. The fund managers, portfolio managers, stockbrokers, and investment advisor may suggest and guide the investors to rebalance their portfolios by incorporating the Shariah stocks. Therefore, the risk will be diversified for a given expected return of the stocks.

Table 11
Volatility estimation of the S&P 1200 Shariah and Non-Shariah sectoral indices during the Covid-19.

| Variable     | Intercept | Shariah Intercept | ARCH | GARCH | Intercept | Non-Shariah Intercept | ARCH | GARCH | Obs |
|--------------|-----------|-------------------|------|-------|-----------|-----------------------|------|-------|-----|
| Communication| 0.147     | 1.009*            | 0.827*** | 0.048* | 0.127**   | 0.848***              | 216  |
|              | (0.272)   | (0.065)           | (0.096) | (0.027) | (0.059)   | (0.055)               |      |
| Consumer Discretionary | 0.048* | 0.105**          | 0.868*** | 0.047** | 0.090*    | 0.885***              | 216  |
|              | (0.029)   | (0.052)           | (0.056) | (0.022) | (0.051)   | (0.050)               |      |
| Consumer Staples | 0.039*  | 0.104**          | 0.853*** | 0.033** | 0.094**   | 0.870***              | 216  |
|              | (0.022)   | (0.050)           | (0.061) | (0.015) | (0.039)   | (0.047)               |      |
| Energy       | 0.145*    | 0.077             | 0.990*** | 0.091*  | 0.085*    | 0.897***              | 216  |
|              | (0.087)   | (0.055)           | (0.057) | (0.054) | (0.052)   | (0.049)               |      |
| Financials   | 0.147     | 0.125*            | 0.825*** | 0.055*  | 0.110**   | 0.870***              | 216  |
|              | (0.110)   | (0.068)           | (0.078) | (0.033) | (0.054)   | (0.056)               |      |
| Health Care  | 0.052*    | 0.093**           | 0.868*** | 0.064   | 0.104**   | 0.848***              | 216  |
|              | (0.032)   | (0.042)           | (0.053) | (0.042) | (0.047)   | (0.066)               |      |
| Industrials  | 0.058**   | 0.068***          | 0.875*** | 0.053** | 0.089**   | 0.887***              | 216  |
|              | (0.027)   | (0.045)           | (0.048) | (0.025) | (0.043)   | (0.046)               |      |
| IT           | 0.150*    | 0.091*            | 0.852*** | 0.152   | 0.105*    | 0.835***              | 216  |
|              | (0.093)   | (0.055)           | (0.077) | (0.095) | (0.060)   | (0.085)               |      |
| Materials    | 0.055**   | 0.087**           | 0.884*** | 0.061** | 0.084**   | 0.886***              | 216  |
|              | (0.021)   | (0.041)           | (0.039) | (0.028) | (0.043)   | (0.044)               |      |
| Utilities    | 0.065     | 0.093*            | 0.846*** | 0.036*  | 0.129**   | 0.854***              | 216  |
|              | (0.056)   | (0.053)           | (0.077) | (0.021) | (0.050)   | (0.048)               |      |

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively. The standard error of the coefficient is reported in the parentheses.
Table 12
The ARCH Lagrange multiplier (LM) test to test the diagnostic of the model.

| Sectoral Indices | Non-Shariah Obs*R-squared | Prob. | Shariah Obs*R-squared | Prob. |
|------------------|---------------------------|-------|-----------------------|-------|
| Communication    | 1.53                      | 0.22  | 0.07                  | 0.80  |
| Consumer Discretionary | 0.79                      | 0.37  | 0.37                  | 0.54  |
| Consumer Staples | 0.43                      | 0.51  | 0.40                  | 0.53  |
| Energy           | 0.31                      | 0.58  | 0.03                  | 0.86  |
| Financials       | 0.03                      | 0.86  | 1.86                  | 0.17  |
| Health Care      | 0.11                      | 0.74  | 0.13                  | 0.72  |
| Industrials      | 0.02                      | 0.88  | 0.07                  | 0.79  |
| IT               | 0.00                      | 0.99  | 0.04                  | 0.85  |
| Materials        | 0.21                      | 0.65  | 1.44                  | 0.23  |
| Utilities        | 0.96                      | 0.33  | 1.31                  | 0.25  |

Conflict of interest and authorship conformation form

All authors have participated in (a) conception and design, or analysis and interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version.

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