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The Performance And Volatility Of Islamic Index As Compared To Conventional Index

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Abstract

This study aims to investigate whether the Islamic index outperforms the conventional index of India. The BSE TASIS Shariah 50 and Nifty 50 are used as representative of Islamic and Conventional indices, respectively. The study uses daily data for the period 2012-2021. Econometric models such as GARCH model and risk-adjusted measures- Sharpe, Treynor and Jensons Alpha are used to achieve the objective of study. The study found that Islamic index outperforms the Conventional Index but both indexes shows volatility clustering. The study has very important implications for stock exchange, regulator, investors and the policymakers.

Keywords: Risk-adjusted measures, Volatility, GARCH, Islamic Finance.

1.Introduction

Islam is a religion that unites both spiritual and temporal aspects of life. It regulates not only an individual's relationship with God, but also human relationships in social and financial settings (Elfakhani et al., 2005). Islamic finance emerged by financing to small cottage industry in some Arab countries in the late 1970s. It distinguishes itself from conventional finance with compliance of special principles of Islamic or Shariah law. During 1980's Islamic finance was intergraded with commercial and mercantile activities made under the umbrella of either 'Interest free' or 'Islamic Banking'. Islamic finance obtained its significance in the developed and developing countries after 1990's and witnessed broad macroeconomic and structural reforms in financial system in terms of the adoption of liberalization policies for trade, capital movements, privatization, and global integration of financial market. Moreover, the developments have paved the way for Muslim community to participate in the stock market operations and administered by the Shariah Advisory Committee (Shariah Supervisory Board) of a country which creates and frames the rules and regulation for investment on the basis of Islamic law.

The Sharia encourages the use of profit sharing and partnership schemes, and forbids riba (interest), maysir (gambling and pure games of chance), and gharar (selling something that is not owned or that cannot be described in accurate detail; i.e., in terms of type, size, and amount) (El-Gamal 2000; Elfakhani et al., 2005).

Volatility refers to the amount of risk or uncertainty pertaining to the variations in a security's value. Some securities are highly volatile which implies that their values fluctuate over a larger range of values while others are less volatile which means that their values can be spread out over s smaller range of values. (Mutaju and Dickson, 2020). High levels of volatility tend to distort stability of capital markets, destabilize currency value and hinder international trade (Bhowmik, 2013) (Mutaju and Dickson, 2020).

Performance and Volatility are two key factors that investors consider when evaluating investment opportunities. When comparing Shariah and Conventional Indices, there are certain differences in their performance and volatility characteristics due to the difference in principles and criteria they adhere to.

Globally, the existing research literature pertaining to Islamic indices is limited. However, Ahmad and Ibrahim (2002); Hakim and Rashidian (2002); Hussein (2005); Albaity and Ahmad (2008) analyses the performance of Islamic indices vis-a-vis conventional stock market indices using stock market data. The studies such as Saharudin et al (2005); Beik and Wardhana (2009) evaluate the volatility and forecasting ability of Islamic indices. These studies are mostly analysed for developed countries. However, the literature on the subject in emerging countries like India is scarce.

Unlike studies on the financial performance of ethical and conventional funds in developed countries, there is little existing empirical literature on the performance of Islamic stock market indices vis-à-vis conventional stock market indices using stock data from developing countries. Thus, this study examines the financial performance of an investment portfolio comprised of only Islamically compliant stocks, and compares its performance with the conventional stock market index in the Indian stock market.

2.Review of Literature

Albaity and Ahmad (2008) report no significant statistical difference after investigating the performance of the Kuala Lumpur Sharīʿah Index (KLSI) and the Kuala Lumpur Composite Index (KLCI) from 1999 through 2005 by applying classical models such as Sharpe, Treynor and Jensen methods.

Hassan and Girard (2010) found similarity in the performance of Islamic and conventional indices but Ho et al. (2014) report that Islamic indices outperform in a crisis period but the results are not the same after the crisis period.

Chiadmi and Ghaiti (2012) conduct a comparative study between Shariah and conventional indices measuring volatility using the generalized autoregressive conditional heteroskedasticity (GARCH) model. This study also finds that the Shariah index outshines its conventional counterpart. Even if the volatility persists significantly for both indices, the Shariah index is comparatively less volatile than that of the conventional counterpart in both long-run and crisis periods. Similarly, Saiti et al. (2019) and Hassan et al. (2020) reveal that the conventional indices are more volatile that the Islamic indices.

Arshad and Rizvi (2013) unveils that the Shariah indexes are less vulnerable to financial crisis compared to conventional indices of the world, Asia Pacific and emerging markets, and therefore, are safer and more stable.

Karim et al. (2014) reveals the outperformance of Shariah index over conventional benchmark in Malaysia. They note that the results do not change significantly when tested the same at different sub-periods.

Al-Khazali et al. (2014) revealed that apart from the European markets, the performance of conventional indices was better than Islamic counterparts in all the other eight markets including the USA, the UK and Japanese markets.

Bousalam and Hamzaoui (2016) developed benchmark indices comprising Moroccan stocks using Shariah screening and indicated that in the context of Morocco, the Islamic indices outperformed conventional indices

Reddy et al. (2017) investigated the Islamic funds in the UK and report that Islamic funds were least affected during the financial crisis and generated significantly better risk-return trade-off than the conventional benchmarks

Rizvi and Arshad (2018) report that conventional and Islamic sectoral indices follow a similar pattern of systematic risk over time. The aforementioned discussion underscores that the findings regarding the performance of Islamic indices vis-à-vis to conventional indices remain inconclusive (Naqvi et al., 2018).

Dharani et al. (2019) examine the Sharīʿah and conventional stock portfolios and provide evidence of a positive Sharīʿah effect on stock returns in India. The study found that Sharīʿah stock portfolios provide a higher return with a lower level of risk.

Saleem et al. (2021), the impact of the corona outbreak in several Islamic stock markets including Bahrain, the Association of Southeast Asian Nations (ASEAN), Qatar, United Arab Emirates (UAE), Middle East and North Africa (MENA) and Middle East, North Africa and South Asia (MENASA) was significant and in general, the volatility of Islamic indices increased after declaration of global crisis by World Health Organization (WHO). The trend is found to be persisting in the long term as well.

Asutay et al. (2021), a comparison is made between performance of Islamic and conventional indices of Islamic equity indices 883 the USA, Asia-Pacific, European and other worldwide markets during the period 2007 and 2019. The study reveals that the Islamic indices outperformed conventional indices during 2007–2009; however; the results remained inconclusive during 2009–2013 whereby only in European and Asia-Pacific markets, the Islamic indices showed better performance compared to conventional indices.

3.Data and Methology

3.1The Data

The time series data used for modeling volatility in the present study is the daily closing prices of BSE TASIS Shariah 50 index and NIFTY 50 over the period 02 January 2012 to 31 December 2021, comprising of 2477 observations in total. The three-month treasury bills are used in the study as the risk-free assets are taken from the official website of RBI. The daily returns are estimated as the continuously compounded returns as the first difference of the natural log of the closing price of sequential days as follows:

$$R_t = \ln \left(\frac{P_t}{P_{t-1}}\right) \quad (8)$$

where, P_t are the closing prices and P_{t-1} are the closing price of the previous period.

3.2The Methodology

Risk-Adjusted Measures

(1) The Sharpe ratio: represents the portfolio excess return per unit of total risk, and the higher this ratio above the benchmark, the better is.

Sharpe ratio is calculated as follows:

Sharpe = (Rp - RF) / σ

(2) The Treynor ratio: is equal to the portfolio excess return per unit of systematic risk (beta), and the higher this ratio above the benchmark, the better is.

Treynor ratio is calculated as follows:

Treynor = (Rp - RF) / ß

(3) Jensen's alpha: measures excess returns, if any, above (or below) the fund risk-adjusted return as expected in a CAPM world. A positive (negative) alpha implies that the portfolio is outperforming (under-performing) its market premium benchmark, while a (statistically) zero alpha means that the portfolio performance is normal as expected in a CAPM setting.

Jensen's alpha is estimated using the following regression model:
(Rp - RF) = α + ß (RM - RF)

Econometric Models

(1)ARCH and GARCH Model

Conventional econometric models assume a constant one-period forecast variance. To simplify this implausible assumption, Robert Engle presented a set of methods called autoregressive conditional heteroscedasticity (ARCH). These are zero mean, serially uncorrelated methods with non constant variance conditional on the past. A practical generalization of this model is the GARCH parameterization introduced by Bollerslev (1986). This model is also a weighted average of past squared residuals, but it has waning weights that by no means go entirely to zero. A GARCH (p, q) process is defined as:

$$y_k = \sigma_k \varepsilon_k \quad (3)$$

And

$$\sigma_k^2 = \omega + \sum_{1 \le i \le p} \alpha_i y_{k-i}^2 + \sum_{1 \le j \le q} \beta_j y_{k-j}^2 \quad (4)$$

Where ω>0, , $\alpha_i \ge 0, 1 \le i \le p$, $\beta_j \ge 0, 1 \le j \le q$ are constants.

The specification of the GARCH (1,1) model is as follows:

Mean equation:

$$r_t = \mu + \varepsilon_t \quad (5)$$

Variance equation:

$$\sigma_k^2 = \omega + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \quad (6)$$

where ω>0, , $\alpha_1 \geq 0$ and $\beta_1 \geq 0$.

r_t= return of the assets at the period t

μ= mean return

ε_t=residual returns, it is determined as:

$$\varepsilon_t = \sigma_t z_t$$

z_t= standardized residual returns

σ_t^2= conditional variance

The constraints $\alpha_1 \geq 0$ and $\beta_1 \geq 0$ for GARCH (1,1) are required to assure that the conditional variance is positive (Bauwens et al., 2006; Dyhrberg, 2016; Lin, 2018).

(2) Unit root testing

The financial time series data often encounter the problem of the Unit root while working with the time series data. The incidence of a unit root in the data makes it non-stationary which implies that the first and second moments are not time-invariant. As a result, running the regression technique on non-stationary data would lead to spurious regression and a true relationship could not be found. If we discuss the case of the Dickey-Fuller test then there is a problem of autocorrelation. Therefore, Augmented Dickey-Fuller (ADF) test and Phillip-Perron test are employed to deal with the unit root and integration properties of the variables. The following regression equation comprised by Augmented-Dickey Fuller (ADF) test, is as represented below:

$\Delta Y_t = \alpha_0 + \beta t + \alpha_1 Y_{t-1} + \Sigma \gamma_j \Delta Y_{t-j} + \varepsilon_t$

4.Results and Discussion

4.1Risk-adjusted Measures

To measure the stock performances of NIFTY 50 and S&P BSE TASIS, Sharpe Index, Treynor Ratio and Jensen Alpha were used.

Sharpe Index is calculated with the following formula:

$$Sharpe\ Index\ (SI) = \frac{Average\ portfolio\ return - risk\ free\ return}{Standard\ deviation\ of\ Portfolio}$$

Table 01: Sharpe Ratio

Variable	Abbreviation	NIFTY 50	S&P BSE TASIS
Risk-Free Rate	Rf	6.8573%	6.8573%
Annual Return	Rp	-6.804%	0.7%
Annual St. Dev.	Astd	0.010	0.011
Sharpe Ratio	SR	-6.33%	0.64%

Source: Authors' Compilation

By applying Sharpe Index to rate the performance of NIFTY 50 and S & P BSE TASIS stock price indexes as shown in Table 01, it can be seen that the average return of NIFTY 50 are showing negative returns (-6.804%) which suggests that performance of NIFTY 50 is no better than the risk-free rate. Thus, instead of investing on stocks included in the indexes with negative Sharpe index, it is better to invest in risk-free instruments. While the value of Sharpe Index for S & P BSE TASIS is positive (0.7%) and greater than the risk-free rate (6.8573%). Thus, it is better to invest in S & P BSE TASIS index. The same approach is adopted by Albaity and Ahmad (2008) for analysing the performance of Shariah index of Bursa Malaysia.

Table 02: Treynor Ratio

Variable	Abbreviation	NIFTY 50	S&P BSE TASIS
Risk-Free Rate	Rf	6.8573%	6.8573%
Annual Return	Rp	-6.804%	0.7%
Beta	Bp	0.39206	0.449374
Treynor Ratio	TR	-0.173%	0.016%

Source: Authors' Compilation

The Treynor Ratio is calculated as follows:

$$Treynor\ Index\ (SI) = \frac{Average\ portfolio\ return - risk\ free\ return}{Beta\ of\ Portfolio}$$

The Treynor measure, as shown in Table 02, shows that beta of S&P BSE TASIS (0.449) are larger than the NIFTY 50 (0.392). While the Treynor ratio is negative for NIFTY 50 (-0.173%) while positive for S&P BSE TASIS (0.016%). Thus, it is better to invest in S & P BSE TASIS index compared to risk-free assets.

Table 03: Jensens Alpha Ratio

Variable	Abbreviation	NIFTY 50	S&P BSE TASIS
Risk-Free Rate	Rf	6.8573%	6.8573%
Annual Return	Rp	-6.804%	0.7%
Beta	Bp	0.39206	0.449374
Return on Market	Rm	0.06	0.007
Jensen's Alpha Ratio	JAR	-13.33%	-3.39%

Source: Authors' Compilation

Jensen Alpha ratio is calculated as follows:

$$Jensens\ Alpha\ \text{Ratio} = (\mathrm{R_{i,t}} - \text{Risk free rate}_t) - \beta(\mathrm{R_{m,t}} - \text{Risk free rate}_t)$$

Where

$\mathrm{R_{i,t}}$ = Portfolio return

$\mathrm{R_{m,t}}$= Risk-free rate

By using Jensen Alpha to rank the performance of NIFTY 50 and S&P BSE TASIS stock price indexes, as seen in Table 03, it can be observed that the Jensen Alpha ratio is negative for both the indices, that is, -13.33% for NIFTY 50 and -3.39% for S&P BSE TASIS, suggesting that the stock market performance for these indices are lower than risk-free return.

By using Sharpe Index, Treynor Ratio and Jensen Alpha, this study finds that the NIFTY 50 and S&P TASIS index has a consistent ranking. This indicates that these indexes are effective portfolio and well diversified and that well-diversified portfolios tends to produce the Sharpe Index and the Treynor Ratio consistently.

4.2 Descriptive Statistics

The preliminary analysis is estimated and exhibited in Table 4 to determine the mean, maximum, minimum, standard deviation, skewness and kurtosis of BSE TASIS Shariah 50 prices and the NIFTY 50 index.

Table 4 Descriptive Statistics

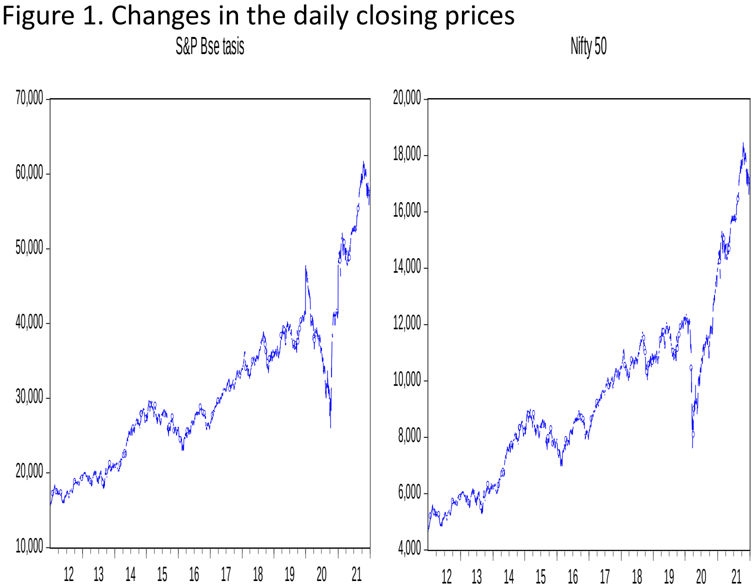
Statistic	BSE TASIS SHARIAH 50	NIFTY 50
Mean	0.053404	0.053283
Median	0.051272	0.076622
Maximum	14.74594	8.400291

Minimum	-8.59474	-13.9038
Standard Deviation	1.150137	1.07429
Skewness	2.461533	-1.23091
Kurtosis	38.02206	21.36926
Jarque-bera	129091	35451.05
Probability	0	0
Sum	132.2814	131.9812
Sum Sq.	3275.289	2857.551
Observation	2477	2477

Source: Authors' Compilation

The average return of BSE TASIS is 0.0534, which ranges from a maximum of 14.74 to a minimum of -8.59. While the average return of NIFTY 50 is 0.0532, with a maximum of 8.40 and a minimum of -13.903. This suggests that BSE TASIS is better than NIFTY 50 in terms of return performance. The daily standard deviation of the series reveals that the BSE TASIS is the most volatile than the NIFTY50. The skewness values shown in the Table 1 ranged to 2.46 for BSE TASIS while it is negatively skewed with a value of -1.23 for the NIFTY 50. The kurtosis value of BSE TASIS is 38.02 while the kurtosis value for NIFTY 50 is 21.369, suggesting that both the series are leptokurtic. This implies that both, BSE TASIS and NIFTY 50 returns series are having fat tails, suggesting that investors experience broader fluctuation while trading in these series. The Jarque-Bera test statistic indicated that the investment returns diverge from the normality, as the p-values for both series are less than 0.05.

Figure 1. Changes in the daily closing prices



Source: Authors' Compilation

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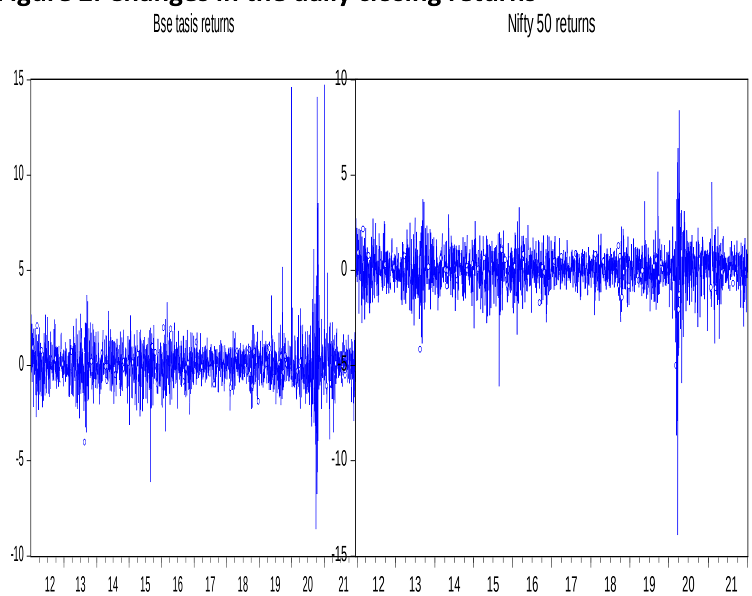
Figure 1 illustrates the variation in the log of daily closing prices of the BSE TASIS Shariah 50 index and NIFTY 50 index.

Figure 2. Changes in the daily closing returns



Source: Authors' Compilation

Figure 2 illustrates the variations in returns of daily closing prices, i.e., volatility clustering. Figure 2 demonstrates the incidence of ARCH effects as the amplitude of the series appears to be varying over the period. This process supports the incorporation of the ARCH/GACRCH model.

4.3Testing for Stationarity

The daily closing prices of BSE TASIS Shariah 50 index and NIFTY 50 along with respective returns are taken into account to examine the stationarity by using Augmented-Dickey fuller test and the Phillip-Perron unit toot test.

Table 5: Unit Root Test for Stationarity

ADF Test						
At Level				At 1st Difference		
	I	C & T	N	I	C & T	N

BSE TASIS SHARIAH 50	-50.204 (0.0001)	-50.195 (0.0001)	-50.121 (0.0001)	-50.206 (0.0001)	-50.196 (0.0000)	-50.111 (0.0001)
NIFTY 50	-49.879 (0.0001)	-49.801 (0.0001)	-49.801 (0.0001)	-17.557 (0.0000)	-17.555 (0.0000)	-17.406 (0.0000)
PP Test						
	I	C & T	N	I	C & T	N
BSE TASIS SHARIAH 50	-848.09 (0.0001)	-840.18 (0.0001)	-848.32 (0.0001)	-22.872 (0.0000)	-22.867 (0.0000)	-22.876 (0.0000)
NIFTY 50	-1011.2 (1)	-1017.1 (1)	-1011.5 (1)	-22.67 (0.0000)	-22.867 (0.0000)	-22.876 (0.0000)

Source: Authors' Compilation

Table 2 reported the results of the stationarity test which shows that the day-to-day closing prices of BSE TASIS Shariah 50 and NIFTY 50 are having unit roots at level form with the p-value being greater than 5 per cent while the returns series are stationary at level. The Null hypothesis of ADF and PP test of series being non-stationary is being rejected at the 1 percent level. Henceforth it can be determined that the returns series are stationary at level.

The foregoing discussion suggested the stationarity of the returns of both the indices at the level by employing the ADF and PP unit root test. Further, ARMA GARCH (1, 1) model has been applied to model the volatility of the BSE TASIS Shariah 50 index and NIFTY 50 in India.

4.4 GARCH(1,1) FOR BSE TASIS SHARIAH 50

Table 6 GARCH(1,1)

Particulars	Coefficient	Standard Error	Z-statistics	p-value
Mean Eq.				
C	0.057343	0.051155	1.120972	0.2623
AR(1)	-0.16195	0.82419	-0.1965	0.8442
MA(1)	0.204086	0.826386	0.246962	0.8049

Variance Eq.				
C	0.846839	0.225757	3.75111	0.0003
RESID(-1)^2	0.138821	0.04645	2.988611	0.0028
GARCH(-1)	0.588821	0.110473	5.330003	0.000
ARCH LM Test for Hetrosedasticity				
F statisctic	17.01742	Probability F(1,2474)	0.000	

Source: Authors' Compilation

The results of the Lagrange Multiplier (LM) test to observe the incidence of heteroscedasticity in the residuals of the return series. It is found that the probability value of residuals is less than 0.05. Hence the null hypothesis as no ARCH effect has been rejected and the incidence of ARCH effect is evident from the study.

The above preliminary checks evidenced the presence of volatility clustering is justified to support the estimation of the GARCH (1,1) model. The results of the mean equation are evidence that there are no effects of the one-day past return and market shock as AR and MR are found to be inconsiderable with the p-value of 0.844 and 0.840, respectively. On the other hand, the variance equation indicated that the volatility of the previous day's return has an impact on today's volatility as both ARCH and GARCH terms are significant with a p-value of 0.00. It can be observed that the total of the ARCH and GARCH coefficient (a + b) are very near to one, suggesting that it has a mean reverting variance process which is an indispensable phenomenon having unrelenting volatility shocks and there is volatility clustering.

4.5GARCH (1,1) FOR NIFTY 50

Table 7

Particulars	Coefficient	Standard Error	Z-Statistics	p-value
Mean Eq.				
C	0.055877	0.027915	2.001712	0.0453
AR (1)	-0.16326	0.429815	-0.37984	0.7041
MA(1)	0.199496	0.425597	0.468745	0.6393
Variance Eq.				
C	0.63115	0.096946	6.510333	0.000
RESID(-1)^2	0.032874	0.00547	6.010049	0.000
GARCH(-1)	0.482874	0.075308	6.411952	0.000

ARCH LM Test for Heteroscedasticity			
F-statisctic	68.06312	Probability F (1,2474)	0.000

Source: Authors' Compilation

The results of the LM test to examine the incidence of Heteroskedasticity in the residuals of the return series. It is found that the p-value of residuals is less than 0.05. Hence, the H0 as no ARCH effect has been rejected and the presence of ARCH effect is evident from the study.

The result of the preceding prelim checks substantiates the presence of volatility clustering in the series of NIFTY 50 which leads to the examination of the GARCH (1,1) model. The results of the mean equation evident that there are no effects of one-day past return and market shock as AR and MR are found to be inconsiderable with the p-value of 0.844 and 0.840, respectively. On the other hand, the variance equation indicated that the volatility of the previous day's return has an impact on today's volatility as both ARCH and GARCH term is significant with a p-value of 0.00. It can be observed that the totality of the ARCH and GARCH coefficient (a + b) are very near to one which implies that it has a mean reverting variance process which is an indispensable phenomenon showing the unrelenting volatility shocks and volatility clustering.

5.Conclusion:

This study principally aims to investigate whether the Shariah index outperforms the conventional index. The objective of this study is attempted to be achieved from the two viewpoints. One is risk adjusted returns performance and the other is volatility of indexes. The BSE TASIS SHARIAH 50 and NIFTY 50 indices are spotted as representatives of the Shariah and conventional indices, respectively. The study uses daily data over the period 2012–2021 and applies various econometric tools such as diverse risk-adjusted return measures and ARCH and GARCH. The results of the analyses produce several findings. First, the Shariah index outperforms the conventional one based on the risk-adjusted returns. Second, the Shariah and conventional indices both found volatile when ARCH and GARCH models are applied. The Shariah index outperforms the conventional index, investors can invest in Shariah index for more returns but both indexes shows volatility clustering, so on the basis of risk and volatility, investors will not get any benefits of diversification. Karim et al. (2014), Alexakis et al. (2015), Ahmed and Farooq (2018), Erragragui et al. (2018), Gonzalez et al. (2019) and Tahir and Ibrahim (2020) too reveal the outperformance of Shariah index over conventional index. In contrast, Hussein and Omran (2005), Habib and Islam (2014) and Rana and Akhter (2015) find that the Shariah indices underperform their conventional counterparts. The study has very important implications for stock exchange, regulator, investors and the policymakers.

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