

Islamic Calendar Effects and Stock Market Behaviour in India: Evidence from Shariah and Conventional Indices

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ABSTRACT

The study examines the influence of the Islamic calendar specifically, the week day, Islamic month, and Ramadan on the returns, risk-adjusted performance, and volatility of Shariah and conventional stock indices in India. Daily data for the Nifty 50, Nifty Shariah 50, Nifty Shariah 500, FTSE All-World, and FTSE Shariah indices from 2018 to 2022 were analysed. Returns were computed using log-difference transformations and mapped onto the Islamic (Hijri) calendar. Day of the week effects were estimated using OLS with robust errors; risk-adjusted performance was examined using Sharpe, Treynor, and Jensen ratios. Ramadan effects on returns were assessed through multiple regression controlling for domestic and global benchmarks. GARCH(1,1) and GJR-GARCH models assessed Ramadan-induced volatility behaviour. The study finds a significant day of the week effect on stock market indices with Monday returns being significantly negative while Tuesday returns are significantly positive for both indices. Month of the year effects are generally insignificant, although Jumada-Al-Awwal exhibits consistently negative and significant returns across indices. Risk-adjusted metrics reveal that Shariah indices outperform during Ramadan but underperform during non-Ramadan periods. Ramadan shows no significant impact on returns once benchmark indices are controlled for, but significantly influences volatility, with strong evidence of volatility clustering and leverage effects. The results imply that the high worship intensity and ethical investment associated with the Ramadan period affects the stock market's volatility. The study recommends that portfolio managers exploit the predictable negative Monday and positive Tuesday patterns. More so, Shariah-compliant investors may benefit from investing in Shariah indices during non-Ramadan periods and realising gains during Ramadan.

Keywords- Islamic calendar effects; Ramadan; Shariah indices; volatility; financial markets.

I. INTRODUCTION

Calendar anomalies have long attracted attention in finance as deviations from market efficiency (Keim, 1983; Thaler, 1987). While most classical anomalies such as the Monday effect or the January effect have been well documented (Bialkowski, Etebari & Wisniewski, 2012; Halari *et al.*, 2015), a growing stream of behavioural finance research shows that religious practices may also generate predictable patterns in asset prices (Hirshleifer, 2001; Kumar *et al.*, 2011). In Islamic finance, the month of Ramadan and other Islamic calendar events can influence investor sentiment, emotions, trading behaviour and risk preferences (Al-Ississ, 2015; Bialkowski *et al.*, 2012; Al-Hajieh *et al.*, 2011).

Ramadan is regarded as the holiest month in Islam, emphasising fasting, worship, charity and avoidance of unethical behaviour. Such practices may cultivate positive sentiment, risk-aversion, and ethical investment behaviour, potentially affecting market activity and pricing (Al-Hajieh *et al.*, 2011; Abbes, 2021; Seyyed, Abraham & Al-Hajji, 2005; Shahid *et al.*, 2019). Shariah compliance further restricts investments to halal business activities and financial ratios, creating another behavioural dimension for Islamic investors (Ho *et al.*, 2014; Ashraf *et al.*, 2018; Dharani & Natarajan, 2011; Halari *et al.*, 2019).

India, although a Muslim-minority country, has a well-developed Shariah-compliant equity market through indices such as Nifty Shariah 50 and Nifty

Shariah 500 (Irfan, 2022). However, limited studies investigate Islamic calendar effects in India, especially using recent data and volatility-based models (Hussain et al., 2020; Munusamy, 2019; Mustafa, 2008). It is against this background that this study was conceived to assess the influence of the Islamic calendar specifically, the week day, Islamic month, and Ramadan on the returns, risk-adjusted performance, and volatility of Shariah and conventional stock indices in India. This study provides new evidence on Islamic calendar anomalies in a Muslim-minority market using both return and volatility based models. It contributes to the growing literature on behavioural finance, sentiment effects and Islamic investment behaviour outside Muslim-majority economies.

II. LITERATURE REVIEW

2.1 Islamic calendar anomalies and investor behaviour

Studies such as Bialkowski et al. (2012) and Al-Ississ (2015) argue that Ramadan fosters positive sentiment, optimism, and reduced trading activity, leading to higher returns and lowered volatility. In contrast, some scholars emphasise cultural and market structure differences, noting that the Ramadan effect may be weaker in Muslim-minority markets.

2.2 Day-of-the-week and monthly effects

Classical calendar anomalies include the Monday effect (typically negative) and Tuesday rebounds. Research in Islamic markets shows mixed patterns: Turk Ariss et al. (2011) found positive last-day effects in GCC markets, while Dharani and Natarajan (2011) found insignificant anomalies in Indian Shariah indices. Monthly Islamic effects remain less studied; however, Halari et al. (2015) reported significant anomalies across Islamic months in Pakistan.

2.3 Ramadan effects on returns

Most studies in Muslim-majority countries document positive Ramadan returns (Bialkowski et al., 2012; Halari et al., 2019). However, Seyyed et al. (2005) found reduced volatility and subdued activity. Emerging evidence suggests that Ramadan effects are context-specific and may not apply uniformly across markets.

2.4 Ramadan effects on volatility

Volatility tends to decrease during Ramadan due to changes in trading hours, reduced speculation, or improved sentiment (Seyyed et al., 2005). GARCH-based Ramadan studies have shown strong conditional volatility dynamics shaped by behavioural shifts. Yet, research in non-Muslim contexts remains scarce.

III. METHODOLOGY

3.1. Data collection

The study considers the daily closing values of the Nifty-50, Nifty Shariah 50, Nifty Shariah 500, and Financial Times Stock Exchange (FTSE)-All World and FTSE Shariah indices from January 2018 to December

2022. This accounts for five years daily data which is sufficient to capture the important features of financial data based on the threshold of four years daily data given by Taylor (1986). The data are obtained from the Investing.com and yahoo finance websites. The T-bills rates are extracted from the Reserve Bank of India website. The daily data of the indices are transformed in accordance with the Islamic calendar which starts from Muharram. The 12 months of the Islamic calendar derived from the lunar cycle are separated by the appearance of the new moon. The number of days in a month average between 29 and 30 days, making the Islamic year, approximately 11 days shorter than the Gregorian one (Bialkowski et al., 2012). The daily closing values of each sample index are converted into the returns (R_t) calculated as the first differences in the natural logarithms using the formula:

$$R_t = \ln(P_t/P_{t-1}) \times 100$$

Where P_t and P_{t-1} is the value of the index at time t and $t-1$ respectively.

3.2. Data analysis

The data was analyzed using the Excel and EView software and different statistical tests were run

3.2.1. Day-of-the-week effect and month-of-the-year effect

The effect of the day of the week and month of the year on the returns of the stock market indices was analyzed using the Ordinary Least Squares (OLS) method based on a model by Gibbons and Hess (1981), Peterson (1990), and Solnik and Bousquet (1990) with a formula;

$$R_t = \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 D_5 + \epsilon_t$$

Where R_t is the daily returns of the stock index t , D_1 to D_5 are dummy variables for each of the trading days of the week for the index and ϵ_t is a random error term. Following the Turk Ariss et al. (2011), the study estimates the beta parameters using Ordinary Least Squares (OLS) with robust standard errors.

Further, the study evaluates the monthly returns of the indices according to the Islamic calendar months. The following model is framed to investigate the months of the year effect of the indices:

$$R_t = \sum_{i=1}^{12} \beta_i D_i + \epsilon_t$$

Where R_t is the logarithmic return of the market index; β_i a coefficient and indicates that the monthly average returns of the index as per Islamic calendar; ϵ_t the error term; D_j the seasonal, monthly dummy variable which will take the value of 1 if significant, and 0 otherwise

3.2.2. Risk-adjusted performance

The risk-adjusted performance measure is estimated using the Sharpe (1966) ratio, Treynor (1965) ratio and the Jensen (1968) ratio. The Sharpe ratio (SR) indicates the amount of excess return of the portfolio over the risk-free rate in a given period per unit of total risk. The Sharpe Ratio is estimated as follows:

$$SR_i = (AR_i - ARFR_i) / \sigma_i$$

Where AR_i is the daily average return of the index over the period. The $ARFR_i$ stands the daily average of the risk-free rate of return. The σ_i is the standard deviation of

Index return. The Treynor ratio (TR) indicates the average excess returns of the portfolio per unit of systematic risk (β). The TR of the indices is computed as:

$$TR_i = (AR_i - ARFR_i) / \beta_i$$

Where TR_i is the TR and AR_i is the average return of the index and the $ARFR_i$ is the average risk-free rate of the return. β_i is the beta coefficient computed using the market model. The Jensen (1968) Alpha represents the average returns on a portfolio over and above the estimated return using the CAPM, to the given portfolio beta and average market return. The Alpha in the model represents the average portfolio return adjusted for risk. The portfolio Alpha is expressed as:

$$\alpha = AR_i - [ARFR_i + \beta_i (R_i - ARFR_i)]$$

Where α_i , AR_i , $ARFR_i$, and β_i are as defined above.

3.2.3. Ramadan and stock market returns

The study investigates the Ramadan effect on the returns of the indices by incorporating the FTSE and Nifty-50 as a benchmark in the multiple linear regression model with the Ramadan dummy variable to have the control over the other global and domestic factors influencing the market returns. The models are framed as follows:

$$Return_t = \alpha_0 + \beta_1 Ramadan_t + \beta_2 DBM_t + \epsilon_t$$

$$Return_t = \alpha_0 + \alpha_1 R_{t-1} + \beta_1 Ramadan_t + \beta_2 GBM_{t-1} + \beta_3 DBM_t + \epsilon_t$$

Where $Return_t$ is the daily return of the indices at the time t . $Ramadan_t$ is a dummy variable for index that takes the value of 1 for the Ramadan days while 0 for the non-Ramadan days of the year and ϵ_t is the error term. The GBM and DBM stand for global benchmark and domestic benchmark, respectively.

3.2.4. Ramadan and the stock market volatility

To investigate the impact of the Ramadan effect on the returns and volatility of the indices, the GARCH (1,1) and GJR-GARCH models are used. The following GARCH (1,1) model is framed:

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \beta_1 Ramadan_t + \beta_2 GBM_{t-1} + \beta_3 DBM_t + \epsilon_t$$

$$\epsilon_t \sim (0, \sigma^2_t)$$

$$h^2_t = \alpha_0 + \alpha_1 \epsilon^2_{t-1} + \beta_1 h^2_{t-1} + \lambda Ramadan + v_t$$

Where R_t and R_{t-1} is the current and lagged return respectively while h_t and h_{t-1} is the current and lagged conditional volatility respectively.

The conditional variance in GJR-GARCH model is defined as:

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \beta_1 Ramadan_t + \beta_2 GBM_{t-1} + \beta_3 DBM_t + \epsilon_t$$

$$\epsilon_t \sim (0, \sigma^2_t)$$

$$h^2_t = \alpha_0 + \alpha_1 \epsilon^2_{t-1} + \beta_1 h^2_{t-1} + \gamma \epsilon_{t-1} I_{t-1} + \lambda Ramadan + v_t$$

Where $I_{t-1} = 1$ if $\epsilon_{t-1} < 0$, bad news and $I_{t-1} = 0$ otherwise, good news. Where R_t , R_{t-1} and ϵ_t are the current return, the lagged return, and the error term in the Equation (11), respectively. The coefficients α_0 , α_1 , β_1 and λ are interpreted as in the GARCH model.

IV. RESULTS

4.1. Descriptive statistics

The means, median, standard deviation, skewness and kurtosis of the stock market returns for the overall period, Ramadan period and non-Ramadan period, respectively were calculated to examine the variation of the market behavior (Table 1). Results revealed that generally, throughout the year (panel A), the Nifty 50 index provides higher returns of 0.0233 percent compared to the Shariah indices that provide quite lower returns (0.0177 and 0.0137). The study results also showed that the Nifty 50 index had a higher standard deviation of 1.4116 as compared to the Nifty Sharia 500 index which had a lower standard deviation of 1.252346. This implies that the shariah indices were quite less volatile as compared to the conventional Nifty-50 index. The high-performance stocks are constituted in the conventional index, therefore, this implies that they are in a position to provide higher returns to the investors.

Table 1: Summary statistics of the stock market returns for the different indices

Variable	Mean	Median	SD	Min.	Max.	Skew.	Kurt	Obs.
Panel A: full sample period								
Nifty Shariah 500	0.01767	0.1089	1.2523	-12.360	8.36433	-1.129	13.1428	1228
Nifty Shariah	0.01373	0.0610	1.6001	-18.104	17.0830	-0.609	34.9450	1228
Nifty 50	0.02332	0.0890	1.4116	-15.239	9.27945	-1.438	16.7786	1228
FTSE Shariah	0.01439	0.0628	1.0771	-9.8441	7.89396	-0.975	13.4289	1228
FTSE	0.01281	0.0600	1.0979	-9.9713	7.98393	-1.115	15.6784	1228
panel B: Ramadan period								
Nifty Shariah 500	0.06828	0.08644	1.2281	-5.1180	3.65422	-0.375	3.6095	84
Nifty Shariah	0.01939	0.03099	1.3587	-5.7577	4.81416	-0.245	4.7280	84
Nifty 50	0.07189	0.24196	1.5371	-6.7420	4.4086	-0.815	4.3374	84
FTSE Shariah	-0.0127	0.01685	0.8702	-2.761	2.82843	0.056	1.6050	84
FTSE	-0.0178	0.15231	0.8611	-2.9007	2.74923	0.044	2.0239	84
Panel C: Non Ramadan period								
Nifty Shariah 500	0.01824	0.12053	1.2557	-12.360	8.3643	-1.198	14.020	1123
Nifty Shariah	0.02041	0.06934	1.6201	-18.104	17.083	-0.634	36.213	1123
Nifty 50	0.02298	0.09225	1.4046	-15.239	9.2794	-1.529	18.314	1123

FTSE Shariah	0.02335	0.06731	1.0918	-9.8441	7.8939	-1.031	13.882	1123
FTSE	0.02285	0.07333	1.1139	-9.9713	7.9839	-1.174	16.154	1123
Panel D: Ramadan period minus non-Ramadan period								
Nifty Shariah 500	0.05004	-0.0340	-0.027	7.242	-4.710	0.823	-10.410	
Nifty Shariah	-0.0010	-0.0383	-0.261	12.346	-12.268	0.389	-31.485	
Nifty 50	0.0489	0.14970	0.1324	8.497	-4.8708	0.714	-13.976	
FTSE Shariah	-0.0361	-0.0504	-0.221	7.083	-5.0655	1.087	-12.277	
FTSE	-0.0407	-0.0734	-0.252	7.070	-5.2347	1.218	-14.130	

Results from Panel (B) reveal the risk and returns behavior of the indices during the Ramadan period. The results reveal that the Nifty-50 index yields slightly higher average returns (0.0719) but with more risk (1.5372) as compared to Shariah-500 index which yields less returns (0.0683) but with a lower risk (1.2282). This implies that even during the Ramadan days, the conventional index is performing better than the Shariah Index although to a slight small magnitude as compared to the whole year through.

In panel D, the study examines the risk and returns of the markets during the Ramadan period and non-Ramadan period. The study results reveal that comparing the Ramadan to the non-Ramadan period, the

risk in the Ramadan period is significantly lower. Furthermore, the difference in returns between the Ramadan and non-Ramadan period was higher for the Nifty Shariah 500 index (0.0500) as compared to the conventional Nifty 50 index (0.0489). This indicates that Shariah indices trade much higher in Ramadan as compared to non-Ramadan periods.

Further still, the study computes the risk and returns of the indices on a day wise basis. The study then estimates the total risk and average returns of the common and the Shariah indices during the overall period, Ramadan period and non-Ramadan period, respectively and the results are presented in table 2.

Table 2: Summary statistics by day of the week

	Monday		Tuesday		Wednesday		Thursday		Friday	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD

Panel A: full sample period

Nifty Shariah 500	0.0166	1.2546	0.017	1.254	0.017	1.253	0.017	1.253	0.017	1.2528
Nifty Shariah	0.0131	1.6033	0.013	1.602	0.013	1.602	0.013	1.601	0.013	1.6008
Nifty 50	0.0227	1.4143	0.023	1.413	0.023	1.413	0.023	1.412	0.023	1.4121
FTSE Shariah	0.0145	1.0783	0.014	1.077	0.013	1.077	0.014	1.077	0.014	1.0775
FTSE	0.0129	1.0993	0.012	1.098	0.012	1.098	0.013	1.098	0.012	1.0984

Panel B: Ramadan period

Nifty Shariah 500	0.074	1.241	0.075	1.233	0.068	1.228	0.064	1.254	0.066	1.246
Nifty Shariah	0.035	1.371	0.029	1.363	0.019	1.358	0.024	1.386	0.027	1.377
Nifty 50	0.094	1.548	0.086	1.540	0.071	1.537	0.072	1.560	0.083	1.554
FTSE Shariah	0.025	0.844	0.007	0.854	-0.012	0.870	0.016	0.845	0.030	0.848
FTSE	0.016	0.842	0.001	0.847	-0.017	0.861	0.011	0.845	0.022	0.845

Panel C: non-Ramadan period

Nifty Shariah 500	0.017	1.257	0.017	1.257	0.018	1.256	0.018	1.256	0.018	1.255
Nifty Shariah	0.019	1.622	0.020	1.622	0.020	1.621	0.020	1.620	0.020	1.620
Nifty 50	0.022	1.406	0.022	1.406	0.020	1.405	0.023	1.405	0.022	1.404
FTSE Shariah	0.023	1.092	0.023	1.092	0.022	1.092	0.023	1.092	0.023	1.091
FTSE	0.022	1.115	0.022	1.114	0.022	1.114	0.023	1.114	0.022	1.113

Panel D: Ramadan period minus non-Ramadan period

Nifty Shariah 500	0.057	-0.016	0.058	-0.024	0.05	-0.028	0.046	-0.002	0.048	-0.009
Nifty Shariah	0.016	-0.251	0.009	-0.259	-0.001	-0.263	0.004	-0.234	0.007	-0.243
Nifty 50	0.072	0.142	0.064	0.134	0.051	0.132	0.049	0.155	0.061	0.15
FTSE Shariah	0.002	-0.248	-0.016	-0.238	-0.034	-0.222	-0.007	-0.247	0.007	-0.243
FTSE	-0.006	-0.273	-0.021	-0.267	-0.039	-0.253	-0.012	-0.269	0	-0.268

The study results in table 2 reveal that generally, the average returns of the indices are higher on Monday as compared to other days of the week. Further still, when the average returns were compared for the days during the Ramadan period and those during the non-Ramadan period, the average returns of the indices are higher in Ramadan period. The average returns are still higher on Monday than other days of the week during the Ramadan

while during the non-Ramadan period, Thursday posted higher returns.

4.2. Inferential statistics

4.2.1. Day of the week and month of the year effects on the returns of the stock market indices

The effects of the day-of-the-week and month-of-the-year on the returns of the Islamic and conventional stock market indices was analyzed using OLS with a robust standard error and the results are shown in table 3.

Table 3: Results of the day-of-the-week effect on the returns of the indices

$$R_t = \sum_{j=1}^5 \beta_j D_j + \varepsilon_t$$

Variable	Nifty Shariah 500	Nifty Shariah	Nifty 50	FTSE Shariah	FTSE
Panel A: day of the week effect –entire sample period					
Monday	-0.191 (0.0157)	0.145 (0.1530)	-0.262 (0.0033)	-0.060 (0.3726)	-0.088 (0.2057)
Tuesday	0.204 (0.0101)	0.135 (0.1843)	0.262 (0.0033)	0.120 (0.0795)	0.116 (0.0940)
Wednesday	0.032 (0.6857)	0.013 (0.8955)	0.041 (0.6423)	0.087 (0.2061)	0.078 (0.2654)
Thursday	0.0265 (0.7386)	-0.065 (0.5179)	-0.001 (0.9839)	-0.096 (0.1578)	-0.066 (0.3429)
Friday	0.0717 (0.3711)	0.134 (0.1921)	0.078 (0.3852)	0.023 (0.7311)	0.024 (0.7259)
R ²	0.010	0.004	0.014	0.005	0.005
D-W stat	1.9861	2.277	2.093	1.819	1.917
Panel B: Ramadan period					
Monday	-0.178 (0.5027)	-0.199 (0.503)	-0.280 (0.3873)	-0.133 (0.4990)	-0.104 (0.5963)
Tuesday	-0.216 (0.4265)	-0.357 (0.2431)	-0.087 (0.7924)	-0.314 (0.1204)	-0.346 (0.0885)
Wednesday	0.125 (0.6533)	-0.059 (0.8482)	0.168 (0.6197)	0.019 (0.9251)	0.005 (0.9784)
Thursday	0.230 (0.4104)	0.318 (0.3090)	0.381 (0.2628)	0.017 (0.9337)	0.012 (0.9534)
Friday	0.108 (0.6974)	0.023 (0.9411)	-0.053 (0.8739)	0.016 (0.9349)	-0.041 (0.8400)
R ²	0.021	0.027	0.023	0.021	0.021
D-W stat	1.540	1.461	1.603	1.811	1.958
Panel C: Non Ramadan period					
Monday	-0.192 (0.0203)	-0.139 (0.1935)	-0.260 (0.0051)	-0.053 (0.4569)	-0.086 (0.2416)
Tuesday	0.243 (0.0034)	0.180 (0.0928)	0.295 (0.0015)	0.160 (0.0268)	0.160 (0.0305)
Wednesday	0.024 (0.7734)	0.019 (0.8532)	0.030 (0.7441)	0.093 (0.2005)	0.084 (0.2539)
Thursday	-0.049 (0.5536)	-0.099 (0.3530)	-0.035 (0.7007)	-0.106 (0.1398)	-0.073 (0.3216)
Friday	0.068 (0.4142)	0.144 (0.1843)	0.090 (0.3348)	0.024 (0.7386)	0.030 (0.6804)
R ²	0.013	0.006	0.0165	0.007	0.007
D-W stat	2.020	2.330	2.039	1.825	1.923

The results in table 3 reveal that Monday returns are negative and statistically significant for both Nifty Shariah 500 ($\beta = -0.191$, $P = 0.0157$) and conventional Nifty 50 ($\beta = -0.262$ (0.0033)). Since the Monday coefficient is significantly negative, this confirms that the Monday has a significantly lower than the estimated coefficient for the rest of the week, thus, its effect on the behavior of the stock market is that investors are more willing to sell and less willing to buy the stocks on Monday. However, the study results show that Tuesday returns are also significant but positive for both the Nifty Shariah 500 ($\beta = 0.204$, $P = 0.0101$) and conventional Nifty 50 ($\beta = 0.262$, $P = 0.0033$) indices. This implies that Tuesday has a positive effect on the stock market behavior in that investors are more willing to buy and less willing to sell the stocks on Tuesday.

To assess whether the month of Ramadan has a significant return on Monday and Tuesday in the indices, the data was partitioned into two sets, that is, Ramadan

days and non-Ramadan days period, and the equation for each set was re-estimated separately and results are in Table 3 panel B and C. The results in Panel C for the non-Ramadan days' period support the earlier finding, reported in above stating the presence of a statistically significant negative return on Monday and a significantly positive return on Tuesday. However, the results in panel B for during the Ramadan days' period show that there is no significant day of the week effect on the stock market returns. This implies that the effect of the day of the week on the stock market is more pronounced during the non-Ramadan days but is not prominent during the Ramadan period. In summary, the results reveal that the returns are not distributed equally over the days and confirm the presence of the day-of-the-week effect on both Shariah and conventional indices in India.

To check the robustness of the results, the study also analyzed the month-of-the-year effect on the stock market returns and the results are presented in table 4.

Table 4: Regression analysis results of the month-of-the-year effect as per Islamic calendar

$R_t = \sum_{i=1}^{12} \beta_i D_j + \epsilon_t$					
Months	Nifty Shariah 500	Nifty Shariah	Nifty 50	FTSE Shariah	FTSE
Muharram	0.020 (0.8767)	0.012 (0.9381)	0.012 (0.9331)	-0.198 (0.0740)	-0.168 (0.1384)
Shafar	0.030 (0.8106)	0.015 (0.9243)	0.181 (0.1991)	0.131 (0.2215)	0.131 (0.2301)
Rabi-al-awal	0.149 (0.2128)	0.151 (0.3252)	0.129 (0.3364)	0.123 (0.2305)	0.104 (0.3165)
Rabi-al-thani	0.039 (0.7266)	0.076 (0.5966)	0.020 (0.8687)	0.100 (0.2970)	0.093 (0.3415)
Jumada-al-awal	-0.026 (0.8274)	-0.077 (0.6195)	0.011 (0.9302)	-0.073 (0.4786)	-0.040 (0.7049)
Jumada-al-thani	-0.374 (0.0030)	-0.352 (0.0288)	-0.477 (0.0008)	-0.304 (0.0048)	-0.324 (0.0032)
Rajab	0.178 (0.1699)	0.227 (0.1707)	0.166 (0.2549)	0.204 (0.0657)	0.212 (0.0606)
Sha'ban	0.017 (0.8878)	-0.049 (0.7542)	0.020 (0.8856)	-0.087 (0.4122)	-0.106 (0.3293)
Ramadan	0.028 (0.8175)	0.010 (0.9492)	0.152 (0.2779)	0.180 (0.0919)	0.184 (0.0924)
Shawwal	0.008 (0.9421)	0.055 (0.7192)	-0.039 (0.7735)	-0.054 (0.6013)	-0.042 (0.6891)
Zul-qaadah	0.106 (0.3945)	0.064 (0.6879)	0.056 (0.6866)	0.092 (0.3893)	0.069 (0.5272)
Zul-hijjah	0.028 (0.8253)	0.018 (0.9090)	0.045 (0.7536)	0.034 (0.7496)	0.018 (0.8714)
R ²	0.010	0.006	0.013	0.018	0.017
D-W stat	2.019	2.295	2.048	1.862	1.958

The study results from table 4 show that , a positive return is present in the Islamic months of Muharram, Rabi-Al-Awwal, Rabi-Al-Thani, Rajab, Ramadan, and Shawwal, while a negative return is observed in the months of Jumada-Al-Awwal and Jumada-Al-Thani. However, the coefficients are not significant for all of the Islamic months except Jumada-al-thani which is negative and significant for all the indices, that is, the shariah indices Nifty Shariah 500 ($\beta = -0.477$, $P = 0.0008$), and Nifty Shariah 50 ($\beta = -0.374$, $P = 0.0030$) and the conventional index Nifty 50 ($\beta = -0.352$, $P = 0.0288$). This implies that the coefficient of Jumada-al-thani was significantly lower than as compared to the estimated average of all the months, as such, the stock market returns during this month were significantly lower.

Furthermore, the results in table 4 also reveal that the highest mean returns of Shariah indices are in the

month of Rajat and Rabi-Al-Awwal. The average returns for these months are 0.227 percent and 0.151 percent, respectively, however, both indices were not significant. The average monthly returns for the conventional indices Nifty 50 and FTSE were higher in Safar and Ramadan but they were not significant. Therefore, the alternative hypothesis that there is a significant month of the year effect on the returns of the Islamic and conventional stock market indices is retained.

4.2.2. Risk-adjusted performance of the stock market indices

The second objective of the study is to determine the Risk-adjusted performance the stock market indices. This was analyzed by estimating the Sharpe (1966) ratio, Treynor (1965) ratio and the Jensen (1968) ratio, the results are presented in table 5.

Table 5: Results of the risk adjusted performance measurement

Variables	Risk-adjusted performance measurement					
	Mean	SD	B	Sharpe	Treynor	Jensen
Full sample period						
Nifty Shariah 500	0.017676	1.252346	1.1404	-0.0133	-0.23166	0.02045
Nifty Shariah	0.013733	1.600159	1.1098	-0.0108	-0.24712	0.0028
Nifty 50	0.023325	1.411607		-0.0111		
Ramadan Period						
Nifty Shariah 500	0.068287	1.228179	1.1154	0.0648	1.1305	0.1991
Nifty Shariah	0.019395	1.358738	1.2011	0.0484	0.8812	-0.0851
Nifty 50	0.071891	1.537152		0.04010		
Non-Ramadan Period						
Nifty Shariah 500	0.050044	-0.02754	1.1446	-0.01306	-0.22717	-1.0260
Nifty Shariah	-0.00102	-0.26145	0.9562	-0.01055	-0.28347	-0.9110
Nifty 50	0.048904	0.132486		0.03003		

The results in table 5 show that as per the Sharpe Ratio (SR), the financial performance of all the indices were negative. This implies that generally both conventional and Shariah indices were performing at almost equal levels. However, the financial performance

of the Nifty Shariah 500 index is more negative higher than the conventional index. This implies that generally, the financial performance of the Nifty Shariah 500 has outperformed that of other indices during the study period. Furthermore, the SR for each index is higher

during the Ramadan days as compared to non-Ramadan days. This implies that all the indices provide higher returns during the Ramadan days.

More still, the study estimates the Treynor Ratio (TR) and the results are shown in Table 5. The estimation of coefficients (Beta) is needed to compute the TR, therefore, we estimate the CAPM model by considering Nifty 50 index as the market return. The beta coefficient have been calculated for the Nifty Shariah 50 and Nifty Shariah 500. The results in table 5 indicate that for the overall and the non-Ramadan period, there are significant but negative differences between Shariah Index and conventional index. Since the beta is negative, this implies that the shariah indices generally performance decent as compared to the conventional index throughout the study period and non-Ramadan period. Therefore, conventional indices are more likely to bring better returns to investors as compared to Shariah indices in this time frame. However, the TR is higher than zero in the Ramadan days and indicates that investors have the possibility to get a better return in this period.

Further, the study computes the Jensen's Alpha ratio under the CAPM method and the results are presented in Table 5. The results in table 5 reveal that the Jensen's Alpha ratio is close to zero during the overall

period and non-Ramadan period, suggesting no significant performance between the Shariah index and the common index in these time frames. However, during the Ramadan period, the results show that the Nifty Shariah 500 there was a positive and significant difference in the performance of this index as compared to the conventional index. This implies that the Nifty Shariah 500 index outperforms the conventional index during Ramadan. This means that the Shariah stocks provide higher returns in the Ramadan period than the non-Ramadan period during the study period. It suggests that investors' mood and mind have been motivated positively in the Ramadan days and it influences the stock returns in the market.

4.2.3. Ramadan effect on the returns of the stock market indices

The Ramadan effect on the stock market indices returns. The study estimates the models under the four alternatives to investigate the behavior of the returns in a different period of the study. The Nifty 50 index is used as the domestic benchmark index and the FTSE and FTSE-Shariah indices as a benchmark for the global index. The estimation of the results for the models are presented in Table 6.

Table 6: Results of the impact of Ramadan on the stock market indices

Variable	Nifty Shariah 500				Nifty Shariah 50			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	0.005 (0.858)	-0.000 (0.983)	0.004 (0.882)	-0.000 (0.957)	0.007 (0.8638)	0.002 (0.945)	0.006 (0.8801)	0.001 (0.9716)
FTSE Shariah(-1)			0.790 (0.000)	0.034 (0.030)			0.701 (0.0006)	0.078 (0.0284)
Ramadan	0.057 (0.611)	-0.009 (0.851)	0.050 (0.050)	-0.006 (0.907)	-0.012 (0.935)	-0.082 (0.488)	-0.018 (0.904)	-0.073 (0.5333)
FTSE	0.541 (0.000)		-0.219 (0.141)		0.562 (0.000)		-0.113 (0.572)	
Nifty 50		0.807 (0.000)		0.794 (0.000)		0.786 (0.000)		0.755 (0.0000)
R ²	0.225	0.829	0.241	0.829	0.148	0.481	0.156	0.483
D-W	2.143	1.849	2.111	1.855	2.427	2.501	2.421	2.511

Results in Table 6 show that the coefficients of the Ramadan are generally negative but not statistically significant. It indicates that the Ramadan effects are not associated with Shariah index returns after controlling the benchmark returns. However, the results for the Ramadan effect on Nifty Shariah 500 in model 3, after controlling for the global index FTSE and its Shariah are positive and significant ($\beta = 0.050$, $P = 0.05$). This implies that the excess returns during the Ramadan days is statistically higher than the returns of the non-Ramadan days for the Nifty Shariah 500 index as compared to the global index. No other significant Ramadan effect was achieved for both the shariah indices, hence the Ramadan effect was not generally associated with the Shariah indices.

4.2.4. Ramadan effect on the volatility of the stock market indices

To investigate the impact of the Ramadan effect on the volatility of the stock market indices, the data was analysed using the GARCH (1, 1) and GJR-GARCH (1, 1) models and the results of the models are presented in Tables 7 and 8.

The results in table 7 reveal that the Arch effect (Alpha) is positive and significant. This indicates the presence of volatility clustering, as such, the results show that there is a Ramadan effect on the volatility of the stock market indices. At the same time, the Garch effect (β) is positive, significant and higher than the Arch effect. Since the Garch effect is higher than the Arch effect, this indicates the presence of high volatility clustering

persistence. More so, a large value of the beta coefficient implies that shocks to conditional variance in the stock markets during Ramadan take a long time to decay or die out, so volatility persistence will be longer hence the market stabilizes slowly.

On the other hand, results from table 8 show that for the Gamma coefficient Nifty Shariah 500 is positive while that for Nifty Shariah 50 is negative. Since both coefficients are significant, the results indicate the presence of leverage effect in the stock market indices. However, the positive Gamma coefficient for Nifty Shariah 500 means that the volatility is impacted more by negative shocks than positive shocks of the same magnitude while the negative Gamma coefficient for

Nifty Shariah 50 means that the volatility is impacted more by positive shocks than negative shocks of the same magnitude.

The results therefore mean that the Nifty Shariah 500 index during the Ramadan period suffers much from the negative shocks as such this would be a good time for investors to buy stocks in this index which they can sell later when the leverage effect is highly affected by positive shocks and the vice versa is would be good for the Nifty Shariah 50 index. Therefore, the alternative hypothesis that there is a significant Ramadan effect on the volatility of the stock market indices in India is retained.

Table 7: Results of the Ramadan effect on the return and the volatility using GARCH (1, 1)

		Nifty 500 Shariah				Nifty 50 Shariah		
Variable	Coefficient	SE	Prob.	Coefficient		SE		Prob.
Mean equation				Mean equation				
Intercept	-0.009	0.014	0.5306	-0.038		0.035		0.2816
FTSE Shariah(-1)	0.020	0.013	0.1377	0.095		0.026		0.0002
Ramadan	0.003	0.045	0.9399	-0.020		0.069		0.7692
Nifty 50	0.812	0.010	0.000	0.763		0.016		0.000
Variance equation				Variance equation				
Intercept	0.012	0.003	0.0003	0.746		0.746		0.0000
RESID (-1)^2	0.012	0.012	0.0000	0.421		0.024		0.0000
GARCH (-1)	0.894	0.021	0.0000	0.017		0.037		0.6366
Ramadan	-0.005	0.004	0.1873	-0.442		0.044		0.0000
R²	0.829			0.482				
D-W	1.902			2.649				

Table 8: Results of the Ramadan effect on the return and the volatility using GJR-GARCH

	Nifty 500 Shariah				Nifty 50 Shariah		
Variable	Coefficient	SE	Prob.	Coefficient	SE	Prob.	
Mean equation				Mean equation			
Intercept	-0.013	0.015	0.3723	0.040	0.059	0.4986	
FTSE Shariah(-1)	0.021	0.013	0.1309	0.084	0.032	0.0105	
Ramadan	0.000	0.045	0.9964	-0.095	0.087	0.2743	
Nifty 50	0.806	0.010	0.0000	0.781	0.018	0.0000	
Variance equation				Variance equation			
Intercept	0.011	0.003	0.0003	1.277	0.090	0.0000	
RESID (-1)^2	0.034	0.015	0.0208	0.453	0.050	0.0000	
RESID(-1)^2*(RESID(-1)<0)	0.050	0.014	0.0004	-0.466	0.056	0.0000	
GARCH(-1)	0.898	0.021	0.0000	0.022	0.066	0.7333	
Ramadan	-0.005	0.004	0.1811	-0.899	0.085	0.0000	
R ²	0.829			0.481			
D-W	2.638			2.645			

RESID (-1)² (Arch effect-Alpha-Volatility clustering), RESID(-1)²*(RESID(-1)<0) (γ - Leverage effect), GARCH(-1) (Beta-Volatility persistence)

V. DISCUSSION

5.1. Day of the week and Month of the year effect on stock market indices

The study results reveal that Monday returns are negative and statistically significant for both Shariah and conventional indices while Tuesday returns are also significant but positive for both indices. The study result that Tuesday positively and significantly influence the stock market indices is in agreement with Turk Ariss et al. (2011) who reported that in the GCC stock market, the last trading day had a significant positive impact on the stock market. The results are consistent with Munusamy (2018) who reported that in India, Wednesday had a positive and significant impact on the stock market. On the other hand, the study result that Monday negatively but significantly influences the stock market indices is in disagreement with Dharani and Natarajan (2011) who reported that Nifty Shariah index and Nifty index average Monday returns were not significant. However the difference in results may be due to the difference in data analysis, since the current study used OLS model while that study used a two sample t-test. The negative influence of Monday could be due to its being the first trading day of the week, as such, investors are cautious of the stock market dynamics thus are less willing to buy. However, by Tuesday, they may have a clear picture of the stock market hence are more willing to trade, which may explain the positive significant influence of Tuesday.

The study results also revealed that Jumada-al-thani was the only month with a significant influence on the stock market indices although it was negative and other months including Ramadan had no significant effects. The study results are in agreement with Bialkowski et al. (2012) who reports that Ramadan does not affect the return of the common indices in the non-Muslim country. The study results are also in agreement with Munusamy (2018) who reported that the month of Jumada-al-thani had a negative effect on the stock market indices in India although the effect was not significant. The study results also consistent with the findings of Al-Ississ (2015), Al-Hajieh et al. (2011) and Halari et al. (2015) who reported that significant month of the year effect on the stock market indices, although they were positive unlike this study's results. The study results that the highest mean returns of Shariah indices are in the month of Rajat and Rabi-Al-Awwal agree with Munusamy (2018) who reported that significant returns are observed in the month of Rabi-Al-Awwal. However, the same results disagree with Halari, Tantisantiwongb and Power (2015) who while investigating the Islamic monthly anomalies in a Pakistani stock market reported that Rajat had the lowest returns. However, the study was carried out in a muslim majority country while the current study country is opposite which may explain the differences.

5.2. Risk-adjusted performance of the stock market indices

The study results as per the Sharpe Ratio reveal that during the Ramadan period, Nifty Shariah 500 positively and significantly outperforms the conventional index. The study result is in agreement with Dharani and Natarajan (2011) who reported that generally Shariah indices in India have a better financial performance in the Ramadan months as compared to the common indices. The study results also agree with Shahid, Sattar and Aftab (2019) who noted that the shariah indices perform better when compared using the risk-adjusted returns of Islamic stock market indices in the Ramadan period given the observance of ethical guidelines by the investors. This may be attributed to the notion that during Ramadan, the urge for halal investment drives investors to formulate investment strategies and choose a trading time in order to outperform on a risk-adjusted basis without violating the Islamic guidelines (Halari, Tantisantiwongb & Power, 2015).

Meanwhile, the study results disagree with Boujelbene (2012) who compared the risk-adjusted returns of Islamic stock market indices to those of their conventional counterpart indices, and found no differences in the performance of the various types of indices over the entire period. The discrepancy in the results of this study and that of Boujelbene (2012) may be due to the fact that he used data which included the period of the financial crisis.

The study results also indicated that for the overall and the non-Ramadan period, there are significant but negative differences between Shariah Index and conventional index with the latter performing better than the former. The study results agree with Turk Ariss et al. (2011) who reported that in non-Islamic countries, the Shariah indices perform less during the ordinary calendar period but better during Ramadan. The study results also agree with Mustafa (2017) who investigated the Islamic calendar effect on the Karachi stock market using both conditional and unconditional risk assessments and reported that there are less risks for the shariah indices during Ramadan but the risks are greater during non-Ramadan thus the Shariah indices perform poorer in such periods.

5.3. Ramadan effect on the returns of the stock market indices

The study results showed that the coefficients of the Ramadan are generally negative and non-significant. The study findings agree with Seyyed, Abraham and Mohsen (2004) who while examining the effect of Ramadan on weekly stock returns in the Saudi stock market reported that there was a decline in trading activity during Ramadan. They elaborated that the pricing of securities, especially option-like instruments, and the asset allocation choices made by investors in Islamic nations are significantly impacted by evidence of a systematic decrease in volatility during Ramadan. The study results also agree with Al-Najjar, Assous, Al-hsa,

Al-Najjar and Al-Rousan (2022) who reported that in Kuwait, Ramadan had no significant impact on forecasting and projecting stock market index performance. Shahid, Sattar and Aftab (2019) reported that the changes in the Ramadan effect on the stock exchange could be explained by the adaptive market hypothesis which allows the performance of the well-known Ramadan effect to change over time. They explain that the Ramadan effect therefore varies from one place to another and at a given point in time, thus this may explain why the current study results were negative although a number of other studies report otherwise.

Most studies disagree with the study findings, one such study is that of Bialkowski et al. (2012) who documented that the Ramadan positively influences the stock market returns. Similarly, the study findings by Al-Ississ (2015) are also contrary to the current study but consistent with the results of Bialkowski et al. (2012). Munusamy (2018) while supporting the contrary view bases his argument on the notion that Ramadan creates the positive mood and emotions in the investor behavior. This emotion is further expounded by Wright and Bower (1992) stating that a positive mood state can make investors more optimistic and willing to undertake riskier investment decisions.

Similarly, Halari, Tantisantiwongb and Power (2015) also disagreed with the current study. They reported that the calendar effect existed not only in Ramadan, but in other Islamic months as well. However, the study partly agrees with the current study when it noted that despite some months can produce negative returns like the month of Rajat. Despite this not being Ramadan, this result is an indication of probable negative month of the year effects.

Also contrary to the current study, Ali, Akhter and Chaudhry (2021) reported that Ramadan just as the holy days of Eid-ul-Fitr and 'Eid Milad-un-Nabi had positive effects on the stock market indices of eight Asian and African countries. Other studies such as Bialkowski, Etebari and Wisniewski (2014) have also found evidence of a strong Ramadan effect. However, almost all the studies that are contrary to the results of this study have been carried out in largely Muslim countries, as such, those results may not be transferable to explain the dynamics of the Indian stock Exchange Market which is in a Muslim Minority country.

5.4. Ramadan effect on the volatility of the stock market indices

The study results revealed that there is a significant Ramadan effect on the volatility of the stock market indices. The study results are in agreement Mustafa (2014) who reported that the Karachi Stock Market was experiencing the effects of Ramadan among which was volatility and a comparative increase in risk during the month of Ramadan. Results of another study by Bialkowski, Etebari and Wisniewski (2014) were also in agreement to that of this study. They reported that stock returns during Ramadan were significantly higher and less

volatile than during the rest of the year thus a strong Ramadan effect. Similarly, a study by Seyyed, Abraham and Mohsen (2004) while investigating how seasonality affects in stock returns and volatility Ramadan reported that there is a significant decrease in volatility during the month of Ramadan. They elaborated that the pricing of securities, especially option-like instruments, and the asset allocation choices made by investors in Islamic nations are significantly impacted by evidence of a systematic decrease in volatility during Ramadan. Similar results were also reported by Bialkowski, Bohl, Kaufmann and Wisniewski (2013) in Turkey.

On the contrary, the study results disagree with a number of studies. One such study is that by with Carmen (2022) who found out that there is no significant effect on returns and volatility by Ramadan. The study further reported that for conditional volatility, the Ramadan effect on volatility was not detected. This may be attributed to the generally positive investor mood or sentiment that the markets remain stable despite Ramadan being a time of celebration for Muslims (Al-Hajieh, Redhead & Rodgers, 2011). The study results also disagree with Iqbal and Muneer (2019) who reported that on the Pakistan stock exchange, the Ramadan effect on its volatility was insignificant a trend they pinned on the changes in emotions and perceptions of investors due to their past experience and perceived market consequences, and biased behaviors, as such they do not rush to buy or sell. However, all these studies were carried out in the majority Muslim world hence it may not be feasible to generalize their findings. Besides, the difference in the study period data may also bring about differences in results since none of the studies used data between 2018 and 2022 that the current study employed.

VI. CONCLUSION AND RECOMMENDATION

There was a significant day of the week effect on the stock market indices. Monday has a negative effect on the stock market indices while Tuesday effect is positive. This implies that Tuesday has a beneficial effect on the stock market behavior as such investors are more willing to buy and less willing to sell the stocks on Tuesday unlike Monday.

Further still, the month of the year effect on the stock market indices is generally not significant. However, the month of Jumada-al-thani is negative and significant for all the indices while the highest mean returns of Shariah indices are in the month of Rajat and Rabi-Al-Awwal. This implies that Shariah indices would be most profitable if bought in the month of Jumada-al-thani and sold in the months of Rajat and Rabi-Al-Awwal and most preferably on a Tuesday.

The results also show that the Shariah indices perform better during the Ramadan period as compared to their performance during the non-Ramadan period. This implies that it would be more profitable to investors if

they buy stocks in Shariah indices during the non-Ramadan period and sell them off during the Ramadan period.

There is no significant Ramadan effect on Shariah indices as compared to conventional indices and the relationship is insignificantly negative. This implies that investing in Shariah stocks with the hope of a trading boost during the Ramadan period in India is not profitably viable as the returns are low during this period. As such, it is better to instead invest in Shariah stocks during the non-Ramadan period.

There is a significant Ramadan effect on the volatility of the stock market indices in India. This implies that the high worship intensity and ethical investment associated with the Ramadan period affects the stock market's volatility. As such, the study recommends that investors buy Shariah stocks with a positive leverage effect during the Ramadan period which they can sell later when the leverage effect is negative and do the inverse when it comes to selling Shariah stocks.

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