MULTIDISCIPLINARY SCIENTIFIC RESEARCH
BJMSR VOL 9 NO 4 (2024) P-ISSN 2687-850X E-ISSN 2687-8518
Available online at https://www.cribfb.com
Journal homepage: https://www.cribfb.com/journal/index.php/BJMSR
Published by CRIBFB, USA

DISAPPEARING THE DAY OF THE WEEK EFFECT ON RETURN TO INVESTORS: NOVEL EVIDENCE FROM INDIAN STOCK MARKET

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ARTICLE INFO

Article History:

Received: 26th May 2024
Reviewed & Revised: 26th May to 5th August 2024
Accepted: 10th August 2024
Published: 20th August 2024

Keywords:

Stock Market, Return and Volatility, GARCH, Calendar Anomalies, Day of the Week Effect

JEL Classification Codes:

G11, G14

Peer-Review Model:

External peer review was done through double-blind method.

ABSTRACT

The efficiency in emerging markets is becoming more important as the trend of investment in these markets is accelerating nowadays. The level of market efficiency influences an investor's investment strategy because of its improper valuation. The improper valuation of securities may lead to abnormal gains for the investor. On the other hand, abnormal gain in a perfectly efficient market is impossible as the share price absorbs all the information available in the public domain. However, efficiency in its finest sense is a distant reality. Many researchers have pointed out different levels of efficiencies, including the presence of calendar anomalies. The purpose of the study is to capture the effect of the day of the week on the stock return and volatility in India. Daily time series data of Sensex and Nifty were collected from the two prominent exchanges of India, i.e. Bombay Stock Exchange and National Stock Exchange websites, for a period of four years. After validating stationarity with ADF and Phillip-Perron tests, the study used GARCH, EGARCH and TGARCH models to capture day impacts on stock return and volatility. The study reveals that the Tuesday effect persisted in the Indian stock market during the study period. Moreover, the TGARCH model was found to be the most suitable model for describing volatility behaviour in the Indian stock market. As other days in the week were less significant, the study's findings suggest that the gradual disappearance of day affects the Indian capital market. Another study finding is the significance of the leverage effect, which implies the increased role of bad news over good news while capturing the day-of-the-week effect. Considering the above facts, the present study's findings contribute to a deeper understanding of stock market dynamics and the challenge of the day-of-the-week effect on market efficiency.

INTRODUCTION

The basic premise of the Efficient Market Hypothesis (EMH) is that the current stock price fully reflects all the available information, which implies the random movement of stock price. So, investors cannot predict the share price and make an abnormal return. However, investors always try to predict the market movement by capturing some patterns to earn more investment returns. In the academic literature, specific patterns are observed in asset prices and returns that are inconsistent with the theory. These inconsistencies are referred to as anomalies. The calendar anomalies are one of them. The different days of the week may impact the stock return and volatility. This day-of-the-week effect poses an exciting challenge to the EMH. This anomaly states that the expected returns are different for all the weekdays. That means a day in a week generates higher or lower stock returns than other days. It follows a certain pattern over time in earning returns on the investment. Numerous literary works have archived the presence of this impact on the security exchanges as far as regrettable mean profits from the first day of the week and higher returns on the last day of the week. Wang, Li, and Erickson (1997) explain the negative average Monday stock return phenomena as one of the most puzzling empirical findings. Not only do the above two days affect the market, but any day of the week can also. The day-of-the-week effect not only exists in developed

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https://doi.org/10.46281/bjmsr.v9i4.2243

To cite this article: Acharya, P. N., Chaudhury, S. K., Bhanotu, V. R., Pradhan, S. K., & Patro, S. K. (2024). DISAPPEARING THE DAY OF THE WEEK EFFECT ON RETURN TO INVESTORS: NOVEL EVIDENCE FROM INDIAN STOCK MARKET. *Bangladesh Journal of Multidisciplinary Scientific Research*, *9*(4), 16-24. https://doi.org/10.46281/bjmsr.v9i4.2243

markets but also in emerging markets (Aziz & Ansari, 2015; Choudhary, 2000; Gbeda & Peprah, 2018; Wang et al., 1997). Osborne (1962), Cross (1973), Rozeff and Kinney (1976), and French (1980) were the first researchers to examine this calendar anomaly phenomenon. Investigation into this particular phenomenon, especially in emerging countries like India, has received less attention. Markets in emerging economies operate in a different environment than those in developed economies. In literature, however, different views regarding this issue have been expressed. Some mention its existence (Aziz & Ansari, 2015; Cai et al., 2006; Khan et al., 2023; Raj & Kumari, 2006; Samaniego et al., 2022) while others discuss its disappearance (Brooks & Persand, 2001; Basher & Sadorsky, 2006; Gbeda & Peprah, 2018; Khan et al., 2023; Karanovic & Karanovic, 2018; Miss et al., 2020). Investigating such anomalies gives us a deeper understanding of the phenomena that can be used in framing investment strategies to outperform the market. Hence, in the above backdrop, the main objective of this paper is to examine the possible presence of the day-of-the-week effect in the Indian capital market. For this purpose, time series data of two prominent stock exchanges, i.e., the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), were used. The study uses three heteroscedasticity models, namely Generalized Autoregressive Conditional Heteroskedasticity (GARCH), Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) and threshold Generalized Autoregressive Conditional Heteroskedasticity (TGARCH) to capture the volatility behaviour of the market indices.

The structure of the paper is as follows: The next section reviews the ancestral studies about the day-of-the-week effect and highlights their conclusions. This is followed by the methodology used in this study and analysis. The following section discusses the results after the analysis. The last section of the paper gives the concluding remarks on the study.

LITERATURE REVIEW

To analyze the presence of calendar anomalies on the return and volatility in the Indian capital market, the methodology used by previous studies and the conclusions reached become essential. In this context, the current literature review covers a period of almost 20 years, i.e. from 2000 to 2020. However, it is a fact that the history of observing the calendar anomaly dates back to the 1930s, in the earliest evidence of the study documented by Fields (1931, 1934), where he found that on Friday, investors sold off, causing the stock price to fall on Saturday. Then, the research on this topic gained momentum, and many researchers worldwide started researching the randomness of the share price movement and its degree. As stated above, some were able to capture a certain type of pattern, while others found its absence. Therefore, there remain contradictions about its presence and absence. If there is a particular style in share price movements, it indicates that the market is inefficient and that market anomalies can be used to investors' advantage. In other words, the stock market's efficiency and inefficiency are at the heart of the discussion. The efficient market hypothesis (EMH) suggests that it is impossible to consistently outperform the market by using publicly available information because stock prices always incorporate all relevant information.

The study of Brooks and Persand (2001) was on the Southeast Asian stock market, covering five prominent stock exchanges: South Korea, Thailand, Malaysia, Taiwan, and the Philippines. South Korea and the Philippines did not show any day effect on the return series. Monday is found to have a positive impact on Thailand and Malaysia's stock markets. Similarly, Taiwan experienced the Wednesday effect, and Malaysia experienced the Tuesday and Thursday effect. However, the effect remained absent in the case of the Philippines during this period. However, the study conducted by Berument and Kiymaz (2001) showed that Wednesday had the best returns, while Monday had the lowest returns. Additionally, Monday and Thursday were identified as the most and least volatile days, respectively. Basher and Sadorsky's study (2006) was on the emerging markets of twenty-one countries covering ten years. Out of the twenty-one stock markets, only ten stock markets, including the Philippines, showed the presence of this effect. This finding contradicted Brooks and Persand's (2001) study of the Philippines. Surprisingly, the Indian stock market did not show the presence of this effect. The study on two prominent Chinese stock exchanges, namely Shanghai and Shenzhen, by Cai et al. (2006) found a peculiarity in the weak effect. In the third and fourth weeks of the month, Monday returns were found to be significantly negative. However, in the second week, Tuesday returns were negative. In the same year, Raj and Kumari (2006), on the Indian stock market, reported no significant variation in return over different days of the week. The traditional Monday effect was also found to exist and be significantly positive compared to other days of the week. Interestingly, Germany, a developed country, did not show the so-called Monday effect (Miss et al., 2020). However, contrary to this, Choudhary (2000) detected Wednesday and Friday, and then the study of Srinivasan and Kalaivani (2014) disclosed the presence of Monday and Wednesday effects in the Indian market. Later, Arora (2018) studied this effect on Nifty using high-frequency data. This could be considered a unique study in the current literature review because of high-frequency data. The study used five-minute interval data from 2010 to 2011. Like Nishat and Mustafa (2002), the study period was divided into two sub-periods. The first was before the launch of a pre-opening session (i.e. before 18/10/2010), and the second was after the launch. Using the GARCH (1, 1) model, the study disclosed that volatility differed significantly across the trading days except for Monday in the first sub-period. In the second sub-period, it was Friday. In 2015, Aziz and Ansari found Monday and Wednesday's significance in the BSE and the NSE, using the GARCH (1, 1) model with different distribution assumptions such as normal, student's *t* and GED. A recent study by Chawla (2018) reported that Monday and Wednesday are significant in all the sectoral indices of Sensex. However, in the case of Nifty sectoral indices, Monday is significant. As far as the Sensex and Nifty are concerned, both Monday and Wednesday are significant. Choudhary's (2000) study also reported that Monday significantly negatively affected the stock return in Indonesia, Malaysia and Thailand out of seven emerging Asian stock markets, namely Indonesia, Malaysia, the Philippines, S. Korea, Taiwan, Thailand and India. Only the cases of Korea, Taiwan, and Thailand show a discernible negative Tuesday effect. The only market where Thursday has a substantial impact is Thailand. Alagidede (2008) attempted to test the stock markets of Egypt, Kenya, Morocco, Nigeria, South Africa, Tunisia, and Zimbabwe to capture this effect on the African continent. Out of these countries, only Nigeria and Zimbabwe showed the day-of-the-week effect,

while others did not. Besides, the Friday effect is seen in both countries. Later, Kamaly and Tooma (2009) reported that the day-of-the-week effect exists in the stock markets of Egypt (on Sunday and Thursday), Jordan (on Sunday and Thursday), Kuwait (on Monday, Tuesday, Wednesday, and Saturday), and the United Arab Emirates (on Sunday). Except for Jordan and Morocco, where higher-order GARCH models were examined and found to be adequate, both the GARCH and GARCH-M models with order one were determined to be the best match models. The study of Angelovska (2013) was on the Macedonian Stock Exchange, where the OLS approach failed to discover consistent evidence of the weekday effect. Advanced models, including GARCH (1, 1), EGARCH, modified M-GARCH (1, 1), and MEGARCH, showed this weekday effect on Thursday. Investors may be able to produce extraordinary returns by taking advantage of the predicted asset price swings. The Tunisian stock market was the subject of Chaouachi and Douagi's (2014) study from 1998 to 2011. The study revealed the effect of the day of the week on all the days except the initial two days of the week, i.e. Monday and Tuesday. Later, the same was supported by Derbali and Hallara (2016), who found a positive and significant return on Wednesdays and Thursdays, while Tuesdays showed a negative return. A comparative analysis using intraday and interday returns of the stock exchange of Sy and Derbali (2015) revealed the presence of the Thursday effect in the return series. A study on the Turkish stock market by Öncü, Ünal, and Demirel (2017) revealed the presence of this effect. Using the GARCH model of order one, they found the statistical significance of Monday and Thursday. Gbeda and Peprah (2018) revealed an interesting fact about this effect in the Stock Exchanges of Ghana and Kenya using different GARCH methods. Ghana does not show any evidence of this effect like Davidson and Faff (1999), whereas Kenya's Nairobi Stock Exchange (NSE) shows the Friday effect. Samaniego et al. (2022) reported the Friday effect in Mexico's stock market. A study on the Balkan countries was carried out by Karanovic and Karanovic (2018) and Baruah and Changkakati (2024), which was disclosed in line with Gbeda and Peprah (2018), where many Balkan countries do not experience the day effect except Croatia. In the case of Croatia, all the days have a significant effect on the return series, while Romania is said to have this effect on Wednesday. In a recent study by Khan et al. (2023), this effect is present in China, Indonesia, Pakistan, South Korea, Taiwan, and Thailand except India and Malaysia. This indicates that the day effect is gradually disappearing in the Indian capital market.

In the above-detailed review of literature, first of all, the day effect is present in different capital markets across the globe. However, there are various opinions concerning the impact of a particular day on other countries. Some of the studies also reported the absence of this effect. Nevertheless, most studies have captured Monday as the most influential day, followed by Wednesday, Thursday and Friday. As far as the Indian capital market is concerned, the Monday effect is still prevalent in some foreign countries. However, very few studies have found Wednesday to be the next most influential day. Market behaviour changes with the changes in the business environment, including the macroeconomic environment and many more, which may result in a change in investors' sentiment. This dynamism in the market behaviour may lead to the change of the day of the week effect. Hence, an effort has been made to verify whether the same day remains influential under such changing environments. Looking at another dimension of the study, i.e., the number of studies on emerging economies like India is much lower than that of developed economies. More research studies on these economies will be beneficial in generalizing these concepts and assessing their degree of efficiency. The detailed methodology of the research is explained below.

MATERIALS AND METHODS

The study aims to capture the effect of day-of-the-week on stock return and volatility. For this purpose, the daily price data of both the indices, i.e. Sensex and Nifty, have been collected from the websites of the BSE and NSE, respectively, and then returns are calculated using standard methodology. The pandemic started around April 2020, so the data after April 2020 are avoided. So, this study takes data into account for four years, i.e. from 2016-17 to 2019-20 are used in the study. The data's stationary was tested using the Augmented Dickey-Fuller and Phillips-Perron tests. Descriptive statistics have been used to explain the characteristics of the variables. Finally, the GARCH models, as proposed by Bollerslev (1986) and Ding, Granger, and Engle (1993), Nelson (1991) and Zakoĭan (1994), have been used to capture the day effects on the stock return and volatility. The day-of-the-week effect indicates that some days of the week have abnormally higher returns than the other days. The present study attempts to estimate the conditional volatility in the presence of the day-of-the-week effect and to find a suitable model for strategy building. For this purpose, the following equations have been considered for the estimation.

Mean Equation

$$R_t = \sum \phi_t D_t + R_{t-1} + \varepsilon_t \quad (1)$$

Where, R_t is the return at time t and R_{t-1} is the one period lagged return. D_t is the days of the week starting from Monday to Friday.

Variance Equation

GARCH Model

$$h_t = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_j h_{t-j} \quad (2)$$

Where, h_t is the conditional variance. $\mathcal{E}_t$ is the squared residuals.

EGARCH Model

$$\log(h_t) = \omega + \sum_{j=1}^{q} \alpha_j \left| \frac{\varepsilon_{t-j}}{\sqrt{h_{t-j}}} \right| + \sum_{j=1}^{q} \gamma_j \frac{\varepsilon_{t-j}}{\sqrt{h_{t-j}}} + \sum_{i=1}^{p} \beta_i \log(h_{t-i}) \quad (3)$$

The leverage impact is exponential because the conditional variance is in log form in the above equation instead of quadratic. The conditional variance is, therefore, more significant than zero. In this case, γ_j is considered as the leverage feature in the equation, and if $\gamma_1 = \gamma_2 =$..... = 0, the equation becomes symmetric. When $\gamma_j < 0$, it can be said that good news causes less volatility than bad news.

TGARCH Model

$$h_t = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{p} \gamma_i \varepsilon_{t-i}^2 d_{t-i} + \sum_{j=1}^{q} \beta_j h_{t-j} \quad (4)$$

Here, $_{it}$ is a dummy variable that takes the value 1 if $\mathcal{E}_t$ is less than 0; otherwise, it is 0. Coefficientγ_i is a leverage parameter that captures the effect of bad and good news on the volatility. When the coefficient γ_i is greater than zero, it means that bad news is mostly responsible for raising volatility.

In order to fulfil the above research objectives, the study uses several statistical and econometric tests to analyze the data. In the first step, descriptive statistics were performed to determine the nature and characteristics of the variables. The Mean, Median, Standard Deviation, Skewness, Kurtosis, Jarque-Bera test statistics, etc., are calculated in this regard. As a time series analysis, an attempt has been made to test the stationarity for drawing meaningful inferences. Once the data passed the tests, the next step is to estimate the proposed regression equations.

RESULTS

Descriptive Statistics for Sensex and Nifty returns, along with day-wise returns from 2015-16 to 2019-20, have been displayed in Table 1. The mean returns of the Sensex series are positive for all the trading days except Monday. The mean return of Tuesday is higher, and Thursday's return is lower among all the days of the week. The highest volatility, represented by standard deviation, has been noticed on Monday and the lowest on Tuesday. From the skewness, kurtosis and Jarque-Bera test, it has been confirmed that the day series of the Sensex is not normally distributed. Now, looking at the results of Nifty, Monday and Thursday are observed as the days of negative returns. Like Sensex, Tuesday shows the highest daily return in a week during the study period. In line with the study of Berument and Kiymaz (2001), Tuesday noticed the highest volatility in a week. The skewness, kurtosis, and Jarque-Bera tests also confirmed that the day series of the Nifty is not normally distributed.

Table 1. Descriptive statistics for the BSE Sensex and CNX Nifty daily returns

(a) BSE Sensex

Statistics	RETURNS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Mean	0.000231	-0.000760	0.000765	0.000630	2.98E-05	0.000479
Maximum	0.069796	0.037487	0.036152	0.069796	0.049446	0.057541
Minimum	-0.131526	-0.131526	-0.025836	-0.055907	-0.081778	-0.036441
Std. Dev.	0.010696	0.014790	0.007985	0.009247	0.010097	0.010204
Skewness	-2.391445	-4.531753	0.299259	1.096577	-2.170577	1.326259
Kurtosis	37.00949	37.58091	5.617492	23.91923	25.85189	12.07741
Jarque-Bera	48507.81	10383.64	58.87750	3668.433	4486.243	737.8405
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Observations	987	195	196	199	199	198

(b) NSE Nifty

Statistics	RETURNS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Mean	0.000190	-0.001238	0.001340	0.000330	-0.000540	0.001119
Maximum	0.066247	0.036915	0.038238	0.066247	0.038904	0.058329
Minimum	-0.129805	-0.129805	-0.025045	-0.055565	-0.083019	-0.026681
Std. Dev.	0.010660	0.014620	0.007823	0.009339	0.010296	0.009789
Skewness	-2.383660	-4.236626	0.480866	0.670203	-2.614791	1.744236
Kurtosis	35.26574	35.44457	5.859999	20.46892	23.70537	12.92870
Jarque-Bera	43749.00	9323.535	73.59487	2545.210	3819.508	895.2173
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Observations	987	199	194	199	201	194

After explaining the nature of the study's data, it is time to test whether the data series are stationary. If their means and variances change, the computed t-statistics under the OLS regression fail to converge to their true values as the sample size increases (Bhaumik, 2015). For this purpose, two tests, the Augmented Dickey-Fuller Test (ADF) and the Phillips-Perron Test (PP), have been performed.

Table 2. Results of Stationarity Test for Sensex and Nifty Returns Series

	Sensex		Nifty	
Parameters	**ADF Test**	**PP Test**	**ADF Test**	**PP Test**
Level	-12.5881	-32.9072	-12.6531	-32.9531
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Level and Intercept	-12.6040	-32.9088	-12.6613	-32.9475
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***

Note: *, **, and *** denote statistically significant values of 10%, 5%, and 1%, respectively.

Table 2 displays the results of the above tests. The study confirmed that both return series are stationary at level, level, and intercept. As the data are stationary in both the parameters mentioned above, the data should be used at its level to estimate the equations. The results of equations 1, 2, 3, and 4 for both markets, i.e., the BSE and NSE, are discussed below.

Table 3. Results of GARCH, EGARCH and TGARCH Equations for Sensex

Variables	**GARCH**	**TGARCH**	**EGARCH**
MONDAY	0.001077	0.000695	0.00063
	(2.3726)***	(1.5333)	(1.3746)
TUESDAY	0.001232	0.000718	0.000691
	(2.3539)**	(1.4878)	(1.5338)*
WEDNESDAY	0.000823	0.000441	0.000613
	(1.4426)	(0.8056)	(1.1514)
THURSDAY	0.000986	0.000636	0.000494
	(1.9386)**	(1.2917)	(1.0117)
FRIDAY	0.000525	2.9E-05	9.12E-05
	(1.1185)	(0.0783)	(0.2555)
Return(-1)	0.0499	0.06814	0.0638
	(1.3092)	(2.0982)***	(1.9461)**
	Variance Equation		
C	2.36E-06	3.23E-06	-0.58014
	(2.2181)**	(3.8628)***	(-5.9702)***
ARCH	0.1263	-0.01314	0.14364
	(6.6528)***	(-1.1953)*	(5.2177)***
Leverage	NA	0.242816	-0.19077
		(6.8758)***	(-8.4797)***
GARCH	0.8514	0.85073	0.95215
	(27.8047)***	(32.2742)***	(103.7885)***
Ljung Box Q (5)	1.3044	5.4733	3.7879
	(0.934)	(0.361)	(0.580)
Ljung Box Q (10)	5.7386	7.7067	10.399
	(0.837)	(0.657)	(0.495)
ARCH LM Test (5)	0.2356	1.0832	0.6977
	(0.9468)	(0.3679)	(0.6252)
ARCH LM Test (10)	0.5342	0.7368	1.0205
	(0.8666)	(0.6901)	(0.4237)

Note: Ljung Box Q statistics represent the squared residuals up to lag 5. *, **, and *** denote statistically significant values of 10%, 5%, and 1%, respectively.

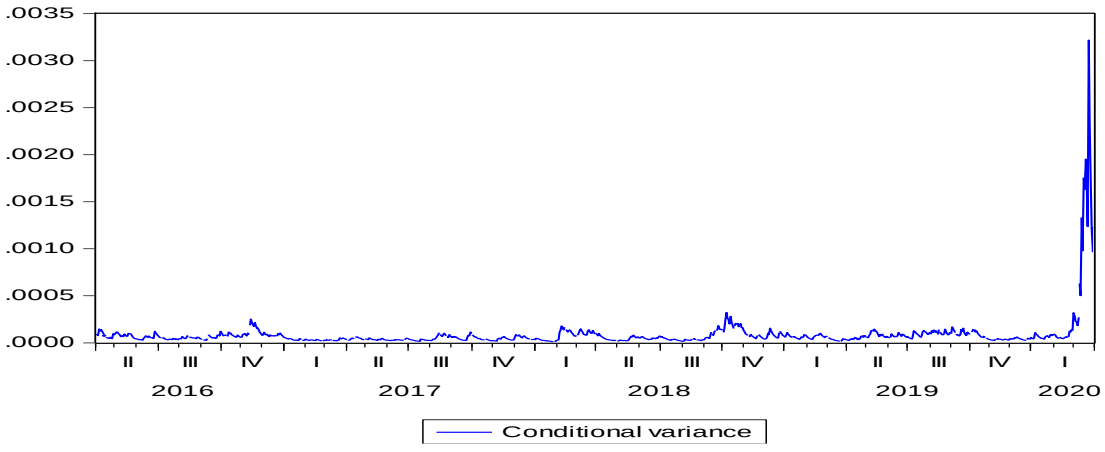

Figure 1. Conditional Variance (GARCH) of Sensex Series

Table 3 shows the GARCH model results for the Sensex return series. Only three days of the week, namely Monday, Tuesday, and Thursday, are significant in the mean equation of the GARCH estimation. In contrast, only Tuesday is significant in the other two estimations. Davidson and Faff (1999) and Chaouachi and Douagi (2014) support the study's outcome. Tuesday has the highest influence on the return series, while Friday has the lowest influence. From the variance equation, it is found that both the ARCH and GARCH terms are significant. Hence, past volatility affects present volatility

in the presence of day-of-the-week effects. The diagnostic tests confirm no Autocorrelation and ARCH effect in the residuals. The time series plot of conditional variances is displayed in Figure 1. It can be noticed how the variance of the error term changes over time and is not constant.

Table 4. Results of GARCH, EGARCH and TGARCH Equations for Nifty

Variables	GARCH	TGARCH	EGARCH
MONDAY	0.00108 (2.3620)	2.52E-05 (0.0590)	-0.000144 (-0.3325)
TUESDAY	0.001187 (2.2564)***	0.001124 (2.1553)**	0.001048 (2.0235)**
WEDNESDAY	0.000759 (1.3296)	0.000254 (0.6223)	0.000308 (0.6350)*
THURSDAY	0.000971 (1.9238) **	9.75E-05 (0.1995)	0.000142 (0.2983)
FRIDAY	0.00459 (0.9797)	0.000310 (0.6316)	0.000344 (0.7229)
Return (-1)	0.049961 (1.30279)	0.0739 (0.0209)**	0.0696 (2.0625)**
	Variance Equation		
C	2.41E-06 (2.2668)	3.49E-06 (3.7520)***	-0.5883 (-6.0177)***
ARCH	0.1276 (6.5852)***	-0.0118 (-1.1647)	0.1301 (4.4985)***
Leverage	NA	0.2583 (6.6769)***	-0.2112 (-8.9779)***
GARCH	0.8492 (27.6908)***	0.8420 (29.7432)***	0.9499 (103.1130)***
Ljung Box Q (5)	0.9493 (0.967)	5.1404 (0.399)	3.7739 (0.582)
Ljung Box Q (10)	3.9241 (0.951)	7.1624 (0.710)	10.598 (0.582)
ARCH LM Test (5)	0.1744 (0.9721)	1.0292 (0.3990)	0.7522 (0.5845)
ARCH LM Test (10)	0.3907 (0.9511)	0.7055 (0.7199)	1.0951 (0.3626)

Note: Ljung Box Q statistics represent the squared residuals up to lag 5. *, **, and *** denote statistically significant values of 10%, 5%, and 1%, respectively.

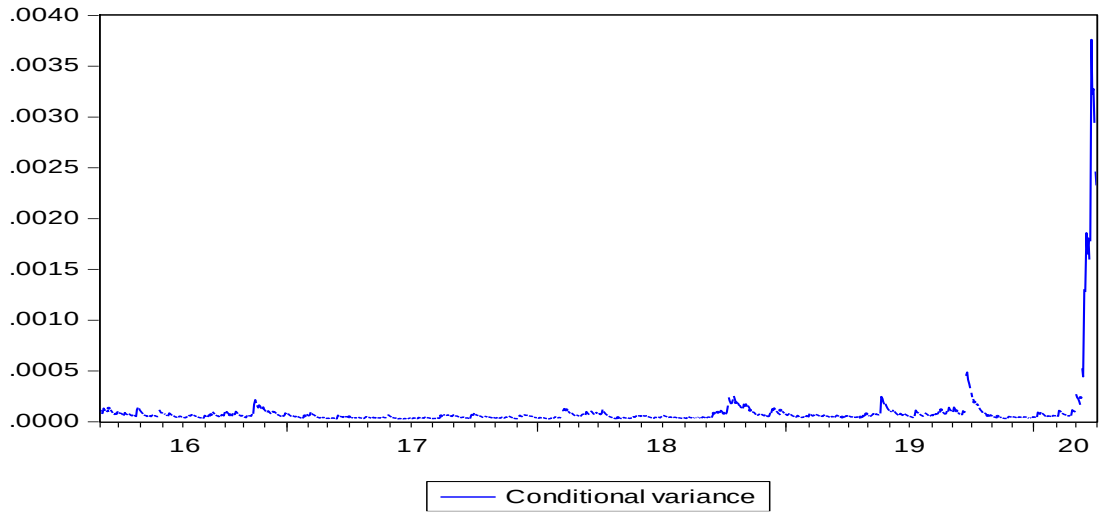

Figure 2. Conditional Variance (GARCH) of Nifty Series

Table 4 displays the GARCH model results for the Nifty return series. After correcting for autocorrelation and the ARCH effect, only one day, i.e. Tuesday, is significant at a 5% significance level in the NIFTY series. Like Sensex, Tuesday has the highest influence on the return series, while Monday has the most minor influence. From the variance equation, it is found that both the ARCH term and GARCH terms are significant. Hence, past volatility affects the present volatility. The diagnostic test verifies that the residuals in the various lagged values do not contain any evidence of autocorrelation or the ARCH effect. The conditional variance plot of the estimated equation is displayed in Figure 2.

Table 5. Model Fitting Criterion

Parameters	Sensex			Nifty		
	GARCH	TGARCH	EGARCH	GARCH	TGARCH	EGARCH
AIC	-6.8266	-6.8877	-6.8847	-6.8067	-6.8725	-6.8764
SIC	-6.7819	-6.8381	-6.8350	-6.7620	-6.8229	-6.8268
LL	3374.536	3405.656	3404.167	3364.731	3398.166	3400.102

Note: AIC stands for Akaike Information Criterion, SIC stands for Schwarz Information Criterion, and LL stands for Log Likelihood Test

Table 5 shows the test summaries of the model selected. The AIC, SIC, and LL determine how well a model fits the data from which it was built. When accepting a model, the lowest value is AIC/SIC and the highest is LL. The above table shows that the TGARCH in the case of BSE and EGARCH in the case of NSE fulfil the prescribed criteria. However, the above models' summation of ARCH and GARCH coefficients may not be overemphasized. The summation of both terms is either close to one or exceeding one in the case of GARCH and EGARCH, respectively. This indicates the high degree of persistence in volatility. As the GARCH coefficient value is higher than the ARCH coefficient value, it can be inferred that past volatility has a higher impact than past shocks.

DISCUSSIONS

The analysis revealed that Tuesday has the most significant positive average return, while Monday has the lowest negative return. Similarly, Monday has exhibited the most significant level of volatility in both the stock markets. Jarque - Bera test results suggest the non-normality of the returns series, which may be explained by volatility clustering and asymmetry effects. Now, looking at the results of the regression equations, it is revealed that Tuesday is found to be significant on the weekdays. Investors become cautious when deciding on Monday. They prefer to wait for a day to see the movements in the market. Results of the study support the findings of Basher and Sadorsky (2006), who found the disappearance of this effect in the Indian stock market but fail to support the studies of Raj and Kumari (2006), Choudhary (2000), Srinivasan and Kalaivani (2014), Aziz and Ansari (2015), Öncü, Ünal, and Demirel (2017) and Chawla (2018) who have detected so-called Monday effect on different stock markets around the world. Interestingly, in a recent study, Khan et al. (2023) reported the disappearance of the day effect in the Indian stock market. Looking at the issue of emerging only one day out of the five days in the present study, it can be said that with the increased prominence of information technology, the markets are gradually becoming more informationally efficient, and such price anomalies are being corrected through arbitrage (Kenourgios et al., 2005). However, this efficiency can be said to be achieved unless the lagged values of the conditional variance term are insignificant. Therefore, from the variance equation, it is found that the ARCH term and the GARCH term have coefficients other than zero for these two indices, which indicates that the lagged values of residuals and the lagged values of conditional variance are capable of capturing the future volatility of the market in the presence of the day effect.

CONCLUSIONS

The Indian capital market is expanding rapidly, with both established and new enterprises joining the market, where its efficiency has remained a central focus of research for many decades. It occupies a disproportionately large place in the everyday discussion of potential investors. The study examines the effect of the day of the week on the Indian stock market. The data sets, comprised of daily returns from 2016 to 2020, have been used in the study. To capture the asymmetry effect, three distinct GARCH models were employed, each assuming a Normal Gaussian Distribution. The average daily returns for the BSE and NSE are higher on Tuesday and extremely volatile on Monday. The study indicates that Tuesday has a considerable impact on the weekdays. Investors may exhibit a sense of caution while making decisions on Mondays. They prefer to wait for a day in order to see the fluctuations in the market. This pattern casts doubt on the efficient market hypothesis's foundational assumptions. However, correlating with Khan et al. (2023), this study also made an important indication by showing the significance of only one day out of five days a week. Therefore, the day-of-the-week effect is gradually disappearing in India. The available evidence about the day-of-the-week effect supports theories that link this effect to psychological factors and the assimilation of knowledge during weekends. Upon examining the variance equation, it is evident that the ARCH term and the GARCH term have non-zero coefficients for these two indices. This suggests that the previous values of residuals and conditional variance can effectively predict the future volatility of the market, taking into account the day effect. Thus, it appears that the Indian market is efficient, albeit in its weak form. Based on the established criteria, the Threshold GARCH model can describe the volatility in the Indian capital market. Furthermore, the study revealed the asymmetry effect, where bad news plays a more significant role in volatility. The results of the current study have theoretical and practical implications and can be utilized by the investors in designing the investment strategy(s). Investors can take advantage of this anomaly to make abnormal gains. However, this strategy may need to be revised in the long run. Investors must thoroughly comprehend the market dynamics before investing in a specific stock market. Market regulators are required to keep a careful eye on the reactions of investors with regard to the transmission of information and the trustworthiness of the disclosed information to bring market efficiency. The users should be careful when using the study results as they have limitations regarding sample size and study period. As the current study has used only two indices, the generalization of the findings cannot be possible. Similarly, the study highlighted the pre-pandemic phase. Hence, a post-pandemic study is necessary to check its continuity as, with time, the rationality of the investors improves. Surveying to investigate the preferences of investors for this specific oddity could be a potential avenue for future research.

Author Contributions: Conceptualization, P.N.A., S.K.C., V.R.B., S.K.P. and S.K.P.; Methodology, P.N.A. and V.R.B; Software, P.N.A.; Validation, S.K.C., S.K.P. and S.K.P; Formal Analysis, P.N.A. and V.R.B.; Investigation, S.K.C., S.K.P. and S.K.P.; Resources, P.N.A.; Data Curation, P.N.A.; Writing – Original Draft Preparation, P.N.A. and V.R.B.; Writing – Review & Editing, S.K.C., S.K.P. and S.K.P.; Visualization, S.K.C., S.K.P. and S.K.P.; Supervision, P.N.A. and V.R.B.; Project Administration, P.N.A.; Funding Acquisition, V.R.B. Author has read and agreed to the published version of the manuscript.
Institutional Review Board Statement: Ethical review and approval were waived for this study because the research does not involve vulnerable groups or sensitive issues.
Funding: The authors received no direct funding for this research.
Acknowledgments: Not Applicable.
Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.
Data Availability Statement: The data presented in this study are available upon request from the corresponding author. Due to restrictions, they are not publicly available.
Conflicts of Interest: The authors declare no conflict of interest.

REFERENCES

Alagidede, P. (2008). Day of the Week Seasonality in African Stock Markets, *Applied Financial Economics Letters*, *4*(2), 115-120. https://doi.org/10.1080/17446540701537749

Angelovska, J. (2013). An Econometric Analysis of Market Anomaly - Day of the Week Effect on a Small Emerging Market. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *3*(1), 314–332.

Arora, A. (2018). Day of the Week Effect in Returns and Volatility of Nifty 50: An Evidence using High-Frequency Data, *Pacific Business Review International*, *10*(8), 61–66.

Aziz, T., & Ansari, V. A. (2015). The day of the week effect: evidence from India. *Afro-Asian Journal of Finance and Accounting*, *5*(2), 99-112. https://doi.org/10.1504/AAJFA.2015.069886

Basher, S. A., & Sadorsky, P. (2006). Day of the Week Effects in Emerging Stock Market, *Applied Economics Letters*, *13*(10), 621–628. https://doi.org/10.1080/13504850600825238

Berument, H., & Kiymaz, H. (2001). The Day of the Week Effect on the Stock Market Volatility, *Journal of Economics and Finance*, *25*(2), 181-193. https://doi.org/10.1007/BF02744521

Bhaumik, S. K. (2015). Principles of Econometrics, Oxford University Press, New Delhi-110001.

Baruah, A., & Changkakati, B. (2024). Vader sentiment analysis on twitter: predicting price trends and daily returns in india's stock market. *Bangladesh Journal of Multidisciplinary Scientific Research*, *9*(2), 45-54. https://doi.org/10.46281/bjmsr.v9i2.2226

Bollerslev, T. (1986). Generalized Autoregressive Conditional Heteroskedasticity, *Journal of Econometrics*, *31*(3), 307-327. https://doi.org/10.1016/0304-4076(86)90063-1

Brooks, C., & Persand, G. (2001). Seasonality in Southeast Asian Stock Markets: Some new Evidence on Day of the Week Effects, *Applied Economics Letters*, *8*(3), 155-158. https://doi.org/10.1080/13504850150504504

Cai, J., Li, Y., & Qi, Y. (2006). The Day of the Week Effect: New Evidence from the Chinese Stock Market, *Chinese Economy*, *39*(2), 71-88. https://doi.org/10.2753/CES1097-1475390206

Chaouachi, O., & Douagi, F. W. B. M. (2014). Calendar effects in the Tunisian stock exchange. *International Journal of Behavioural Accounting and Finance*, *4*(4), 281-289. https://doi.org/10.1504/IJBAF.2014.067593

Chawla, V. (2018). Day of the Week Effect in Indian Stock Markets, *Mudra: Journal of Accounting and Finance*, *5*(2), 45–59. https://doi.org/10.17492/mudra.v5i2.14329

Choudhary, T. (2000). Day of the Week Effect in Emerging Asian Stock Markets: Evidence from the GARCH Model, *Applied Financial Economics*, *10*(3), 235–242. https://doi.org/10.1080/096031000331653

Cross, F. (1973). The Behavior of Stock Prices on Fridays and Mondays, *Financial Analysts Journal*, *29*(6), 67–69. https://doi.org/10.2469/faj.v29.n6.67

Davidson, S., & Faff, R. (1999). Some Additional Australian Evidence on the Day of the Week Effect, *Applied Economics Letters*, *6*(4), 247-249. http://dx.doi.org/10.1080/135048599353447

Ding, Z., Granger, C. W., & Engle, R. F. (1993). A long memory property of stock market returns and a new model. *Journal of empirical finance*, *1*(1), 83–106. https://doi.org/10.1016/0927-5398(93)90006-D

Gbeda, J. M., & Peprah, J. A. (2018). Day of the week effect and stock market volatility in Ghana and Nairobi Stock Exchange, *Journal of Economics and Finance*, 42, 727–745. https://doi.org/10.1007/s12197-017-9409-7

Derbali, A., & Hallara, S. (2016). Day-of-the-week effect on the Tunisian stock market return and volatility. *Cogent Business & Management*, *3*(1), 1-12. https://doi.org/10.1080/23311975.2016.1147111

Fields, M. J. (1931). Stock Prices: A Problem in Verification, *Journal of Business of the University of Chicago*, *4*(4), 415-418. Retrieved from https://www.jstor.org/stable/2349652

Fields, M. J. (1934). Security Prices and Stock Exchange Holidays in Relation to Short Selling, *Journal of Business of the University of Chicago*, *7*(4), 328-338. Retrieved from https://www.jstor.org/stable/2349545

French, K. R. (1980). Stock returns and the weekend effect. *Journal of Financial Economics*, *8*(1), 55–69. https://doi.org/10.1016/0304-405X(80)90021-5

Kamaly, A., & Tooma, E. A. (2009). Calendar Anomalies and Stock Market Volatility in Selected Arab Stock Exchanges. *Applied Financial Economics*, *19*(11), 881-892. https://doi.org/10.1080/09603100802359976

Karanovic, G., & Karanovic, B. (2018). The Day-of-the-Week Effect: Evidence from Selected Balkan Markets, *Scientific Annals of Economics and Business*, *65*(1), 1-11. Retrieved from https://saeb.feaa.uaic.ro/old/index.php/saeb/article/view/211

Kenourgios, D., Samitas, A., & Papathanasiou, S. (2005, July). The day of the week effect patterns on stock market return and volatility: Evidence for the Athens Stock Exchange. In *Proceedings of the 2nd Applied Financial Economics (AFE) International Conference on "Financial Economics", Samos island, Greece*. http://dx.doi.org/10.2139/ssrn.2494791

Khan, B., Aqil, M., Kazmi, S. H. A., & Zaman, S. I. (2023). Day-of-the-week effect and market liquidity: A comparative study from emerging stock markets of Asia. *International journal of finance & economics*, *28*(1), 544-561. https://doi.org/10.1002/ijfe.2435

Miss, S., Charifzadeh, M., & Herberger, T. A. (2020). Revisiting the monday effect: a replication study for the German stock market. *Management Review Quarterly*, 70, 257–273. https://doi.org/10.1007/s11301-019-00167-4

Nelson, D. B. (1991). Conditional Heteroskedasticity in Asset Returns: A New Approach, *Econometrica*, *59*(2), 347–370. https://doi.org/10.2307/2938260

Nishat, M., & Mustafa, K. (2002). Anomalies in Karachi Stock Market: Day of the week effect. *The Bangladesh Development Studies*, *28*(3), 55–64. Retrieved from https://www.jstor.org/stable/40795659

Osborne, M. F. M. (1962). Periodic Structure in the Brownian Motion of Stock Prices, *Operation Research, 10*(3), 345–379. https://doi.org/10.1287/opre.10.3.345

Öncü, M. A., Ünal, A., & Demirel, O. (2017). The day of the week effect in Borsa Istanbul; a GARCH model analysis. *Uluslararası Yönetim İktisat ve İşletme Dergisi*, *13*(3), 521-534. https://doi.org/10.17130/ijmeb.2017331332

Raj, M., & Kumari, D. (2006). Day of the Week and other Market Anomalies in the Indian Stock Market, *International Journal of Emerging Markets*, *1*(3), 235-246. https://doi.org/10.1108/17468800610674462

Rozeff, M. S., & Kinney Jr, W. R. (1976). Capital market seasonality: The case of stock returns, *Journal of Financial Economics*, *3*(4), 379–402. https://doi.org/10.1016/0304-405X(76)90028-3

Srinivasan, P., & Kalaivani, M. (2014). Day of the Week Effects in the Indian Stock Market, *Int. Journal of Economics and Management*, *8*(1), 158-177. Retrieved from http://www.ijem.upm.edu.my/vol8no1/bab09.pdf

Sy, A., & Derbali, A. (2015). The day of the week effects in the Stock Exchange of Casablanca: Analysis by Intraday and Interday Returns, *International Journal of Critical Accounting*, *7*(4), 366–386. https://doi.org/10.1504/IJCA.2015.072003

Samaniego, J. D. V., Salgado, R. J. S., & Pérez, M. A. L. (2022). Are there "day-of-the-week" and "holiday" anomalies in the mexican stock market?. *Contaduría y Administración*, *67*(3), 111-134. https://doi.org/10.22201/fca.24488410e.2022.2920

Wang, K., Li, Y., & Erickson, J. (1997). A new look at the Monday effect. *The Journal of Finance*, *52*(5), 2171–2186. https://doi.org/10.1111/j.1540-6261.1997.tb02757.x

Zakoĭan, J. M. (1994). Threshold Heteroskedastic Models, *Journal of Economic Dynamics and Control*, *18*(5), 931-44. https://doi.org/10.1016/0165-1889(94)90039-6

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