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Linkages Between Festivals and Stock Market Returns: A Study of Indian Stock Market

Kokila Kalimuthu

Research Scholar, VIT Business School
Vellore Institute of Technology, Chennai, Tamil Nadu, India.
E-mail: kokila.k2020@vitstudent.ac.in

Shaik Saleem

Assistant Professor, VIT Business School
Vellore Institute of Technology, Chennai, Tamil Nadu, India.
**Corresponding author:* E-mail: saleemshaik57@gmail.com

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Abstract

Purpose –The aim of this paper is to analyse the performance of the Nifty 50 and selected sectoral indices. Further, an attempt is made to examine the effect of various festivals on the performance of these indices.

Design/methodology/approach – For study purposes, closing prices of Nifty 50 and selected sectoral indices have been collected from the NSE India for the period of January 1, 2016, to December 31, 2021. The study employs descriptive statistics to know about the sample mean, standard deviation, sample variance, maximum, minimum, skewness, and kurtosis. Paired t-test was used to compare the returns of indices before and after the festival. Unit root test was used to test stationarity. Finally, the Granger causality test was applied to study the relationship between the Nifty 50 and sectoral indices returns.

Findings – According to this study, higher returns have been found for indices during Ramadhan and Christmas. Investors purchasing and selling behaviour is more positive during these times. During the pre-covid 19 period, Christmas is the only festival that shows positive returns in all sectoral indices. There is a positive return of all indices on Ramadhan and Diwali days during covid 19 period. The paired sample t-test showed that among all the festivals, Diwali is the only festival, which has an impact on the Nifty 50 and Nifty Auto index. The Granger causality test discovered a bidirectional relationship between Nifty Oil & Gas and Nifty health care, as well as Nifty 50 and Nifty Bank.

Originality/value – Festivals are one of the factors that attract investors into the market. It implants a positive attitude in the minds of investors. Decision science enables investors to analyse, quantify, and track the performance of their investments in different sectors. The findings of the study would be useful to investors, to come up with some investment strategies and maximize their returns during the festival season. Fund managers can restructure and allocate their funds based on sectoral indices performance.

Keywords: Nifty 50, Sectoral Indices, festivals, paired t-test, granger casualty test.

JEL classification: G10, G11, G14, E44

1. Introduction

The Efficient Market Hypothesis has major implications for investors and businesses (Kelikume, 2016). It states that when markets are efficient there is no scope for investors to make excessive profits because everything is already fairly and properly priced. The presence of anomalies in the stock market changes this notion. A stock market anomaly is a price fluctuation that deviates from the stock market's predicted behaviour. These anomalies could be caused by a variety of factors, including fresh information (Srilakshminarayana, 2021) not being updated promptly, various tax treatments, cash flow adjustments, and investor behavioral restrictions (Tiwari et al., 2021). The calendar effect is one of the anomalies that affect the stock market return (Urquhart & McGroarty, 2014). It refers to variations in market price or market index as a result of how certain times are associated with stock prices. There are several theories that indicate that certain days, months, and times have considerable links with stock prices. The October effect, January effect, Monday effect, and Halloween impact are all popular calendar effect theories. Due to their relation with certain seasons, the calendar impact shows apparent behaviours of stock prices in the stock market. Like various calendar anomalies, religious holidays and other special occasions are systematically examined to determine how they affect stock market returns.

Stock market prices are an indicator of a country's economic growth (Adebayo et al., 2022a; Darsono et al., 2022). Countries with higher economic growth have higher stock market performance (Paramati & Gupta, 2011). The stock market's performance is not entirely based on macroeconomic variables. (Adebayo et al., 2022b; Yang et al., 2022; Gupta et al., 2021; Rjoub et al., 2021; Saungweme & Odhiambo, 2021; Lv et al., 2019). The stock market is significantly influenced by sectoral market growth contributions as well. (Karatat & Unal, 2022; Hismendi et al., 2021; Vo et al., 2019). Sectoral indices summarize and help in comparing the performance of various industries or sectors (Aravind, 2017). It also allows investors to compare a stock's performance corresponding to a specific sector (Alam et al., 2021; Sahoo & Kumar, 2021).

India is a country with a rich heritage and diverse religions. Festivals are a vital part of Indian culture. These festivals bring people closer and create a strong bond of humanity (Gaur & Chapnerkar, 2015, Vinnie Jauhari & Sandeep Munjal, 2015). All over the world religious beliefs and consumer sentiment (Rehman & Shahzad, 2016) play a significant role in buying and selling goods and services (Ashari & Soesetio, 2021). Demand and sales during this period act as an indicator of the vitality of the business and the economy. During the festival season, consumers tend to spend more (George & Chandrasekar, 2015) and many of them decide to upgrade the products they have. During the festival seasons, there is a great amount of demand for consumer goods (George, 2013). This increasing demand leads to a surge in industrial activity and investments. Therefore, sales of textiles, automobiles, consumer durables, food, jewelry, electronic goods, tourism, and real estate pick up (Maheta, 2014; Kurisetti et al., 2018; Ramya & Bhuvaneshwari, 2021; Prasad & Gangineni Danaiah, 2016). All of them have a substantial effect on the stock market's growth and performance in terms of both sectoral and overall indices.

1.1 Stock Market Indices

A stock index is a tool that tracks the price changes of a set of stocks. Investors and financial institutions frequently use indices as benchmarks against which they compare their own investment

performance (Pandey et al., 2017, Kedia, 2016). The wide range of stock market indices can also aid investors in identifying various sectors that are outperforming or underperforming the overall market. Stock indices are continually updated during the trading day to give real-time information, and they also provide historical market data spanning decades. The following are the sectoral indices used for this study.

Nifty 50

The NIFTY 50 is a benchmark Indian stock market index that was introduced on April 22, 1996. It characterizes a weighted average of 50 of the country's key firms listed on the NSE (accessed from the NSE website).



Figure 1 Nifty 50 movements from 1996 to 2022 (Source: nseindia.com)

Nifty Auto Index

The NIFTY Auto Index represents the market performance of the automobile sector. It consists of 15 exchange-listed, tradable companies. Automobiles (four-wheelers, three-wheelers, and two-wheelers), auto ancillaries, and tyres are all represented in the index. It can be used to benchmark fund portfolios and introduce index funds, ETFs, and structured products (accessed from the NSE website).



Figure 2 Nifty Auto Index movements from 2004 to 2022 (Source: nseindia.com)

Nifty Bank Index

The NIFTY Bank Index includes the most noteworthy and liquid banking firms in India. It serves as a benchmark for investors and market intermediaries, catching the performance of Indian banks. The Index is made up of a maximum of 12 NSE-listed firms. The NIFTY Bank Index can be used to benchmark fund portfolios and establish index funds, and ETFs (accessed from the NSE website).



Figure 3 Nifty Bank Index movements from 2001 to 2021 (Source: nseindia.com)

Nifty FMCG Index

The NIFTY FMCG Index reflects the performance of FMCGs. It is made up of 15 stocks from the FMCG industry that is traded on the NSE. The NIFTY FMCG Index can be used for fund portfolio benchmarking, index fund launches, ETF launches, and structured product launches (accessed from the NSE website).



Figure 4 Nifty FMCG Index movements from 1997 to 2021 (Source: nseindia.com)

Nifty Health Care Index

The Nifty Healthcare Index shows the performance of healthcare firms. It includes a maximum of 20 exchange-listed, tradable companies and can be used to benchmark fund portfolios, as well as to launch index funds, ETFs (exchange-traded funds), and structured products (accessed from the NSE website).



Figure 5. Nifty Health Care Index movements from 2006 to 2022 (Source: nseindia.com)

Nifty IT Index

The NIFTY IT index measures the performance of ten NSE-traded firms. It is measured using the free-float market capitalization. The NIFTY IT Index can be used for fund portfolio benchmarking, index fund launches, ETF launches, and structured product launches (accessed from the NSE website).



Figure 6. Nifty IT Index movements from 1997 to 2021 (Source: nseindia.com)

Nifty Oil & Gas Index

The Nifty Oil & Gas Index shows the behaviour of firms in the oil, gas, and petroleum industries. It can have 15 tradable, exchange-listed firms. The Nifty Oil & Gas Index can be used to fund portfolio benchmarking, index fund launches, ETF launches, and structured product launches (accessed from the NSE website).



Figure 7 Nifty Oil & Gas Index movements from 2006 to 2022 (Source: nseindia.com)

1.2 Indian festivals

India is a country known for its numerous festivals (Varma, 2013). These festivals are meant to cheer special moments and unite people to come together for celebration and happiness. It is a way to celebrate wonderful heritage, culture, and traditions (Nayak, 2003). Following are the festivals chosen for study purposes.

Pongal is a major festival celebrated in the month of January. It marks the end of the winter season and the beginning of the sun's northward movement. Different states celebrate this festival under different names, depending on the traditions and festivities. It is a major harvest festival celebrated by Hindus across India.

Ramadhan is the Islamic holy month of fasting by Muslims worldwide. It is a month of prayer, fasting from sunrise to sunset, and midnight feasts for the faithful. This festival marks the end of the Holy month of Ramadhan and desserts play an important role in the celebrations.

Navratri means nine nights. It is one of the most popular Hindu festivals dedicated to worshipping the nine avatars of Goddess Durga. It is observed in the month of October to symbolize the victory of good over evil.

Diwali – The Festival of Lights commemorates the triumph of good over evil. It is celebrated at the end of October or the beginning of November. People begin the day with a special pooja with new

traditional clothes, sweets, and glowing lamps. There is a special trading session called “Muhurat Trading” on Diwali day. It is for an hour to celebrate the auspicious occasion. People believe (Misra, 2019) that trading Muhurat hour creates a better chance of earning wealth and gaining prosperity throughout the year. This auspicious session holds huge value for millions of traders and investors (Khanna & Sampat, 2015).

Christmas marks the birth of Jesus and it is celebrated every year on the 25th of December. It is a famous festival for Christians and it reminds the importance of giving and sharing with friends and family.

Festivals are one of the aspects that attract investors (Al-Ississ, 2015, Vinnie Jauhari & Sandeep Munjal, 2015). This is the season when the bulk of the annual sales (Khanna, 2015) of consumer goods will happen. This consumption boom leads to a surge in investment activity. The stock market is persuaded by the inflow and outflow of funds when people invest or withdraw money. The price movements of stocks in sectors may be influenced by festivals (Badru et al., 2021). Understanding the relationship between festivals and the success of various industries will considerably support investors in their portfolio review process. Investors are more positive (Ryu et al., 2017, Al-Hajieh et al., 2011) during festivals and keen to invest on those auspicious days (Sankararaman et al., 2009). Decision science helps investors to decide which sector is good for investment. It also aids in the future decision-making process. Thus, the current study looks at how festivals affect the Nifty 50 and sectoral indices.

The intention of this paper is to examine how the festive season affects the Indian stock market. The study uses one aspect of behavioral finance, religion, to predict the everyday market return of the NSE sectoral indices in order to assess market efficiency. Religious faith, in general, plays a significant effect in people's lives, behaviour, and choices. Even though religious practices have a significant impact on economic activity, researchers have mostly neglected this aspect. However, a recent universal trend in literature reveals the growing use of religious aspects in business and investment analysis. However, there is still a lack in the area of study in India. This study attempts to address this gap by examining how festivals affect the return and volatility of the stock market. It also analyses whether the sectoral indices have a festival impact or not. The following is the outline of the paper: Section 2 examines the literature on the impact of festivals on the Nifty 50 indices. The data and methodology of the research are explained in Section 3. The study's findings are covered in Section 4. The study report concludes in Section 5.

2. Literature Review

As per ‘Efficient Market Theory’ when fresh information enters the economy, it is promptly reflected in stock prices. Investors purchasing and selling activity is influenced by information flow in the markets. According to certain studies, the stock market's behaviour is influenced by holidays, seasons, faith, and emotion. Ali et al. (2017) investigate the impact of Muslim holy days on Asian financial

markets. They look at the stock markets of Pakistan, Bahrain, Saudi Arabia, and Turkey from 2001 to 2014. They discovered that 'Eid-ul-Fitr' (Holy Day) had a significant impact on Asian stock outcomes. The Friday impact is the single (Gregorian) calendar anomaly in Asian markets. The relationship between the Nifty 50 and sectoral indices was investigated by Singh and Kumar (2020). The unit root and the Granger-causality test were used to analyse the underlying relationship between the Nifty 50 and sectoral indices. According to the study's findings, the financial services industry outperformed all indexes, followed by the banking sector. However, the pharmaceutical and real estate industries underperformed. Other sectors' indices are less volatile than the Nifty-Fifty.

The research of Hassan and Kayser (2019) looks at the relationship between Ramadhan, the Muslim holy month, and the DSE's market return, volatility, and volume of transactions. According to this analysis, the Ramadan month has no relevant relationship with stock market return and volatility. However, it has a negative impact on the DSE's daily trade. Tan and Ozlem (2018) investigate the effect of Ramadan holidays on stock exchanges in 16 Muslim-majority countries. The Muslim holy days are divided into three periods, according to the study: the first ten days of Ramadhan, the second ten days of Ramadhan, and the third ten days of Ramadhan. Their data show that thirteen Muslim financial markets in sixteen nations have favourable returns during Ramadhan. There were statistically significant variations amongst the stock markets studied. (Dubai Financial Market, Amman Stock Exchange, Karachi Stock Exchange, and Tunis Stock Exchange). Kedia (2016) studies the impact of Indian festivals on the BRICS stock market indices. The study found that there is no before and after-festival influence on stock indices in Brazil, Russia, China, and South Africa. They concluded that the event had little impact on the BRICS countries' market indices. Munusamy (2018) examines how stock market returns differ during Ramadhan and other days. This article also investigates the effect of Ramadhan on the returns and volatility of Indian stock market indices. According to the study, the average return of the indices during Ramadhan days is higher than the average return during non-Ramadhan days.

Another researcher, Norvaisiene et al. (2015), investigates seasonality evidence trends in Baltic stock markets and determines whether a trading technique based on seasonal anomalies allows an investor to profit abnormally. The daily log return indices of the Baltic stock exchange, Nasdaq OMX Tallinn, Nasdaq OMX Riga, and Nasdaq OMX Vilnius were studied from 2003 to 2014. There is evidence that the Halloween effect, as well as the Month effect, exist in Estonia and Lithuania. Ramadhan's effects on the Karachi stock market were investigated by Atoq Ur Rehman Shah and Syed Nasir Ahmed (2014). The KSE market exhibits no discernible behaviour throughout the month of Ramadhan. They determined that the Ramadhan effect on the Karachi Stock Exchange in Pakistan is minimal. A similar study was conducted by Khan et al. (2016) and Munusamy and Natarajan (2011). They found that there is the presence of the Ramadhan effect.

Srikanth and Ram (2013) studied the effect of the Diwali festival on the Indian stock market. For analysis purposes, they considered 10 working days before and 10 working days after Diwali. Their findings showed that the Diwali influence on the Indian stock market is not statistically significant. Agrawal Al-Hajieh et al. (2014) findings also support this outcome. Harneeth Singh (2018) analysed the festival's impact on Nifty return. The study concluded that there is no festival impact on Nifty return. Safeer and Kevin (2014) examined the impact of market anomalies in the Indian stock market. The study revealed that there was a weekend effect on the Indian stock market. Mohammad

Salahuddin Chowdhury and Tarik Hasan (2019) studied the Ramadhan effect in the Mdaghri South East Asian stock market. The study concluded that there is no Ramadhan effect in this market.

Shanmugasundram and John Benedict (2013) investigated the numerous risks in sectoral indexes and the CNX Nifty index, as well as their long-term relationship. For the study, the CNX Nifty index, CNX Auto index, CNX Bank index, CNX FMCG index, CNX Infrastructure index, and CNX Information Technology index were used from 01/01/2004 to 30/04/2012. According to the data, the mean ratings of different time intervals differ significantly.

Sobti (2018) studied the magnitude and value effects of seasonal anomalies like January, April, and Diwali effects in the Indian equity market. The period of study is 1996 to 2016 considering the Nifty 500 as the benchmark index. The study concluded that there is a presence of magnitude and value effect and there is no Diwali effect in India for the study period. Wen et al. (2019) used the nonlinear autoregressive distributed lags (NARDL) model and the Diks and Panchenko (DP) test to investigate the nonlinear co-integration and nonlinear causality linkages between oil prices and the Chinese stock market on a global and sectoral scale. The major component responsible for the nonlinear causality between oil prices and the Chinese stock market, according to the data, is volatility persistence, not asymmetrical co-integration. However, few studies employed multivariate nonlinear causality (Bai, et al. 2010, 2011, 2018) and normality test (Hui, et al. 2017) in their analysis.

The impact of the covid 19 and its consequences are felt differently by different sectors. There are considerable amounts of studies on the impact of the covid 19 on stock market return and liquidity. For instance, Nguyen, et al. (2021) examine the covid impact on Vietnam's financial sector. They concluded that covid 19 has a significant impact on stock return. Some other studies have been carried out in this area (Alaoui Mdaghri et al. 2021; Baig et al. 2021; Harjotos & Rossi 2021; Al-Awadhi et al. 2020; Ali et al. 2020; Topcu & Gulal, 2020).

In the above literature studies, it is visible that many studies have examined the stock return during festivals. However, few studies discuss the festival effect based on sectoral indices. So, there is a need for a study to analyse the festival impact (including covid 19 period) and sectoral indices return in a simultaneous way.

3. Methodology

The study uses daily market returns for the period of January 1, 2016, to December 31, 2021, to evaluate the relationships between the Nifty 50 and particular sectoral indexes. The weighted average of sectoral indexes including Nifty auto, Nifty bank, Nifty FMCG, Nifty IT, Nifty healthcare, and Nifty oil & gas is used. The data are retrieved from the NSE website and the daily returns percentage are calculated as follows:

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

where P_t is the index's current price and P_{t-1} is the index's closing price on the day before.

3.1 Festivals and Stock Market Returns

It is evident from the literature that festivals affect stock market returns. Many studies have been carried out to study the link between festivals and stock market return showing that there is a link between festivals and the stock market return. Mahata (2014) examined festival effects in the Indian stock market. He found that festivals like Holi, Janmashtami, and Diwali had an impact on the Indian stock market. Other researchers like Tan and Ozlem (2018), Al-Ississ (2015), and BialKowski et al. (2012) tested the festival effect on different stock markets and concluded that there is a festival effect on the stock market. The following hypothesis has been developed in the current study to assess the impact of festivals:

H0: There is no effect of festivals on the stock market indices' performance.

The study's main goal is to understand the impact of festivals on sectoral indices. For this purpose, festivals like Pongal, Ramadhan, Navratri, Diwali, and Christmas were considered as these festivals are celebrated for a minimum of four days to a maximum of one month.

First, daily returns of indices were computed using equation-1 and average returns of indices were computed for the following two different periods of ten days each with reference to the specific festival, (i) Ten trading days before the festival and (ii) Ten trading days after the festival (Srikanth and Ram, 2013). Any trading on the festival day is not taken into consideration for analysis. The study also examined the pre-covid 19 (2018 January-2019 December) and covid 19 period (2020 January to 2021 December) return on sectoral indices during festivals.

Paired t-test is used to find out the difference in average daily returns of indices before and after the festivals (Prakash & Yogesh 2021; Waryati Waryati et al. 2021; Kiryanto et al.2022; Yunus Kasim et al. 2022). Daily returns of indices for ten days before the festival and ten days after the festival have been taken to conduct the paired t-test.

Unit Root Test – Augmented Dicky Fuller (ADF) Test

The augmented Dicky Fuller test (Dickey and Fuller (1979, 1981) and Dickey (1984)), is the widely used statistical model to check the stationarity of time-series data. A time series y_t ($t=1,2,\dots$) is said to be stationary if its statistical properties do not vary with time as it will be the same as in the past.

$$y_t = c + \beta t + \alpha y_{t-1} + \varphi_1 \Delta Y_{t-1} + \varphi_2 \Delta Y_{t-2} + \dots + \varphi_p \Delta Y_{t-p} + e_t \quad (2)$$

where y_t stands for time series data to be examined, c is a constant factor and is the coefficient on a certain time trend, P is the autoregressive process' lag order, and e_t is the white noise error term. A random walk is modeled by $\alpha = 0$ and $\beta = 0$. To model a random walk with drift, constraint $\beta = 0$ must be met. The time series data are typically assumed to be non-stationary while conducting the test. The likelihood of rejecting null hypotheses increases if the test statistics are unfavourable.

Granger Causality Test

The Granger causality test is a statistical test used to determine whether one time series can be used to forecast data from another time series. It is a predictive statistical concept of causality. It means if

X Granger causes Y, then past values of X must provide data to assist in the prediction of Y.

The study applies the time series data analysis technique (the stationarity of the data can be evaluated using Unit-root test procedures and the presence of a unit root shows that the data is non-stationary). Finally, the Granger Causality Test was employed to examine the relationship between the indices, and the Unit Root Test was employed to test stationarity.

4. Results and Discussion

The study first computes the descriptive statistics of the sectoral indices from January 2016 to November 2021. Table 1 represents the mean, standard deviation, sample variation, skewness, and kurtosis for the Nifty 50 and sectoral indices. Over the studied period, IT shows the highest returns of 0.0869 percent followed by oil & gas at 0.0712 percent. The standard deviation of the bank and auto is 1.5450 and 1.5052 percent respectively. It reveals that the indices are more volatile than other indices in the market. The highest and lowest values of the bank and auto indices are more volatile than those of the other indices. Throughout the study period, all indicators exhibited negative skewness, and these distributions have long left tails. All sectoral indices exhibit positive kurtosis values, indicating that the dispersals have longer tails and a sharper peak than expected.

Table 1 Avg. daily returns of the Nifty 50 and sectoral indices (Source: Author's calculation)

Variables	Nifty 50	Auto	Bank	FMCG	Health care	IT	Oil & Gas
Mean	0.0583	0.0279	0.0627	0.0483	0.0277	0.0869	0.0712
SD	1.1230	1.5052	1.5450	1.1003	1.2337	1.3113	1.3915
Variance	1.2612	2.2656	2.3872	1.2107	1.5219	1.7196	1.9363
Kurtosis	21.1553	10.5266	15.6363	13.7931	5.3298	7.9512	11.3282
Skewness	-1.2506	-0.2487	-0.7735	-0.1894	-0.0169	-0.3017	-0.7954
Maximum	8.7632	10.4063	10.5117	8.3185	9.1961	9.0247	9.0638
sMinimum	-12.9805	-13.8478	-16.7340	-10.5954	-8.3256	-9.5750	-11.7010
Count	1460	1460	1460	1460	1460	1460	1460

Note: The above table indicates mean, SD, variance, kurtosis, skewness, maximum and minimum values of the Nifty 50 and selected sectoral indices.

According to the study, the FMCG and Nifty 50 indices are less volatile than other selected sectoral indices.

The study (Table 2) examines the average daily mean return (festival season) of the sectoral indices during the pre-covid 19 (2018-19) and covid 19 period (2020-21). As per the pre-covid period study result, Christmas is the only festival that shows positive returns in all sectoral indices. During Diwali days except for the IT sector (-0.0879), other sectoral indices show positive results.

The period of 2020-21 is the Covid – 19 pandemic period. During this period the financial markets are completely volatile. It had a negative impact on public health and severely damaged the economy and business sector. All economies have been shaken as a result of the government's implementation of lockdowns, travel restrictions, and closures of workplaces, malls, and companies (Senol & Zeren 2020). Not all sectors in the Nifty were equally affected by covid 19 (Curto & Serrasqueiro 2022) in terms of return during festival season. Nifty sectors like auto, bank, FMCG, health care, IT, oil & gas gave positive returns during Ramadhan and Diwali days. But other festivals like Pongal, Navratri, and Christmas shows both positive and negative return in all sectoral indices. It denotes that there is a covid 19 impact on all sectors but the degree of impact has differed from one another. The initial phase of the year 2020 has a fall in indices return due to covid 19. But later the indices moved to the recovery zone because of the government initiatives.

Table 2 Avg. everyday returns of the Nifty 50 and sectoral indices during the festival for pre-covid 19 and covid 19 periods (Source: Author’s calculation)

	Pongal		Ramadhan		Diwali		Navratri		Christmas	
Pre-Covid	M. Return	SD	M. Return	SD	M. Return	SD	M. Return	SD	M. Return	SD
Nifty 50	0.0577	0.6111	0.0362	0.8982	0.1602	0.7583	0.0378	1.4534	0.1118	0.7528
Auto	-0.2386	1.0573	-0.2024	1.1690	0.2369	1.1912	-0.0319	2.3610	0.0732	1.1891
Bank	0.0843	0.7399	0.0676	1.2117	0.2749	0.9002	0.2899	2.0340	0.1519	0.8482
FMCG	0.0509	0.7070	-0.0838	0.7512	0.1291	0.8005	0.0973	1.4244	0.0777	0.7012
Health care	0.0149	0.8442	0.0217	1.0754	0.1132	1.2377	0.0029	1.4672	0.1163	0.6689
IT	0.2779	0.8337	0.1427	0.8737	-0.0879	1.5242	-0.3151	1.7374	0.1435	0.8654
Oil & Gas	-0.0193	0.8494	-0.1035	1.3166	0.1870	1.0386	-0.1414	2.6242	0.0715	0.9088
Covid period										
Nifty 50	0.0471	1.3307	0.3977	1.3152	0.1581	0.9657	0.0693	0.9506	0.2034	0.9444
Auto	0.2089	1.6571	0.6934	1.7263	0.3039	1.2922	-0.0640	1.1620	0.1989	1.3473
Bank	0.1010	1.8606	0.4579	2.4906	0.3905	1.7521	0.4057	1.6658	0.1765	1.2971
FMCG	-0.0096	0.9205	0.3226	0.8512	0.0726	0.8628	-0.2739	0.8676	-0.0010	0.9178
Health care	-0.1056	1.1369	0.2789	1.1314	0.0630	1.3845	-0.1413	1.1773	0.2006	1.0495
IT	0.2403	1.4178	0.3990	1.1645	0.0362	1.4202	-0.0102	1.5304	0.5073	1.3407
Oil & Gas	-0.1161	1.5661	0.4014	1.3746	0.0557	1.3254	-0.0083	1.2640	0.0836	1.4660

Note: The above table shows different festivals and the sectoral mean returns during the pre-covid 19 and covid 19 periods.

M. return denotes Mean return.

The study estimates the mean return and variance of sectoral indices during different festivals (See Table 3). As per the study, the average everyday returns of Nifty 50 and all sectoral indices are positive in the Ramadhan period (Nifty 50 (0.1901), auto (0.1998), bank (0.2369), FMCG (0.1661), health care (0.2056), IT (0.1237), oil & gas (0.2737)).

Table 3 Avg. everyday returns of the Nifty 50 and sectoral indices during festivals (Source: Author’s calculation)

Indices	Pongal		Ramadhan		Diwali		Navratri		Christmas	
	M. Return	SD	M. Return	SD	M. Return	SD	M. Return	SD	M. Return	SD
Nifty 50	0.0475	0.9972	0.1901	0.9944	0.1094	0.8663	0.0669	1.0732	0.1410	0.7424
Auto	-0.0031	1.3853	0.1998	1.3463	0.0947	1.3169	-0.0027	1.5997	0.1708	1.1895
Bank	0.0500	1.3604	0.2369	1.6638	0.2933	1.3297	0.2590	1.6042	0.1042	0.8891
FMCG	0.0402	0.8521	0.1661	0.8977	0.0606	0.9148	-0.0719	1.0596	0.0764	0.8173
Health care	-0.0367	1.0401	0.2056	1.0165	0.0806	1.3144	0.0210	1.2330	0.1427	0.8778
IT	0.1608	1.1245	0.1237	1.0705	-0.0554	1.3169	-0.0696	1.3915	0.2649	1.0405
Oil & Gas	-0.0058	1.2783	0.1737	1.2298	0.1100	1.1456	0.0442	1.7578	0.1068	1.0184

Note: The above table depicts the different festivals and the sectoral returns and M. return denotes Mean return

Christmas is the year-end festival and found positive returns for the Nifty 50 and sectoral indices (Nifty 50(0.1410), auto (0.1708), bank (0.1042), FMCG (0.0764), health care (0.1427), IT (0.2649), oil & gas (0.1068)). During Diwali except for IT indices (-0.0554), all sectoral indices got positive returns. Investors believe that trading during Diwali day brings wealth and prosperity to them ever. So, it creates positive attitudes and feelings in the investor’s buying behaviour (Tan 2018). The study also indicates that health care (-0.0367) and auto indices (-0.0031) got negative returns during the Pongal period. Auto (-0.0027), FMCG (-0.0719), and IT (-0.0696) got negative returns during the Navratri festival. The Nifty FMCG index was found to be less volatile than the other indices across festivals.

4.1 Impact of festivals

The stock market is fluctuated by a number of factors, including inflation, exchange rates, interest rates, national income, employment, economic and political events, world events, disasters, and festivals. Among these, festivals play a vital role. They are not simply celebrated for religious or cultural purposes. They are celebrated to learn about one's culture. Festivals bring people together and build a sense of unity and belongingness. Festivals are one of the factors that attract investors

(Saurabh & Dey 2020), and the stock market is influenced by the inflow and outflow of funds when people invest or withdraw money.

The impact of each festival on indices is shown separately using a paired sample t-test. The results are shown in Table 4.

Pongal

From the study, before mean returns are higher than after mean returns of Nifty 50, auto, FMCG, health care, IT, and oil & gas except for bank. Though the returns have increased after the festival, t-stat. values show that there is an insignificant impact of Pongal on all selected indices. This could be because investors are waiting for the Union Budget presentation during the month of February. For particular areas of the economy, the Finance Minister may provide specific allocations or exclusions. So, the investors are keen on sectoral announcements and their potential impact on these stocks. This could be the reason for the insignificant impact of Pongal on sectoral indices.

Ramadhan

During this period after mean returns of Nifty 50, auto, bank, FMCG, and IT indices are higher than prior mean returns except for health care, and oil & gas indices. The t - stat. values indicate that there is an insignificant impact of Ramadhan on all selected sectoral indices. This contradicts the results of Gavriilidis et al. 2016; Munusamy, 2018; Hassan & Kayser, 2019; Wasiuzzaman & Al-Musehel, 2018. But it is supporting the result of Bialkowski et al. 2012. It could be due to Ramadhan influencing the stock market in Muslim countries and not the stock market of non-Muslim countries. So, it might be the reason for the insignificant impact of Ramadhan on all selected sectoral indices in India.

Navratri

The study shows that after mean returns of Nifty 50, auto, bank, FMCG, health care and oil & gas indices are higher than before mean returns of these indices, except IT. The t - stat. values indicate that there is an insignificant impact of Navratri on all selected sectoral indices. This may be because 21 days after Navratri, people celebrate Diwali which is a major festival. The final day of Navaratri marks the beginning of preparation for Diwali.

Diwali

It is clear from the study that before-mean returns are higher than after-mean returns of all selected sectoral indices. The t - stat. values show that there is an insignificant impact of Diwali on selected sectoral indices like the bank, FMCG, health care, IT, and oil & gas except for Nifty 50 and auto. Diwali is a festival that takes place towards the end of October or the start of November and is a major festival celebrated across the country. This is the time of the company's half-yearly results, dividend, and interim bonus declaration (Patel 2008). Stock markets are generally pushed higher by these forces.

So, there is a significant impact of Diwali (Harshita et. al. 2018) on the Nifty 50. This result is inconsistent with the study of Sobti (2018) and Srikanth and Ram (2013).

Diwali is considered an auspicious period (Misra, 2019) for buying a new vehicle, a new house, or any other expensive item. These days there are exclusive discounts and offers from car manufacturers and car dealers to attract customers. So, this could be the reason for the significant impact of Diwali on the auto index.

Christmas

After mean returns are higher than before mean returns of Nifty 50, bank, FMCG, health care, and oil & gas except for auto and IT indices. T – stat values show that there is an insignificant impact of Christmas on all selected sectoral indices. So, it is concluded that there is no Christmas festival impact on all selected indices. Festivals are one of the factors that attract investors, and the stock market is influenced by the flows of funds. During Christmas, there is an increased trading activity prevalent in the markets due to the ‘Black Friday’ and ‘Santa Claus Rally’ (Washer et. al. 2016; Nippani et.al. 2015). This is reflected in the stock markets of Christian-majority countries and not in non-Christian countries like India. Most of the Indian population are Hindus. So, this could be the reason for an insignificant impact of Christmas on all sectoral indices.

Table 4 Impact of festivals on the Nifty 50 sectoral returns (Source: Author's calculation)

	Pongal			Ramadhan			Diwali			Navratri			Christmas		
	Before Mean	After Mean	T-stat	Before Mean	After Mean	T-stat	Before Mean	After Mean	T-stat	Before Mean	After Mean	T-stat	Before Mean	After Mean	T-stat
Nifty 50	0.0712	0.0238	0.2522	0.1407	0.2395	-0.5057	0.2923	-0.0735	2.3431**	0.0312	0.1025	-0.3573	0.1115	0.1705	-0.4031
Auto	0.0771	-0.0834	0.6115	0.1797	0.2199	-0.1683	0.3701	-0.1808	2.3583**	-0.0806	0.0751	-0.5533	0.1816	0.1599	0.0903
Bank	0.0154	0.0847	-0.2829	0.0197	0.4541	-1.3235	0.5066	0.0799	1.8506	0.2049	0.3131	-0.3687	0.0511	0.1572	-0.5608
FMCG	0.0897	-0.0093	0.6455	0.1597	0.1725	-0.0805	0.1882	-0.0671	1.5376	-0.1602	0.0163	-1.0134	-0.0166	0.1695	-1.1572
Health care	0.0637	-0.1371	0.9970	0.3282	0.0830	1.3945	0.2735	-0.1122	1.6136	-0.0965	0.1384	-0.9614	0.0356	0.2498	-1.1956
IT	0.2782	0.0435	1.0430	0.0962	0.1512	-0.2608	0.0313	-0.1421	0.7310	-0.0581	-0.0810	0.0859	0.2696	0.2602	0.0429
Oil & Gas	0.1054	-0.1170	0.9692	0.2709	0.0765	0.8255	0.2870	-0.0670	1.7623	-0.0363	0.1246	-0.5088	0.0794	0.1342	-0.2788

Note: **Rejected at a 5% significance level. The table denotes the before and after-festival impacts on the sectoral indices.

Table 5 will provide the details of the test results. ADF test results show that the critical values of Nifty and sectoral indices are -2.863 (Intercept), and -3.412 (Intercept & Trend) at the corresponding significance level of five percent. The null hypothesis is rejected if the test statistic result falls within the crucial range. In the aforementioned scenario, null hypotheses are ruled out, and stationary time series data can be deduced.

Table 5 ADF Unit Root Test (5% level) (Source: Author’s calculation)

	Int.			Int. & T		
	Crit.	Abs.	P-val.	Crit.	Abs.	P val.
Nifty 50	-2.863	-13.433	0.000	-3.412	-13.433	0.000
Auto	-2.863	-38.030	0.000	-3.412	-38.018	0.000
Bank	-2.863	-36.637	0.000	-3.412	-36.624	0.000
FMCG	-2.863	-39.655	0.000	-3.412	-39.641	0.000
Health care	-2.863	-36.848	0.000	-3.412	-32.926	0.000
IT	-2.863	-39.964	0.000	-3.412	-40.064	0.000
Oil & Gas	-2.863	-39.120	0.000	-3.412	-39.108	0.000

Note: The table indicates the unit root test results at a 5% level. Abbreviations used: Int. – Intercept, Int. & T- Intercept & Trend, Crit. - Critical, Abs. - Absolute, P – val. - P value.

Furthermore, the obtained results for the test statistics (p values of 0.000) are much lower than the statistical level of 0.05. As can be seen from the above table, the data applied in this study is stationary.

Table 6 Granger Causality Test (Source: Author’s calculation)

Direction of causality	Prob.	F - Statistic	Obs.
Bank to Auto	0.4608	0.77526	1458
Auto to Bank	0.5964	0.51709	1458
FMCG to auto	0.6811	0.38413	1458
Auto to FMCG	0.0023	6.09329	1458
Health care to Auto	0.4792	0.73603	1458
Auto to Health care	0.5445	0.6082	1458
IT to Auto	0.0230	3.78032	1458
Auto to IT	0.1449	1.93454	1458
Nifty 50 to Auto	0.8993	0.10612	1458
Auto to Nifty 50	0.7971	0.22685	1458
Oil & Gas to Auto	0.0131	4.34853	1458
Auto to Oil & Gas	0.3427	1.07174	1458
FMCG to Bank	0.7704	0.26085	1458
Bank to FMCG	0.0391	3.24813	1458

Health care to Bank	0.0244	3.72212	1458
Bank to Health care	0.0882	2.43252	1458
IT to Bank	0.0025	6.03196	1458
Bank to IT	0.8215	0.1967	1458
Nifty 50 to Bank	0.0004	7.97968	1458
Bank to Nifty 50	0.0054	5.24879	1458
Oil & Gas to Bank	0.0000	11.8954	1458
Bank to Oil & Gas	0.1250	2.08242	1458
Health care to FMCG	0.6369	0.45134	1458
FMCG to Health care	0.2411	1.42408	1458
IT to FMCG	0.0000	9.35166	1458
FMCG to IT	0.1077	2.23224	1458
Nifty 50 to FMCG	0.0002	8.55274	1458
FMCG to Nifty 50	0.4883	0.71727	1458
Oil & Gas to FMCG	0.0000	9.41283	1458
FMCG to Oil & Gas	0.1426	1.95046	1458
IT to Health care	0.0656	1.95046	1458
Healthcare to IT	0.8087	0.21233	1458
Nifty50 to Health care	0.0142	4.26659	1458
Health care to Nifty 50	0.2182	1.52381	1458
Oil & Gas to Health care	0.0077	4.88323	1458
Health care to Oil & Gas	0.0143	4.25654	1458
Nifty 50 to IT	0.3383	1.08474	1458
IT to Nifty 50	0.0167	4.10119	1458
Oil & Gas to IT	0.0104	4.57723	1458
IT to Oil & Gas	0.5246	0.64545	1458
Oil & Gas to Nifty 50	0.0008	7.10971	1458
Nifty 50 to Oil & Gas	0.2846	1.25777	1458

Note: The table shows the underlying relationship between the Nifty 50 and sectoral indices.

4.2 Granger Causality Test

The underlying relationship between the Nifty 50 and sectoral indices was investigated in this study. Table 6 displays the Granger causality test results. The lag order selection criterion provided two lag times for performing the Granger causality test. The hypothesis is that in the first regression, "x" does not Granger-cause "y," and in the second regression, "y" does not Granger-cause "x."

Nifty 50 does not granger cause to auto, IT and oil & gas as the calculated probability values fall above the 5% significance level. But it can Granger cause to bank, FMCG and health care. Auto does not granger cause with the bank, health care, IT, oil & gas and Nifty. Bank does not granger cause to auto, health care, IT and oil & gas. IT can Granger cause to FMCG and Nifty 50. This relationship is unidirectional and it shows that they are connected to each other. FMCG does not granger cause with the auto bank, health care, IT, oil & gas and Nifty 50. Health care does not granger cause with auto, IT, FMCG and Nifty 50. But it can Granger cause to Bank and oil & gas. IT does not granger cause with health care, and oil & gas. It can Granger

cause to auto, bank, FMCG and Nifty 50. Oil & gas can granger cause with auto, bank, FMCG, health care, IT, and Nifty 50. There is a bi-directional relationship between oil & gas with health care and Nifty 50 with the bank.

5. Conclusion

An investment decision is a well-defined activity that allocates financial resources with the intention of maximising return. The option is chosen based on the investor's investing aim, risk tolerance, and investor type. Decision science assists investors in portfolio construction, portfolio revision, and portfolio management.

For investors, the Efficient Market Hypothesis has serious implications. Market efficiency differs significantly across markets and countries. This is due to the existence of anomalies in the market. It changes the notion of market efficiency and creates profitable endeavors for market participants. Investors can devise trading strategies to exploit the opportunities in the market to generate excess returns (Kumar et al. 2017). The study examines the linkage between the Nifty 50 and sectoral indices during the selected festival season. It is clear from the descriptive statistics that IT provides the highest return followed by oil & gas indices. The bank and auto indices are more volatile compared to other sectoral indices. Nifty 50 indices are less volatile compared to other selected sectoral indices (Singh and Kumar 2020). The study shows that overall returns are high during Ramadhan and Christmas periods in comparison to other periods.

Christmas is the only festival that shows positive returns in all sectoral indices during the pre-covid 19 periods. During covid, 19 sectors like auto, bank, FMCG, health care, IT, oil & gas gave positive returns during Ramadhan and Diwali days. It denotes that there is a covid 19 impact on all sectors but the degree of impact differs from one another.

The paired sample t-test compares the mean returns of selected indices before and after the festival to show the effect of festivals on indices performance. The study highlights that Diwali is the only festival that has an impact on Nifty 50 and Nifty Auto. This is because consumer sales pick up before Diwali because of festive offers and investors expect the stock market would give better returns.

The Granger causality test discovered a bidirectional relationship between oil and gas and health care, as well as the Nifty 50 and the bank. There is a unidirectional relationship between Nifty 50 and bank, FMCG and health care, auto and FMCG, bank Nifty 50 and FMCG, health care with bank and oil & gas, IT with Nifty 50, auto, bank and FMCG, Oil & gas with Nifty 50, bank, and health care.

The limitation of the study is that the data related to the population engaged in stock market trading is not available. Further India is a multi-religious country, which, even though dominated by Hindu populations. Hence the market participants belong to different religions, hence, the stock market may not get affected by all the festivals. Festivals such as Dussehra, Eid, and Christmas fall near the end of the year's quarters. It is possible that the indices boost

is linked to the release of quarter-end results rather than any festival effect. In addition, the Indian Calendar's August-December season is packed with celebrations that are closely related. Over time, the effect of one festival can interfere with the effect of future festivals, resulting in erroneous results. To test the effect of festivals on the Indian stock market sectoral indices, 10 working days before and after working the festivals were considered. Decreasing this window period might give a different result. The festival effect did not remain consistent over time (Hamid & Dhakar, 2003). This paper studies the festival effect on the Indian stock market sectoral indices and does not take into consideration of other factors like inflation, interest rate, foreign exchange fluctuations, and other macroeconomic variables.

For further research, researchers may use other advanced statistical techniques to show in a robust manner the effects of festivals on stock market returns, and volatility in the stock market during the festival season can be studied. Internationally, the impact of festivals on financial markets can also be explored. This study examines pre-covid 19 and covid 19-period returns during the festival season only. An elaborate covid 19 event study might give a clear picture of the pandemic's impact on all sectoral indices.

The findings of the study would be useful to investors, and fund managers. Investors may come up with some investment strategies that may maximize their returns during the festival season. Fund managers can restructure and allocate their funds based on sectoral indices performance.

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