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INVESTIGATING THE DAY-OF-THE-WEEK EFFECT IN THE INDIAN EQUITY MARKET: EVIDENCE FROM NIFTY INDICES

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ABSTRACT:

This study examines the presence of the Day-of-the-Week (DOW) effectone of the most documented seasonal anomaliesin the Indian equity market using data from five major NIFTY indices: NIFTY 50, NIFTY 100, NIFTY 500, NIFTY MIDCAP 150, and NIFTY SMALLCAP 250. Employing daily return data from April 1, 2010, to March 31, 2024, we apply statistical and econometric tools such as descriptive statistics, ANOVA, Kruskal-Wallis, and regression analysis to test for variations in returns across weekdays. The results indicate no significant DOW effect across all indices, confirming market efficiency in the Indian context. This study contributes to the body of behavioural finance by reinforcing the diminishing relevance of calendar anomalies in evolving emerging markets.

Keywords: **Day-of-the-Week Effect, Calendar Anomalies, NIFTY Indices, Indian Stock Market, Market Efficiency**

1. INTRODUCTION

The concept of calendar anomalies, especially the Day-of-the-Week (DOW) effect, continues to captivate the attention of academics, traders, and policymakers due to its implications for market efficiency and behavioural finance. The DOW effect refers to the systematic variation in average stock returns based on the day of the trading week. Such patterns, if persistent and statistically significant, challenge the Efficient Market Hypothesis (EMH), which posits that asset prices fully reflect all available information and that consistent outperformance based on public data is improbable. This study revisits the DOW effect in the context of the Indian stock market, a rapidly evolving and deeply scrutinized emerging market. While international literature has examined this anomaly across various developed and developing markets, fewer studies have provided a rigorous, large-scale, and updated analysis for India using high-frequency data from multiple market segments. Given the rise of algorithmic trading, increased retail participation, and broader institutional influence in Indian markets over the last decade, it is pertinent to reassess whether such anomalies still hold. Unlike earlier studies that often focused on a single index or a narrow time frame, this research investigates the DOW effect across five major NIFTY indicesNIFTY 50, NIFTY 100, NIFTY 500, NIFTY MIDCAP 150, and NIFTY SMALLCAP 250over a fourteen-year period from 2010 to 2024. This diversified dataset allows for a deeper understanding of how the DOW effect may differ across market capitalisation tiers and investor segments. By applying a combination of statistical toolsincluding descriptive analysis, ANOVA, non-parametric testing, and dummy variable regressionthis study seeks to determine whether weekday-based return anomalies persist in India's equity landscape. In doing so, it also offers insights into market efficiency, investor behaviour, and the evolving nature of trading patterns.

2. REVIEW OF LITERATURE

The DOW effect has long served as a cornerstone in studies of market anomalies, particularly in exploring deviations from the random walk hypothesis. Over the decades, scholars have tested the existence and persistence of this effect in diverse global contexts, generating a rich body of empirical work.

A. Studies in Developed Markets

Cross (1973) was among the first to document the phenomenon, noting consistently higher returns on Fridays and lower returns on Mondays in the U.S. stock market. French (1980) and Gibbons and Hess (1981) further confirmed this negative Monday bias in S&P 500 returns, raising questions about time-based return predictability. Lakonishok and Smidt (1988), using nearly a century of Dow Jones data, found a similar pattern, often attributed to investor psychology or delayed reaction to weekend news.

Subsequent work by Connolly (1989) and Sias and Starks (1995) highlighted the role of estimation methods and institutional investors in shaping the weekend and DOW effects. More recent studies, such as Olson et al. (2015), noted the gradual fading of the anomaly in U.S. markets, suggesting that increased market efficiency and awareness might erode such predictable patterns.

B. Studies in International and Emerging Markets

Chang, Pinegar, and Ravichandran (1993) expanded the analysis to 23 global markets and found that 13 exhibited a significant Monday effect. Agrawal and Tandon (1994) revealed similar patterns in 18 countries, with varying weekday anomalies, while Brooks and Persand (2001) observed idiosyncratic DOW effects in Southeast Asian markets.

Basher and Sadorsky (2006) found evidence of DOW effects in several emerging markets even after adjusting for risk, underscoring the role of behavioural and institutional differences. Zhang, Lai, and Lin (2017) employed novel methodologies to affirm the DOW effect's presence across 25 countries, although with varying intensity and day-specific anomalies. The Adaptive Market Hypothesis (Lo, 2004) has since been invoked to explain why such effects appear, disappear, or change over time based on market maturity and investor learning.

C. Indian Market Evidence

In India, early evidence of DOW effects emerged in studies by Gupta and Aggarwal (2004), who reported significant weekday return variations, particularly positive mid-week effects, attributing them to behavioural biases and trading conventions. Dicle et al. (2010) observed autoregressive behaviour in Indian returns and linked the DOW effect to global market integration.

Paital and Panda (2018) found a negative Tuesday effect and a positive weekend effect in Indian indices over 13 years, suggesting persistence despite increased market sophistication. More recently, Aggarwal and Jha (2023), using a longer time span from 1990 to 2022, confirmed significant weekday effects on both return and volatility, pointing to the influence of behavioural factors and institutional trading cycles.

However, with structural reforms, increased digitisation, and broader market participation in the last decade, questions remain about the relevance and consistency of such anomalies. As such, this study seeks to revisit and empirically reassess the DOW effect in Indian equity markets using a richer and more recent dataset encompassing large-cap, mid-cap, and small-cap segments.

3. DATA AND METHODOLOGY

This study adopts a quantitative research design to examine the presence of the DOW effect in the Indian equity market. To investigate this anomaly, the study employs a multi-stage methodological framework involving data extraction, return computation, statistical testing, and model estimation.

3.1 Research Hypotheses

The analysis is guided by the following hypotheses:

Null Hypothesis (H_0): There are no significant differences in stock returns across different days of the week.

H_0: μ Monday = μ Tuesday = μ Wednesday = μ Thursday = μ Friday

Alternative Hypothesis (H_1): There are significant differences in stock returns across different days of the week.

H_1: μ Monday ≠ μ Tuesday ≠ μ Wednesday ≠ μ Thursday ≠ μ Friday

Where μ Day represents the mean daily return for each day of the week.

3.2 Data Selection and Scope

To ensure comprehensive market representation, the study focuses on five major stock indices from the National Stock Exchange (NSE) of India:

- **NIFTY 50** – representing large-cap companies,
- **NIFTY 100** – capturing the performance of the top 100 listed firms,
- **NIFTY 500** – offering a broad market perspective,
- **NIFTY MIDCAP 150** – reflecting mid-cap segment performance,
- **NIFTY SMALLCAP 250** – representing small-cap equities.

These indices were selected due to their wide coverage and ability to capture the behaviour of different investor bases and market capitalisation segments.

- **Data Source:** National Stock Exchange of India (https://www.nseindia.com)
- **Study Period:** April 1, 2010 to March 31, 2024
- **Frequency:** Daily closing price data

The final dataset comprises over 3,500 daily observations for each index, enabling a robust empirical investigation.

3.3 Computation of Returns

To measure daily performance, **logarithmic returns** were calculated using the following formula:

$$\text{Log Return (Rt)} = \ln\left(\frac{\text{Price}_t}{\text{Price}_{t-1}}\right)$$

Where:

- Price_t is the price at time t.
- Price_{t-1} is the price at time $t-1$.
- ln denotes the natural logarithm

Log returns were preferred over simple returns due to their time additive property and better statistical behaviour,

particularly for time series modelling.

3.4 METHODOLOGICAL FRAMEWORK

The analysis followed a structured approach involving five key steps to ensure statistical validity. Initially, the Shapiro-Wilk and Jarque-Bera tests assessed the normality of return distributions, while the Augmented Dickey-Fuller (ADF) test confirmed the stationarity of the data. Descriptive statistics—mean, median, standard deviation, skewness, and kurtosis—were computed to understand the behaviour of daily returns across indices. To examine the DOW effect, weekday-wise average returns and volatilities were analysed using visual tools such as box plots and line charts. Next, ANOVA and Kruskal-Wallis tests were applied to test for significant differences in returns across weekdays, accommodating both normal and non-normal data. Finally, Ordinary Least Squares (OLS) regression models using weekday dummy variables were estimated for each index to quantify return differences relative to Monday, using the equation:

$R_t=\beta_0+\beta_1 D_{Tuesday}+\beta_2 D_{Wednesday}+\beta_3 D_{Thursday}+\beta_4 D_{Friday}+\epsilon_t$

Here R_t denotes the daily log return, $D_{weekday}$ represents weekday dummies, β_0 captures Monday's mean return and ε_t forerror term.

The model estimates whether returns on Tuesday through Friday differ significantly from Monday returns. The p-values associated with each dummy coefficient determine the statistical significance of these differences.

4. RESULTS AND DISCUSSION

A. Normality and Stationarity Tests

To ensure the suitability of data for time series analysis, normality and stationarity were assessed statistically.

As shown in Table1, the Augmented Dickey-Fuller (ADF) test results confirmed stationarity for all indices ($p < 0.01$). Conversely, Shapiro-Wilk test results indicated non-normality ($p < 0.05$), leading to the combined use of parametric and non-parametric tests in the later stages of analysis.

Table 1: Stationarity and Normality Test Results for NIFTY Indices

Index	ADF Statistic	p-value	Result	Shapiro-Wilk	p-value	Result	Observations
NIFTY 50	-16.73	0.000	Stationarity	0.929	0.000	Non-normality	3522
NIFTY 500	-16.22	0.000	Stationarity	0.930	0.000	Non-normality	3521
NIFTY 100	-16.54	0.000	Stationarity	0.931	0.000	Non-normality	3521
NIFTY MIDCAP 150	-15.29	0.000	Stationarity	0.936	0.000	Non-normality	3520
NIFTY SMALLCAP 250	-20.26	0.000	Stationarity	0.929	0.000	Non-normality	3532

B. Descriptive Statistics

Descriptive statistics provided insights into return behaviour across indices (Table2). All indices showed positive mean returns, with mid-cap and small-cap indices (NIFTY MIDCAP 150 and NIFTY SMALLCAP 250) offering higher returns than their large-cap counterparts. However, they also exhibited greater volatility, as reflected in higher standard deviations. Minimum returns highlighted the downside risk, especially in mid-caps. The quartile distribution revealed a slightly left-skewed nature, especially for smaller-cap stocks.

Table 2: Descriptive Statistics for Daily Log Returns of Various NIFTY Indices

	NIFTY 50	NIFTY 500	NIFTY 100	NIFTY MIDCAP 150	NIFTY SMALLCAP 250
Count	3533	3533	3533	3533	3539
Mean	0.000411	0.000434	0.000422	0.000574	0.000478
Std	0.010617	0.010348	0.010502	0.010970	0.011846
Min	-0.139038	-0.137063	-0.136951	-0.139661	-0.132521
25%	-0.004928	-0.004709	-0.004766	-0.004749	-0.005073
50%	0.000694	0.001168	0.000788	0.001787	0.001996
75%	0.006187	0.006124	0.006226	0.006969	0.007332
Max	0.084003	0.074094	0.080907	0.054840	0.058812

C. Day-of-the-Week Effect

a. Descriptive Analysis Table 3 displays average daily returns for each weekday. Monday returns were generally negative or negligible, reinforcing the "Monday Effect." Tuesdays consistently delivered the highest returns across all indices, indicating a potential rebound effect. Mid-week days showed positive but moderate returns, while Friday maintained slightly positive returns, consistent with end-of-week optimism.

Table 3: Descriptive Analysis of Various NIFTY Indicesfor DOW Effect

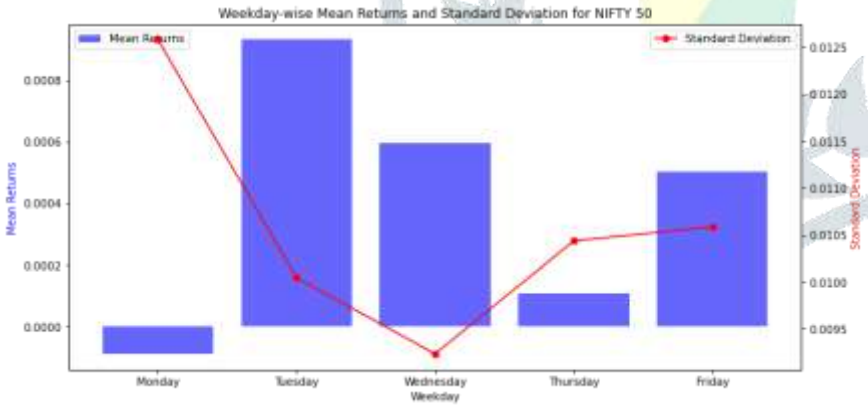
Weekday	NIFTY 50	NIFTY 500	NIFTY 100	NIFTY MIDCAP 150	NIFTY SMALLCAP 250
Monday	-0.000089	-0.000085	-0.000063	0.000007	-0.000031
Tuesday	0.000932	0.000901	0.000924	0.000946	0.000683
Wednesday	0.000596	0.000625	0.000585	0.000805	0.000832
Thursday	0.000106	0.000201	0.000149	0.000466	0.000621
Friday	0.000504	0.000503	0.000507	0.000579	0.000175

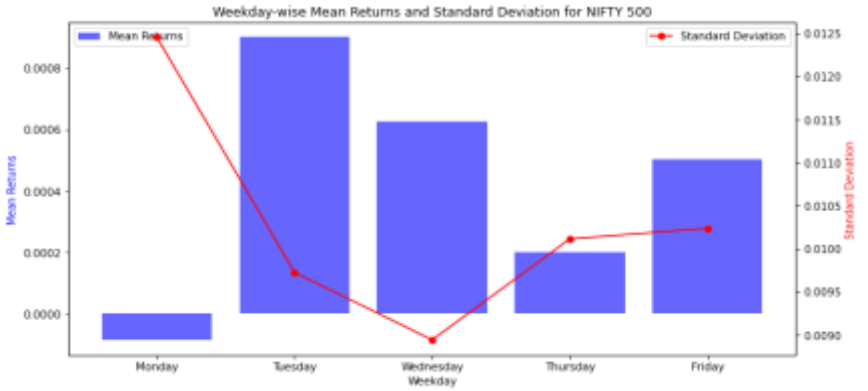
b. Variance Analysis Standard deviation values (Table 4) revealed that Monday was the most volatile day, particularly for the NIFTY SMALLCAP 250. Volatility dropped sharply on Tuesday and reached its lowest on Wednesday, marking mid-week stability. Thursday and Friday experienced a mild rise in volatility, likely due to end-of-week trading adjustments. These observations were further confirmed by graphical representations in Figure 4.

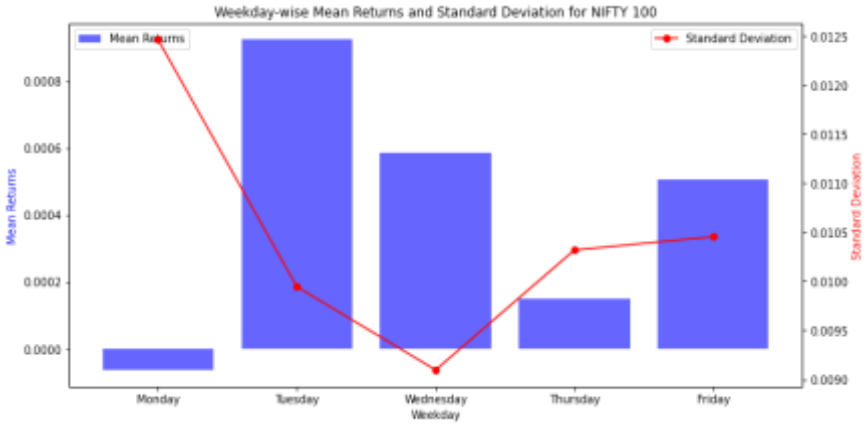
Table 4: Variance Analysis of Various NIFTY Indicesfor DOW Effect

Weekday	NIFTY 50	NIFTY 500	NIFTY 100	NIFTY MIDCAP 150	NIFTY SMALLCAP 250
Monday	0.012577	0.012453	0.012466	0.013545	0.014651
Tuesday	0.010043	0.009727	0.009946	0.010105	0.010932
Wednesday	0.009233	0.008943	0.009097	0.009737	0.010656
Thursday	0.010435	0.010114	0.010320	0.010425	0.011332
Friday	0.010585	0.010238	0.010456	0.010685	0.011255

The figures illustrate the relationship between mean returns (blue bars) and standard deviation (red line) for different days of the week across various NIFTY indices (NIFTY 50, NIFTY 500, NIFTY 100, NIFTY MIDCAP 150, and NIFTY SMALLCAP 250). The charts provide insights into the Day-of-the-Week Effect, offering a combined view of the average returns and volatility (risk) associated with each trading day.







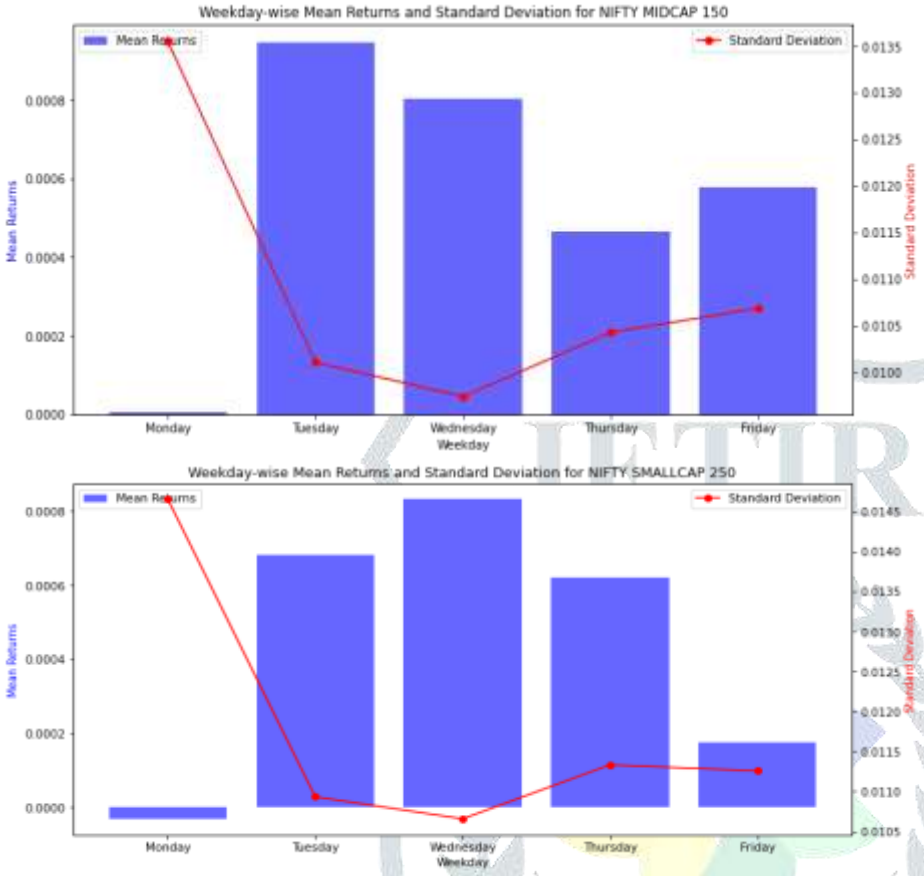


Figure 1: Weekday Mean Returns and Standard Deviations of NIFTY indices

D. Hypothesis Testing

The results of ANOVA and Kruskal-Wallis tests (Table 5) confirmed the absence of statistically significant differences in daily returns across weekdays for all indices. High p-values (> 0.05) in both tests led to the acceptance of the null hypothesis, implying that mean and distributional returns do not vary significantly by day.

Table 5: ANOVA and the Kruskal-Wallis tests result for Various NIFTY Indices for DOW Effect

Index	ANOVA Statistic	p-value	Result (H_0)	KW Statistic	p-value	Result (H_0)
NIFTY 50	1.0250	0.3928	Accepted	1.4569	0.8342	Accepted
NIFTY 500	0.9574	0.4297	Accepted	1.0770	0.8979	Accepted
NIFTY 100	0.9485	0.4347	Accepted	1.3760	0.8484	Accepted
NIFTY MIDCAP 150	0.7652	0.5478	Accepted	0.4910	0.9744	Accepted
NIFTY SMALLCAP 250	0.6723	0.6112	Accepted	1.7616	0.7795	Accepted

E. Regression Analysis

To complement the above findings, an OLS regression model was run using dummy variables for Tuesday through Friday, with Monday as the reference. The results (Table 6) showed no statistically significant coefficients at the 5% level for any weekday across the indices. The closest to significance was Tuesday for large-cap indices (NIFTY 50, 100, 500), with p-values around 0.07–0.08, suggesting a weak tendency for positive Tuesday returns. However, these were not sufficient to reject the null hypothesis.

Table 6: OLS Regression results of Various NIFTY Indices for DOW Effect

Weekday	NIFTY 50	NIFTY 500	NIFTY 100	NIFTY MIDCAP 150	NIFTY SMALLCAP 250
Constant (p-value)	-0.00007 (0.853)	-0.00005 (0.899)	-0.00004 (0.913)	0.00008 (0.836)	0.00008 (0.854)
Tuesday (p-value)	0.0010 (0.074)	0.0009 (0.083)	0.0010 (0.083)	0.0009 (0.138)	0.0006 (0.338)
Wednesday (p-value)	0.0007 (0.234)	0.0007 (0.218)	0.0006 (0.259)	0.0007 (0.215)	0.0008 (0.231)
Thursday (p-value)	0.0002 (0.750)	0.0002 (0.649)	0.0002 (0.730)	0.0004 (0.512)	0.0005 (0.389)
Friday (p-value)	0.0006 (0.307)	0.0006 (0.316)	0.0005 (0.326)	0.0005 (0.398)	0.00009 (0.882)

Overall, the regression analysis aligns with prior statistical tests, indicating the absence of a strong or persistent Day-of-the-Week effect in Indian NIFTY indices. These findings support the argument for market efficiency and suggest that traders cannot reliably exploit weekday return patterns in the Indian context.

5. DISCUSSION

The findings provide empirical evidence against the existence of the Day-of-the-Week effect in the Indian equity market. Despite slight weekday variations in mean returns and volatilities, statistical tests confirm that these are not significant.This reinforces the notion that market participants in India cannot gain abnormal returns through timing trades based on weekday trends. The results are consistent with the Efficient Market Hypothesis and show that calendar-based anomalies may no longer hold in matured emerging markets like India.

6. CONCLUSION

This study explored the Day-of-the-Week anomaly using a robust dataset from major Indian stock indices. Comprehensive statistical tests suggest no significant weekday-based return differentials. The market appears to be efficient in the context of weekly patterns, offering little scope for calendar-based arbitrage strategies.Future studies could explore intraday patterns, monthly effects, or interactions with macroeconomic news to deepen understanding of behavioural anomalies in the Indian stock market.

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