INDIAN STOCK MARKET REGULARITY: THE TURN OF THE MONTH EFFECT

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Abstract. Recent empirical studies have identified the presence of the Turn of the Month (TOM) effect on various stock markets. This effect is a well-known calendar anomaly in stock markets, characterized by higher returns and increased trading volume around the beginning of each month. The researchers have proposed several explanations for this anomaly, including factors such as increased liquidity, window dressing practices, and news announcements. This study focuses on investigating the TOM effect in the Indian stock market, specifically focusing on size of firms and trading activity by individual investors, as well as domestic and foreign institutional investors. We analysed the closing prices of four indices (Nifty 50, S&P BSE Sensex, Nifty SmallCap 50, and BSE SmallCap) from April 2007 to February 2023. Our analysis involved using parametric t-tests and non-parametric Mann-Whitney U tests to assess the significance of our findings. The results indicate that the TOM effect is indeed significant in the Indian stock market, with higher returns observed during the days surrounding the TOM. Furthermore, this effect is more pronounced in smaller indices compared to larger ones. Additionally, we found that domestic institutional investors engage in significant trading activity towards the end of the trading month, while individual investors do not demonstrate the same pattern. Foreign investors also exhibit notable differences in trading activity between the TOM and the rest of the month.

1. INTRODUCTION

The concept of market efficiency has been explored by many prominent authors in the field of finance, including Fama (1965, 1970), who first introduced the Efficient Market Hypothesis (EMH) in his seminal paper Efficient Capital Markets: A Review of Theory and Empirical Work (1970). Fama argued that, in an efficient market, current asset prices should always reflect all available information, making it impossible for investors to consistently earn returns higher than the market average. However, since the introduction of the EMH, numerous empirical studies have cast doubts on the validity of this hypothesis. One area where the EMH has been called into question is the existence of calendar anomalies. These anomalies refer to systematic patterns in asset prices that occur at specific times of the year or month or week or day, which cannot be explained by fundamental factors or economic news. Several researchers, including Al-Khazali and Mirzaei (2017), Wuthisatian (2022), Couto et al. (2021), and Chatzitzisi et al. (2021), have contributed to the exploration of calendar anomalies and have raised questions about the accuracy of the EMH.

The Turn of the Month effect (TOM) effect is one of the most well-known calendar anomalies, which refers to a phenomenon in which stocks exhibit significant positive returns during the

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This paper is in final form and no version of it will be submitted for publication elsewhere.

first few days of each trading month. TOM days typically refers to the four trading days that encompassing the last trading day of the month and the first three trading days of the following month (-1 to +3). Historically the stocks of large-cap and small-cap companies have performed well around the TOM. Market analysts such as Merrill (1966), Fosback (1976), and Hirsch (1979) have claimed that securities have substantial gains at the TOM. Ariel (1987) was the first to have reported a TOM effect, an empirical regularity in stock returns.

The TOM effect has been a subject of extensive research, leading to various explanations proposed by different scholars. Some theories attribute the TOM effect to investor behavior, including practices like window dressing employed by fund managers or strategic trading conducted by institutional investors (Thaler, 1987). Other theories propose a relationship between the TOM effect and market liquidity, as studied by Jacobs and Levy (1988), Ogden (1990), Booth et al. (2001), and Pettengill and Jordan (1988). Additionally, macroeconomic factors such as the timing of dividend payments or the release of economic data have also been suggested as potential influences on the TOM effect, as explored by Nikkinen et al. (2007) and Penman (1987).

Despite numerous theories proposed to explain the TOM effect, a consensus regarding its underlying causes has not been reached (McConnell and Xu, 2008; Maher and Parikh, 2013; Kim, 2022). As a result, this research paper seeks to investigate the TOM effect in the Indian stock market and identify its most probable causes. In order to provide more robust conclusions, we also consider the size of the firm and analyse the trading activity of individual investors as well as domestic and foreign institutional investors. Notably, our review reveals a gap in existing research conducted in India, particularly regarding the combination of firm size and investor trading activity. Therefore, our study aims to shed new light on the behavior of the Indian stock market and contribute to the existing literature in this field.

Our interest in studying the TOM effect arises from several compelling reasons. Firstly, despite its well-documented presence in global financial markets, there remains an ongoing debate regarding the underlying causes and significance of the TOM effect. By conducting research on the TOM effect within the Indian context, we aim to contribute to this discussion and provide fresh insights into this intriguing market anomaly. India serves as an ideal focus for our study due to the scarcity of research specifically targeting the TOM effect in large and increasingly influential emerging markets. Secondly, the Indian stock market has experienced notable transformations in recent years, including the implementation of new regulations and trading mechanisms. These changes have the potential to impact market dynamics and potentially alter the TOM effect. Thus, we consider it both timely and relevant to revisit this topic within the Indian market and investigate whether the TOM effect persists in the present market environment.

This research holds significance for various stakeholders, including investors, policymakers, and academicians who are interested in understanding the behavior of the Indian stock market. By identifying and analysing the TOM effect, we can offer valuable insights to investors, enabling them to make more informed decisions regarding their investment strategies. Additionally, policymakers can benefit from our findings to enhance the efficiency of the Indian stock market.

The remainder of this paper is organized as follows. Section 2 provides a review of the relevant literature on the TOM effect. Section 3 describes the data and methodology used in the study. Section 4 presents the empirical results, and Section 5 concludes.

2. Review of Literature

The assumptions of the EMH, originally proposed by Fama (1965, 1970), have faced challenges from various research studies. These studies cast doubt on the notion that market prices instantaneously and accurately reflect all available information, thus implying that no investor can consistently outperform the market. Recent investigations by Al-Khazali and Mirzaei (2017) have particularly highlighted the presence of calendar anomalies as a significant violation of the EMH, demonstrating their predictive power in stock returns. Similarly, Wuthisatian (2022)

has uncovered calendar anomalies that contradict the EMH, suggesting inefficiencies and predictability in stock returns. Contributing to this discourse, Couto et al. (2021) and Chatzitzisi et al. (2021) offer valuable insights regarding the existence and implications of these calendar anomalies.

Ariel (1987) holds the distinction of being the first to document the TOM effect, observing this phenomenon in stock returns within the United States. His study revealed an empirical regularity whereby a significant portion of cumulative returns occurred during the first ten trading days of the calendar month, spanning from the last trading day of the preceding month to the first nine trading days of the following month (-1 to +9). Subsequently, Lakonishok and Smidt (1988) also identified TOM seasonality in equity returns. They defined the TOM period as the four trading days, commencing with the last trading day of the previous month and concluding with the third trading day of the subsequent month (-1 to +3).

The TOM effect has been observed in most global markets after Ariel (1987) discovered this phenomenon. Barone (1990) reported a substantial TOM effect in the Italian stock market, while Ziemba (1991) observed this effect in the Japanese stock market. Similarly, Cadsby and Ratner (1992) found a strong TOM effect in six out of ten overseas capital markets[1], and Agrawal and Tandon (1994) reported the TOM effect in the capital markets from 18 developed nations[2]. Compton (2002) found positive TOM returns in six Pacific Rim countries[3], while Aziz and Ansari (2018) identified this effect in 11 out of 12 Asia-Pacific markets[4]. Most recently, Kim (2022) reported the TOM effect in the Korean stock exchange. These diverse studies conducted across global markets provide additional evidence supporting the existence of the TOM effect.

The TOM effect has been extensively studied in various types of markets, as evidenced by a collection of research papers. Árendáš and Kotlebová (2023) investigate the TOM effect in agricultural commodity markets, focusing on rice, coffee, and sugar. Their findings demonstrate a statistically significant TOM effect in these markets. Similarly, Vasileiou (2023) explores the TOM effect in cryptocurrency markets, specifically analyzing Bitcoin and Ethereum. The study confirms the existence of the TOM effect and highlights the profitability of certain four-day intramonth periods. Shah and Baser (2022) shift their focus to the global mutual fund market and examine the TOM effect in equity mutual funds across different geographies. They find a statistically significant TOM effect in a substantial number of funds. Moreover, Kumar (2022) investigates the TOM effect in cryptocurrencies, particularly Bitcoin, Ethereum, and Litecoin. Their study reveals positive and significantly higher returns during TOM days compared to non-TOM days. Additionally, Plastun et al. (2022) explore calendar anomalies in passion investment markets. They discover various effects like the Day-of-the-Week and Month-of-the-Year Effects, which suggest patterns in market behavior. However, they observe that the Turn-of-the-Year and TOM Effects are not present in these markets. Finally, Khuntia and Pattanayak (2022) explore the adaptive patterns of calendar effects in the cryptocurrency market, indicating that the TOM effect is a time-varying phenomenon. Collectively, these studies contribute to the understanding of the TOM effect in different markets, ranging from agricultural commodities and cryptocurrencies to mutual funds and passion investments.

While the TOM effect has been observed in various markets, there continues to be ongoing debate regarding its causes and duration. One commonly accepted explanation, as proposed by earlier studies, revolves around the notion of increased investor liquidity. Jacobs and Levy (1988) and Ogden (1990) suggest that the regular payment dates in the United States contribute to the TOM effect by providing investors with additional liquidity towards the end of the month, thereby leading to higher stock prices. Similarly, Booth et al. (2001) and Pettengill

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[1] United States, Canada, the United Kingdom, Australia, Switzerland, and West Germany.

[2] Australia, Belgium, Brazil, Canada, Denmark, France, Germany, Hongkong, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Singapore, Sweden, Switzerland and the United Kingdom.

[3] Australia, Canada, Hong Kong, Japan, Singapore, and the United Kingdom.

[4] Australia, China, Hong Kong, India, Indonesia, Japan, Pakistan, the Philippines, Singapore, South Korea and Taiwan.

and Jordan (1988) have found supporting evidence for the hypothesis of increased liquidity. However, McConnell and Xu (2008) challenge this explanation and argue against the presence of month-end purchasing pressure as the primary cause of the TOM effect. They discovered that the trading volume on the New York Stock Exchange does not significantly differ on the TOM compared to other trading days. Similarly, Maher and Parikh (2013) also found no such significant increase in the trading volume of retail investors in the Indian capital market.

Another perspective, put forth by Thaler (1987), suggests that the TOM effect may be attributed to window dressing, wherein institutional investment managers adjust their portfolios before reporting deadlines by selling underperforming stocks and acquiring profitable ones. Furthermore, Nikkinen et al. (2007) and Penman (1987) argue that the TOM effect is driven by an increase in news announcements during the TOM period. These announcements may impact market sentiment and lead to observed anomalies in stock returns. The presence of these varying theories demonstrates the complexity of understanding the underlying causes of the TOM effect.

In Barone's (1990) study on the Italian stock market from January 1975 to August 1989, he found that there were better stock index returns on days of the month starting with the last trading day of the old month and ending with the fifth trading day of the following month (-1 to +5). Similarly, Ziemba (1991) discovered the TOM effect in the Japanese stock market, with better returns observed during the seven trading days of the month, starting with the last five trading days of the old month and ending with the second trading day of the following month (-5, +2). Supporting the increased liquidity of investors' hypothesis, he argued that Japan's TOM begins on the 25th of the month (-5) as most Japanese companies pay their employees on that day. Martikainen et al. (1995) also demonstrated strong TOM effects between days -5 and +5 in the Finnish stock and stock index futures markets from May 1988 through October 1993.

Only a few studies have explored the TOM effect in the Indian stock market, to our knowledge. One such study was conducted by Freund, Jain, and Puri (2007) who confirmed the TOM effect in India using data from the National Stock Exchange between 1992 to 2004. Later, Mangala and Sharma (2007) observed significant positive returns in the first half of the month while zero or negative returns were observed during the rest of the month, for the period of 1994 to 2005. During the period of 2003 to 2011, Maher and Parikh (2013) found that institutional traders increased their trading volumes at the end of the month. Singh and Das (2020) identified the presence of both the January effect and TOM effect in the banking and IT sectors of the Indian stock market between 2010 to 2019. Tadepalli et al. (2022) found a significant TOM effect in the small-cap and mid-cap indices between 2009 to 2017, but a weakening of the TOM effect in the large-cap indices. Singh et al. (2021) discovered higher average returns during the TOM in emerging markets, including India, between 2000 to 2017. These studies provide valuable insights into the TOM effect in the Indian stock market, and could assist investors in making informed investment decision.

3. Data and Methodology

For the period from April 2007 through February 2023, we examined the daily closing prices of the NIFTY 50, S&P BSE Sensex, Nifty SmallCap 50, and S&P BSE SmallCap indices. In this analysis, we used the Nifty SmallCap and S&P BSE SmallCap indices in order to capture the TOM effect with respect to size factor. The NSE (National Stock Exchange), BSE (Bombay Stock Exchange), and NSDL (National Securities Depository Limited) official websites are the sources of all financial information used in this article, including daily returns, trade volumes, and category-wise investor trading activity. Among Indian stock exchanges, the NSE and BSE have the highest trading volume. As the primary exchanges of the Indian stock market, its equities often belong to more established, larger companies than those of other Indian stock markets. Individual investors trade substantial quantities of equities on BSE and NSE; their share of the Indian stock market's trading volume is around 41 percent in the year 2022 as

per the join report of ASSOCHAM and CARE 2023. Therefore, it is appropriate to test the hypothesis that increased demand pressure from retail investors causes the TOM effect using the NSE and BSE indices. Concerning the specific TOM period, there is no agreement; some studies employ extremely longer durations to determine the TOM (Ariel, 1987; Ziemba, 1991; Martikainen et al., 1995). This study examines returns for the interval (-1, +3) as the conventional TOM period and analyses daily returns for a longer estimation period (-9 to +9). Due to the fact that not every month has the same amount of trading days, additional days are excluded from this analysis. For instance, there are 185 observations for day 1 but there are only 174 observations for day 10. We defined the TOM period as the last trading day of the previous month and the first three trading days of the following month (-1 to +3). This period captures specific days in which we expect to observe distinct patterns in stock returns. We also identified the Rest of the Month (ROM) period as all trading days of the month excluding the TOM period (-1 to +3). Additionally, some studies have reported significantly positive mean daily returns within a narrower TOM period of (-1 to +1). To explore alternative TOM periods, we expanded the intervals to (-1 to +1) and (-1 to +2). These intervals were defined as TOM (-1 to +1), TOM (-1 to +2), and ROM (-1 to +1), ROM (-1 to +2), representing the remaining days of the month other than the TOM (-1 to +1) and TOM (-1 to +2) periods, respectively. By examining these different TOM and ROM periods, we aim to uncover and analyse the specific timeframes during which the TOM effect may manifest in stock returns.

Trading data of DII (Domestic Institutional Investors) and FII/FPI (Foreign Institutional Investors/Foreign Portfolio Investors) on NSE, BSE and MSEI (Metropolitan Stock Exchange of India Limited) were utilised to analyse the trading pattern of DII and FII. The time period from April 2007 to February 2023 was selected for this article based on the availability of investors trading activity data. Data prior to April 2007 was not publicly available or published on the respective web portals of NSE and BSE, hence the period from April 2007 was selected as the starting point. Retail investors' trading activity on the NSE web portal was only available after 2016. Therefore, only the retail investors' trading activity on the BSE is taken into account for the analysis of individual investors' trading patterns.

The daily returns of the indices were calculated using the following formula:

$$R_t = (P_t - P_{t-1})/P_{t-1}$$

Where R_t represents the daily return of the index price for day t, P_t is the closing value of the index for day t, and P_{t-1} is the closing value of the index for the previous day. The study period includes a total of 3438 daily returns observations for each index.

To examine the distribution pattern of daily stock returns over the turn of the month, we have used summary statistical measures like the mean and standard deviation. To verify the significance of the findings, we have also utilised two statistical tests, namely the parametric t-test and the non-parametric Mann-Whitney U test. The non-parametric method was chosen to test seasonality due to its robustness resulting from the absence of assumptions such as population normality and homoscedastic variance. This approach is preferred as it can accommodate data with varying distributions, which makes it more reliable for detecting seasonal patterns.

In order to investigate whether there is a TOM in the Indian stock market, we have tested the following null and alternative hypotheses:

H_0: Mean Returns $_{TOM}$ = Mean Returns $_{ROM}$

H_1: Mean Returns $_{TOM}$ > Mean Returns $_{ROM}$

H_0 states that the mean daily returns at the TOM is equal to the mean daily returns for the ROM, while the alternative hypothesis H_1 proposes that TOM returns are statistically different than the mean returns for the ROM.

For the investigation of the significance difference between the trading activity of NSE/ BSE/ individual/ domestic institutional/ foreign institutional investors during TOM and ROM, the following null and alternative hypotheses have been formulated:

H_0: Trading activity $_{TOM}$ = Trading activity $_{ROM}$

H_1: Trading activity $_{TOM}$ > Trading activity $_{ROM}$

H_0: There is no significant difference between the trading activity of NSE/ BSE/ individual/ domestic institutional/ foreign institutional investors during TOM and ROM. H_1: The trading activity of NSE/ BSE/ individual/ domestic institutional/ foreign institutional investors during TOM is significantly different than the trading activity during ROM.

4. Empirical Results

4.1. **Mean Daily Returns and TOM.** We presented the mean daily index returns by trading day of the month from days -9 to +9 in Figure 1 and 2 to observe the day-wise return trend throughout the month. The mean returns for the Nifty (Nifty 50) and Sensex (S&P BSE Sensex) were highest on day -1, followed by days +2 and +1, for the second and third highest returns, respectively. The mean returns for Nifty Small (Nifty SmallCap 50) and BSE Small (S&P BSE SmallCap) were highest on day +1 and second and third highest on days -1 and +2, respectively. This indicates that the TOM period has the highest returns for the month, except day +3 which reported lower and negative mean returns for Nifty and Sensex respectively. As a result, the TOM (-1, +2) would yield better returns than the ROM (-1, +2). Additionally, returns for the TOM (-1, + 2) period as a whole are positive, while returns for the ROM (-1, + 2) period are negative in the majority of the days. However, it is interesting to observe that both day -4 and day -2 show a notable percentage of positive returns across all four indices. Furthermore, all four indices experience the highest negative returns on day -9.

Figure 1: Mean Daily Returns around the Trading Day of the Month for Nifty and Sensex
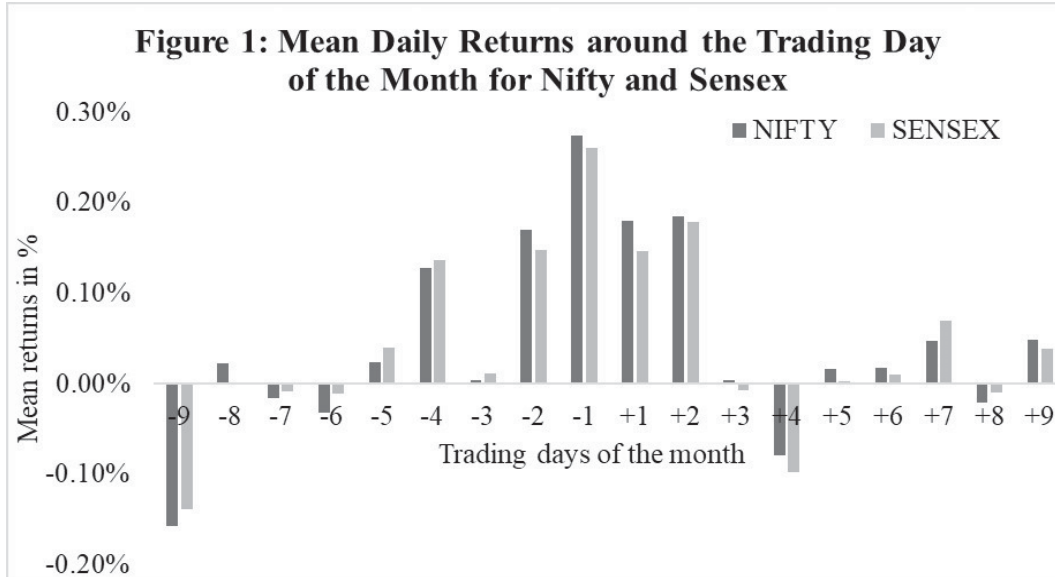
Table 1 provides detailed information on the mean daily returns and other relevant statistics for the Nifty and Sensex indices, categorized by trading day of the month from days -9 to +9. On day -1, both the Nifty and Sensex exhibit the highest mean returns of 0.27 percent and 0.26 percent, respectively. These figures are six times higher than the overall mean returns (0.05 percent and 0.04 percent) for all trading days considered in the study. It is worth noting that day -1 is the only day where the mean daily returns for both indices are statistically significant at the 5 percent level. Although the mean returns on days +1 and +2 are higher and positive compared to other days of the month, they do not reach statistical significance at the 5 percent level.

Figure 2: Mean Daily Returns around the Trading Day of the Month for Nifty Small and BSE Small
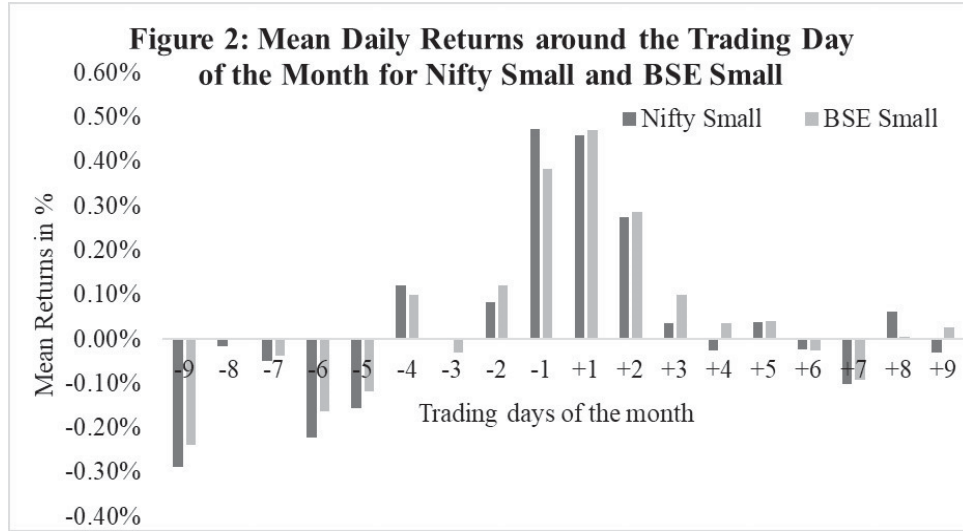
Notably, days -4 and -2 demonstrate notably positive mean returns for both the Nifty and Sensex. However, day +3 shows a zero return for the Nifty and a negative return for the Sensex. These findings suggest a potential shift in the trading days within the TOM period. Both the Nifty and Sensex record their highest negative returns on day -9, which is statistically significant at the 5 percent level for the Nifty and the 10 percent level for the Sensex. Apart from days -4, -2, -1, +1, and +2, the mean returns for the remaining trading days are either insignificant or negative.

Table 1: Means (%), Standard Deviations, and t-statistics of Mean								
Trading	Daily Returns of Nifty and Sensex by Trading Day of the Month							
Day	NIFTY				SENSEX			
of the	Mean	Standard	t-stats	p-value	Mean	Standard	t-stats	p-value
Month	Return	deviation			Return	deviation		
-9	-0.16	0.013289	-2.10959	0.036078**	-0.14	0.013255	-1.89794	0.059073*
-8	0.02	0.013912	-0.26312	0.792722	0.00	0.014021	-0.44725	0.655161
-7	-0.02	0.01745	-0.51579	0.606564	-0.01	0.017257	-0.44051	0.66004
-6	-0.03	0.011474	-0.96211	0.337067	-0.01	0.01148	-0.69118	0.49019
-5	0.02	0.017122	-0.21068	0.833347	0.04	0.016883	-0.06558	0.947834
-4	0.13	0.010665	0.974287	0.330977	0.14	0.010716	1.111224	0.267676
-3	0.00	0.013324	-0.46037	0.645727	0.01	0.01308	-0.37973	0.704531
-2	0.17	0.012466	1.29865	0.195469	0.15	0.012401	1.08524	0.27904
-1	0.27	0.012732	2.372177	0.018579**	0.26	0.013116	2.187614	0.029804**
+1	0.18	0.015147	1.163397	0.246019	0.15	0.015906	0.846095	0.398491
+2	0.19	0.012479	1.459703	0.145846	0.18	0.01255	1.407905	0.160619
+3	0.00	0.012546	-0.49474	0.621295	-0.01	0.012829	-0.57133	0.568383
+4	-0.08	0.01276	-1.36503	0.173693	-0.10	0.012995	-1.51352	0.131642
+5	0.02	0.012112	-0.37114	0.710899	0.00	0.012553	-0.48532	0.627949
+6	0.02	0.013914	-0.31905	0.750006	0.01	0.013973	-0.36711	0.713911
+7	0.05	0.013896	-0.02843	0.977347	0.07	0.014245	0.205402	0.83746
+8	-0.02	0.012442	-0.76768	0.443525	-0.01	0.012388	-0.62522	0.532496
+9	0.05	0.011844	-0.01983	0.984196	0.04	0.012356	-0.09424	0.925004
An asterisk (*) denotes significance at the 10% level.								
Two asterisks (**) denote significance at the 5% level.								
Three asterisks (***) denote significance at the 1% level.								

To assess the level of volatility in the return distributions, as a measure of risk, we analysed the standard deviation during the TOM days. The results indicate that both indices exhibit a typical level of volatility in their return distributions during the TOM period. However, there is no indication that the higher TOM returns are accompanied by a proportionate increase in risk. This suggests that the observed TOM effect is not solely driven by risk compensation.

Table 2 provides comprehensive information on the mean daily returns and other pertinent statistics for the Nifty Small and BSE Small indices, categorized by trading day of the month from days -9 to +9. Significantly positive mean daily returns are observed at the 1 percent level on days -1, +1, and +2 for both the Nifty Small and BSE Small indices. Among these, day -1 stands out with the highest mean returns of 0.46 percent for Nifty Small and 0.47 percent for BSE Small. These figures are thirteen and nine times higher, respectively, than the overall returns (0.04 percent and 0.05 percent) averaged across all trading days considered in the study.

Table 2: Means (%), Standard Deviations, and t-statistics of Daily							
Trading	Returns for Nifty Small and BSE Small by Trading Day of the Month						
Day	Nifty Small				BSE Small		
of the	Mean	Standard	t-stats	p-value	Mean	Standard	t-stats	p-value
Month	Return	devoiation			Return	devoiation		
-9	-0.29	0.017846	-2.44874	0.015179**	-0.24	0.015572	-2.47302	0.01422**
-8	-0.02	0.017679	-0.39665	0.692038	0.00	0.014881	-0.41685	0.677223
-7	-0.05	0.019102	-0.60465	0.546083	-0.04	0.014949	-0.75988	0.448199
-6	-0.22	0.017033	-2.03967	0.042654	-0.16	0.014204	-1.98898	0.048021
-5	-0.16	0.01819	-1.43245	0.153539	-0.12	0.014461	-1.55109	0.122415
-4	0.12	0.013713	0.843714	0.399762	0.10	0.011838	0.609744	0.542677
-3	0.00	0.015054	-0.31877	0.750219	-0.03	0.013059	-0.7871	0.432113
-2	0.08	0.014523	0.435705	0.663491	0.12	0.012365	0.798821	0.425287
-1	0.47	0.014361	4.08875	0.00006***	0.38	0.010839	4.129644	0.00005***
+1	0.46	0.016571	3.456376	0.00066***	0.47	0.014036	4.08038	0.00006***
+2	0.28	0.014765	2.184083	0.03005***	0.29	0.011815	2.717606	0.00711***
+3	0.04	0.014245	0.013217	0.989467	0.10	0.011722	0.593009	0.553799
+4	-0.03	0.01398	-0.58244	0.560879	0.04	0.011958	-0.10899	0.913309
+5	0.04	0.014821	0.018034	0.985629	0.04	0.01261	-0.06129	0.951184
+6	-0.02	0.017403	-0.45686	0.648253	-0.03	0.014967	-0.65589	0.512632
+7	-0.10	0.01587	-1.16058	0.247133	-0.09	0.013162	-1.4087	0.160406
+8	0.06	0.015954	0.233479	0.815617	0.00	0.013415	-0.41869	0.675874
+9	-0.03	0.014345	-0.62444	0.533006	0.03	0.011863	-0.22809	0.819795
An asterisk (*) denotes significance at the 10% level.							
Two asterisks (**) denote significance at the 5% level.							
Three asterisks (***) denote significance at the 1% level.							

While the mean return on day +3 is positive, it is statistically insignificant for both indices at the 5 percent level. Apart from day +3, the TOM period consistently generates positive and statistically significant returns. Notably, days -4 and -2 exhibit notably positive mean returns for both the Nifty Small and BSE Small indices, further suggesting a potential shift in the trading days within the TOM period. However, the mean returns for the remaining days from days +3 to -5 and day -3 are either insignificant or negative.

Both indices record their highest negative mean returns on day -9, which is statistically significant at the 5 percent level. This indicates a distinct pattern in returns during this period. Similar to the Nifty and Sensex, the Nifty Small and BSE Small indices display a typical level of volatility in their return distributions during the TOM days. Analyzing the standard deviation allowed us to assess whether the rise in returns during the TOM period is accompanied by a proportionate increase in risk. However, our findings suggest that the higher TOM returns are

not associated with a higher risk level, indicating that the observed phenomenon is not due to risk compensation.

In summary, the findings from Table 1 and 2 shed light on the mean daily returns and volatility of the Nifty, Sensex, Nifty Small, and BSE Small indices across different trading days of the month. The TOM period emerges as a significant source of positive returns, except for day +3, while other trading days exhibit either insignificant or negative returns. The presence of volatility during the TOM days, without a corresponding increase in risk, supports the notion that the observed phenomenon is distinct from risk compensation.

Table 3 provides a comparison of the mean returns between the TOM and ROM periods, along with corresponding t-values and Mann-Whitney U values. The Nifty, Sensex, Nifty Small, and BSE Small indices exhibit significantly positive mean daily returns at the 1 percent level for the all-alternative TOM periods. Conversely, the alternative ROM periods display insignificantly low and nearly negative mean returns for the Nifty Small and BSE Small indices.

In terms of mean returns, the TOM (-1, +1) period outperforms the TOM (-1, +2) period, and the TOM (-1, +2) period outperforms the TOM (-1, +3) period for all indices. The difference in returns between the TOM and ROM periods is significantly positive for all indices in each of the three alternate TOM periods. This finding is corroborated by the non-parametric Mann-Whitney U test, which also supports the existence of the TOM effect in the Indian stock market.

These findings align with previous research that has identified the TOM effect in the Indian stock market. Freund et al. (2007) confirmed the TOM effect using NSE data from 1992 to 2004. Mangala and Sharma (2007) observed significant positive returns during the first half of the month, while zero or negative returns were observed during the rest of the month from 1994 to 2005. Singh and Das (2020) identified the TOM effect in certain sectors of the Indian stock market between 2010 and 2019. Singh et al. (2021) discovered higher average returns during the TOM in emerging markets, including India, from 2000 to 2017.

Additionally, we examined the Nifty Small and BSE Small indices to analyse the size effect on the TOM. The results indicate that the TOM effect exists in both large and small indices, but it is more pronounced in small indices. At TOM (-1, +1), the daily mean returns for large indices (Nifty and Sensex) are 0.22 percent, while for small indices (Nifty Small and BSE Small), they are 0.45 percent. At TOM (-1, +2), the mean daily returns are 0.21 percent for large indices and 0.39 percent for small indices. Finally, at TOM (-1, +3), the mean daily returns are 0.16 percent for large indices and 0.31 percent for small indices. There is a positive difference between small and large indices. On the other hand, mean returns during the ROM period for small indices are insignificantly negative. Consequently, the spread between TOM and ROM returns is greater for small indices compared to large indices. This finding suggests that the TOM effect is more prominent in small indices, indicating a potential association between the TOM effect and firm size. Further investigation into this effect is warranted. Similarly, Tadepalli et al. (2022) discovered a significant TOM effect in the small-cap and mid-cap indices from 2009 to 2017, they observed a weakening of the TOM effect in the large-cap indices, which aligns with the results of the present study.

To examine whether the mean daily returns during the TOM period are equal to those during the ROM period, parametric t-test and non-parametric Mann-Whitney U test were conducted. Both tests rejected the null hypothesis, indicating that the mean daily returns during the TOM period are significantly greater than those during the ROM period.

	TOM	ROM	Diff.	TOM	ROM	Diff.	TOM	ROM	Diff.
				Table 3: Mean Returns at the TOM and ROM					
	(-1,+1)	(-1,+1)		(-1,+2)	(-1,+2)		(-1,+3)	(-1,+3)	
NIFTY 50									
Mean Ret (%)	0.23***	0.03	0.20***	0.21***	0.02	0.19***	0.16***	0.02	0.14**
t-stat	(3.18)***	(1.35)	(2.66)***	(3.78)***	(0.94)	(3.09)***	(3.35)***	(0.95)	(2.50)**
Mann-Whitney	606510***			874772***			1135866***		
U Value									
SENSEX									
Mean Ret (%)	0.22***	0.03	0.19***	0.21***	0.02	0.19***	0.15***	0.02	0.13**
t-stat	(2.91)***	(1.28)	(2.57)***	(3.51)***	(0.88)	(2.99)***	(3.07)***	(0.92)	(2.35)**
Mann-Whitney	616423***			882358***			1146594***		
U Value									
NIFTY SMALL									
Mean Ret (%)	0.47***	-0.01	0.48***	0.40***	-0.03	0.43***	0.31***	-0.03	0.34***
t-stat	(5.88)***	(-0.41)	(5.51)***	(6.31)***	(-0.98)	(5.92)***	(5.69)***	(-1.08)	(5.28)***
Mann-Whitney	531426***			780082***			1027880***		
U Value									
BSE SMALL									
Mean Ret (%)	0.43***	0.01	0.42***	0.38***	-0.01	0.39***	0.31***	-0.02	0.33***
t-stat	(6.64)***	(0.25)	(5.84)***	(7.38)***	(-0.44)	(6.45)***	(6.99)***	(-0.69)	(6.05)***
Mann-Whitney	534344***			774610***			1012001***		
U Value									
An asterisk (*) denotes significance at the 10% level.									
Two asterisks (**) denote significance at the 5% level.									
Three asterisks (***) denote significance at the 1% level.									

4.2. **Trading and Net Buying Volume around Trading Day of the Month.** Based on the review of literature, the TOM effect is believed to be influenced by higher trading volume or increased investor buying pressure on TOM compared to other days. Several factors have been identified in previous studies as potential causes for this higher trading volume or buying pressure, including greater liquidity, window dressing, and the buying pressure from individual, domestic institutional, and foreign institutional investors. In order to test these assumptions within the context of the Indian stock market, we examined the total and net buying trading volume during the TOM and ROM periods.

As the majority of the explanations assume the greater trading volume around the TOM, we first analysed the total trading volume and turnover in the stock market. Figure 3 presents the average total trading volume and turnover on the NSE and BSE for each trading day of the month, ranging from days -9 to +9. The findings indicate that on the NSE, the highest trading volume and turnover occurs on day -1, whereas no significant increase in trading volume and turnover was observed for the BSE. However, the trading volume and turnover values for the NSE exhibit a relatively consistent pattern throughout the trading days. Similarly, the trading volume and turnover values for the BSE also exhibit a relatively consistent pattern, with minor fluctuations observed for all trading days.

Table 4 presents the average trading volume and turnover for each trading day of the month, ranging from days -9 to +9, for both the NSE and BSE. The results indicate that the NSE reported the highest trading volume on day -1, which is statistically significant at the 5% level. Furthermore, there was a significant increase in turnover on the same day, significant at the 1% level. However, for all other trading days, the trading volume and turnover exhibited a relatively consistent pattern.

In contrast, the trading volume and turnover values of the BSE showed a relatively consistent pattern with minor fluctuations across all trading days. Additionally, it is noteworthy that the

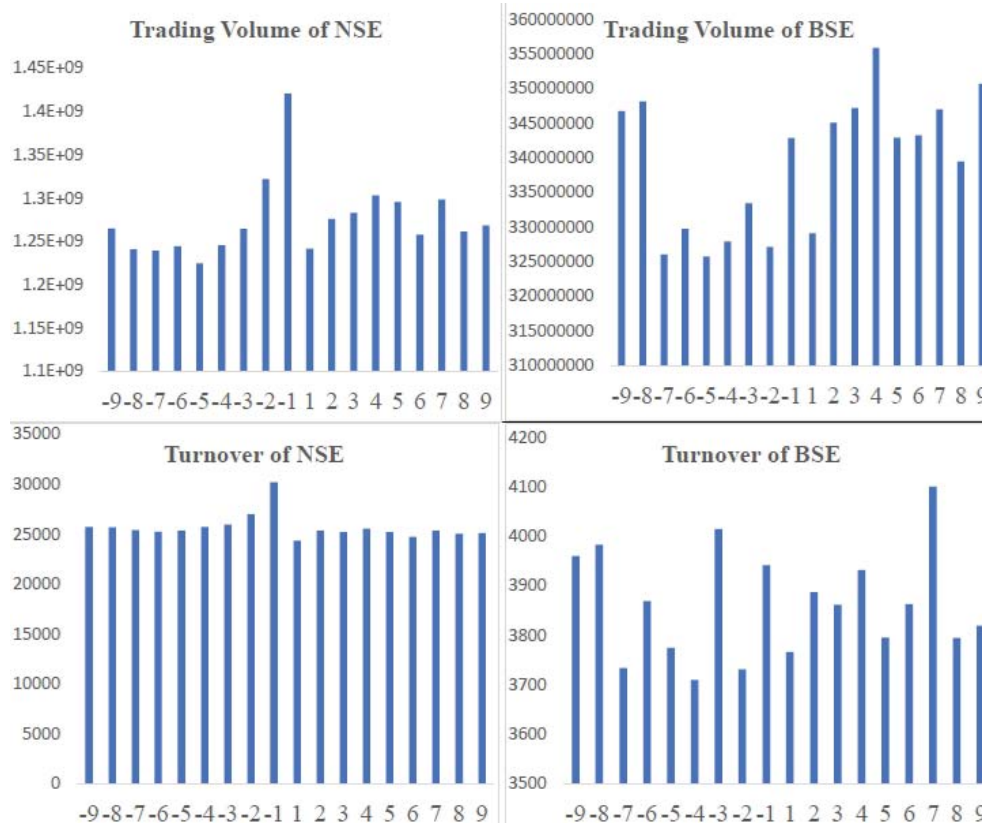NSE consistently had higher trading volume and turnover compared to the BSE for all days of the month.

Figure 3: Trading Volume and Net Turnover around the Trading Days of the Month

These findings suggest that there may be differences in the trading behavior of investors between the NSE and BSE, particularly on day -1, which merits further investigation. The higher trading volume and turnover observed on day -1 on the NSE may indicate a specific market dynamic or investor preference on that particular day. Exploring the reasons behind this disparity and its impact on the TOM effect would contribute to a deeper understanding of the phenomenon in the Indian stock market.

These results suggest that while there may be a higher trading volume and turnover on day -1 for the NSE, but there is no substantial evidence of a consistent increase in trading volume and turnover across all trading days of the TOM for both the NSE and BSE. These findings indicate that factors other than trading volume may be contributing to the TOM effect in the Indian stock market.

We conducted a t-test to compare the differences in trading volume and turnover between the TOM and ROM periods on the NSE and BSE. The results, presented in Table 5, indicate that both the TOM and ROM periods contribute significantly to the overall trade of the month, as trading volume and turnover are significantly greater during these periods. However, the difference in trading volume and turnover between the TOM and ROM is not statistically significant, except for the TOM (-1,1) and ROM (-1,1) comparison on the NSE, which is significant at the 5% level. This suggests that there is no significant difference in trading volume and turnover around the TOM period compared to the ROM period.

Table 4: Trading Volume and Net Turnover around the				
Trading Day	Trading Days of the Month on NSE and BSE			
of the	NSE		BSE	
Month	Trading Volume	Turnover	Trading Volume	Turnover
-9	13026.76	26506.56	3525.681	3968.416
-8	12861.97	26411.06	3583.566	3965.048
-7	12864.28	26184.39	3335.644	3722.561
-6	12884.28	26027.8	3357.582	3856.519
-5	12623.01	25897.17	3298.154	3753.322
-4	12947.99	26504.74	3340.559	3721.424
-3	13107.5	26827.9	3394.849	4017.879
-2	13593.91	27829.1	3320.124	3718.864
-1	14654.9**	31257.28***	3473.367	3922.91
+1	12956.89	25536.6	3373.002	3819.985
+2	13237.68	26244.02	3508.341	3873.503
+3	13370.4	26166.56	3561.269	3879.442
+4	13531.78	26334.75	3643.857	3931.536
+5	13431.35	26071.51	3505.389	3795.798
+6	13031.18	25656.53	3523.093	3921.548
+7	13451.67	26157.67	3542.213	4085.312
+8	13032.93	25862.09	3458.131	3793.737
+9	13144.87	25984.6	3572.08	3841.054
An asterisk (*) denotes significance at the 10% level.				
Two asterisks (**) denote significance at the 5% level.				
Three asterisks (***) denote significance at the 1% level.				

These findings are consistent with a previous study by McConnell and Xu (2008), who found no significant difference in trading volume on TOM compared to other trading days for the New York Stock Exchange. It appears that the hypothesis of higher trading volume and turnover during the TOM period may not hold true in the Indian stock market, similar to the findings in the New York Stock Exchange.

Table 5: Comparison of Trading Volume & Turnover at the TOM & ROM of NSE & BSE										
		TOM	ROM	Diff.	TOM	ROM	Diff.	TOM	ROM	Diff.
		(-1,+1)	(-1,+1)		(-1,+2)	(-1,+2)		(-1,+3)	(-1,+3)	
		Trading Volulme								
NSE	Mean	13795	13097	698.99	13610	13089	521	13550	13072	478
	t-stat	28.30***	84.85***	1.40	34.75***	82.42***	1.25	40.22***	79.89***	1.28
BSE	Mean	3429	3466	-37	3455	3463	-8	3482	3457	24
	t-stat	44.37***	118.56***	-0.39	51.34***	115.45***	-0.10	56.84***	112.66***	0.35
		Turnover								
NSE	Mean	28356	26225	2131	27652	26224	1428	27281	26227	1053
	t-stat	25.45***	82.04***	2.04**	31.66***	79.78***	1.63	36.86***	77.48***	1.35
BSE	Mean	3873	3890	-17	3873	3891	-18	3875	3892	-17
	t-stat	42.20***	95.13***	0.89	51.27***	91.45***	0.87	58.46***	87.77***	-0.18
An asterisk (*) denotes significance at the 10% level.										
Two asterisks (**) denote significance at the 5% level.										
Three asterisks (***) denote significance at the 1% level.										

We conducted an analysis to examine the average daily total turnover and net buying turnover of individual, domestic institutional and foreign institutional investors, in order to determine the impact of different investor groups on the TOM effect. The results, depicted in Figure 4, revealed interesting patterns. For individual investors, the total turnover during

the TOM was lower compared to the ROM, indicating reduced trading activity. Additionally, the net buying turnover for individual investors was negative during both the TOM and ROM periods.

In contrast, institutional investors (both domestic and foreign) exhibited different behaviour. On day -1, the total turnover of institutional investors was higher than on other days, suggesting increased trading activity. However, their total turnover during the remaining days of the TOM was lower. Examining the net buying turnover, domestic institutional investors had the highest values on day -1, followed by days -2 and -3. Their net buying turnover was higher during the second half of the month (days -9 to -1) and lower during the first half (days +1 to +9). Foreign institutional investors had a notable net buying turnover on days +1 and +2 during the TOM, but negative values on days -1 and -3. Moreover, their net buying turnover during the remaining days of the ROM was negative and lower.

These findings suggest that individual traders exhibit lower trading activity during the TOM, while institutional investors, particularly domestic institutional investors, contribute to higher total turnover on day -1. Foreign institutional investors, on the other hand, display mixed behaviour during the TOM and ROM periods.
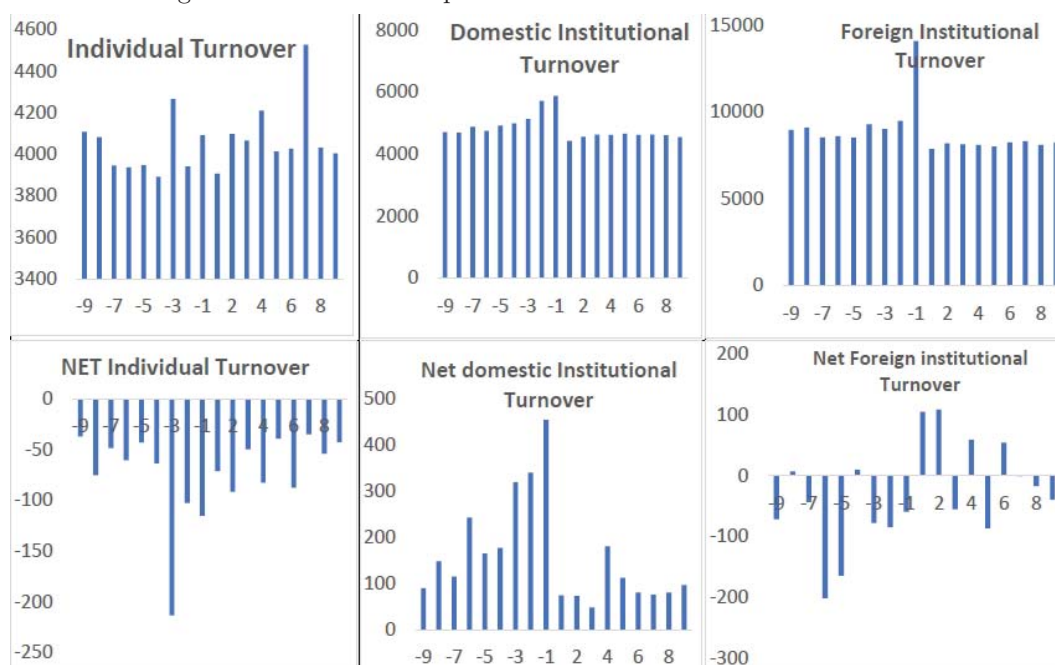

Figure 4: Trading Volume and Turnover by Investors around the Trading Days of the Month

Table 6 provides the average values of total turnover and net buying turnover for individual investors, domestic institutional investors, and foreign institutional investors on each trading day of the month, ranging from days -9 to +9. The data reveals interesting patterns in the trading behavior of different investor groups.

For individual investors, the total turnover and net buying turnover follow a normal distribution pattern across all trading days, without any significant increase on a particular day. This finding casts doubt on the validity of the increased liquidity hypothesis proposed by previous studies such as Jacobs and Levy (1988) and Ogden (1990), which suggested that regular payment dates contribute to the TOM effect by providing investors with additional liquidity.

On the other hand, domestic institutional investors exhibit a significant increase in total turnover on days -1 and -2 at 1 percent level, indicating heightened trading activity during those days. Their net buying turnover is also significantly higher on day -1 at 1 percent level, as well as on days -2 and -3 at 5 percent level. These results are in line with the previous

study by Maher and Parikh (2013), which also found that institutional investors increased their trading activity towards the end of the month, providing further support for Thaler's (1987) window dressing hypothesis.

Foreign institutional investors show a significant increase in total turnover on day -1 at 1 percent significant level, during the TOM, with lower turnover reported on all other trading days in both TOM and ROM. However, their net buying turnover is significantly positive only on days +1 and +2 at 10 percent level, with negative net buying turnover observed on all other trading days. This significant rise in net buying turnover by foreign institutional investors could be attributed to the increased liquidity of investors, as proposed by Jacobs and Levy (1988) and Ogden (1990).

Overall, the findings provide insights into the trading behaviours of different investor groups during the TOM and ROM periods, suggesting potential influences such as window dressing by domestic institutional investors and increased liquidity for foreign institutional investors.

Table 6: Total Turnover and Net Buying Turnover around the Trading Days of the					
Trading Day	Month by Individual, Domestic, and Foreign Institutional Investors				
of the	TOTAL TURNOVER			NET BUYING TURNOVER		
Month	Individual	DII	FII	Individual	DII	FII
-9	4093.464	4936.65	9176.19	-55.0586	121.51	-58.11
-8	4054.082	4882.01	9188.73	-77.4436	166.02	-14.47
-7	3917.238	5066.02	8712.41	-55.5328	131.89	-56.06
-6	3913.435	4969.92	8751.52	-67.5601	257.20	-214.85*
-5	3915.066	5098.57	8571.38	-45.3691	192.96	-190.33
-4	3858.226	5212.90	9531.18	-66.7807	212.52	30.29
-3	4260.173	5371.35	9348.12	-210.938	346.18**	-115.13
-2	3907.122	6053.78***	9687.33	-104.186	382.82**	-136.34
-1	4044.37	6135.64***	14658.77***	-119.684	489.65***	-64.351
+1	3936.496	4735.77	8315.65	-104.486	92.05	105.99*
+2	4067.696	4804.43	8394.81	-94.3167	83.01	100.60*
+3	4048.233	4854.79	8494.16	-54.6503	70.11	-78.03
+4	4186.472	4870.63	8293.22	-86.4543	180.40	40.66
+5	3999.901	4886.77	8182.12	-44.0681	125.74	-116.45
+6	4010.877	4855.49	8654.57	-92.6207	102.61	34.0525
+7	4495.634	4851.44	8500.14	-41.2363	73.09	-5.38
+8	4012.864	4859.85	8321.06	-64.2743	95.76	-3.48
+9	3979.674	4753.49	8621.17	-48.86	109.64	-25.85
An asterisk (*) denotes significance at the 10% level.					
Two asterisks (**) denote significance at the 5% level.					
Three asterisks (***) denote significance at the 1% level.					

Table 7 presents the results of comparing the total turnover and net buying turnover of individual investors, domestic institutional investors, and foreign institutional investors at the TOM and ROM. The findings reveal interesting insights into the trading behavior of these investor groups and their impact on the TOM effect. The analysis indicates that there is no significant difference in total turnover between individual investors and domestic institutional investors (except TOM period -1, +1, which is significant at 5 percent level) at the TOM and ROM. However, the total turnover of foreign institutional investors at the TOM is significantly different from the ROM at a 1 percent level. Specifically, the total turnover of individual investors at the TOM is lower compared to the ROM, while the total turnover at the TOM is positive for domestic institutional investors and significantly positive for foreign institutional investors compared to the ROM.

The results suggest that the hypothesis of increased liquidity of individual investors is not supported, as their turnover at the TOM is not significantly different from that at the ROM.

Similarly, the total turnover of domestic institutional investors at the TOM is not significantly greater than the ROM, although their turnover on specific days (-1, -2, and -3) is significantly higher, as indicated in Table 6. On the other hand, foreign investors exhibit a significantly larger turnover at the TOM compared to the ROM at a 1 percent significance level, suggesting that their increased trading activity at the beginning of the month may be influenced by factors such as increased liquidity or window dressing.

To examine the buying pressure of investors at the TOM, the net buying turnover of individual investors, domestic institutional investors, and foreign institutional investors was analysed. The results indicate that the net buying turnover of individual investors at the TOM and ROM periods is significantly negative, indicating that the hypothesis of increased demand by individual investors for the TOM effect is not supported in the Indian stock market. Interestingly, the net buying turnover of foreign institutional investors at the TOM is insignificantly higher than that at the ROM. Furthermore, the net buying turnover at the ROM for foreign investors in all periods is significantly negative. This suggests that foreign institutional investors may have partial impact on the TOM effect. As for domestic institutional traders, their net buying turnover is positive at the TOM, but it is not significantly different from that at the ROM, except for the TOM (-1, +1) period, which shows significance at a 5 percent level.

Overall, the findings highlight the differences in trading behavior and impact among different investor groups, indicating that individual investors may not contribute to the TOM effect, while the influence of domestic and foreign institutional investors may vary.

Table 7: Comparison of Total Turnover and Net Buying Turnover at the TOM and ROM									
by Individual, and Institutional, Domestic and Foreign Investors									
		TOM	ROM	Diff.	TOM	ROM	Diff.	TOM	ROM	Diff.
		(-1,+1)	(-1,+1)		(-1,+2)	(-1,+2)		(-1,+3)	(-1,+3)	
Total Turnover										
Individual	Mean	3990	4094	-103	4016	4095	-79	4024	4098	-73.85
	t-stat	35.41***	64.99***	-0.53	42.56***	62.19***	-0.48	48.76***	59.34***	-0.50
Institution	Mean	5429	5019	410	5221	5031	189	5129	5042	87
	t-stat	25.97***	79.09***	2.00**	31.43***	77.05***	1.10	36.38***	74.81***	0.57
Foreign	Mean	11488	8826	2662	10457	8851	1606	9966	8873	1093
	t-stat	17.70***	96.37***	7.59***	23.08***	93.56***	5.44***	28.22***	90.68***	4.14***
Net Buying turnover										
Individual	Mean	-112	-73	-39	-106	-72	-35	-93	-73	-20.64
	t-stat	-5.31***	-7.42***	-1.28	-5.57***	-7.07***	1.34	-6.26***	-6.79***	-0.90
Institution	Mean	287	164	124	219	168	51	182	174	7.83
	t-stat	4.67***	10.61***	2.43**	4.88***	10.51***	1.19	5.00***	10.46***	0.20
Foreign	Mean	25.30	-64.13	89.43	50.40	-73.59	123.99	18.29	-73.32	91.62
	t-stat	0.30	-2.59***	1.12	0.79	-2.87***	1.85*	0.34	-2.76***	1.53
An asterisk (*) denotes significance at the 10% level.									
Two asterisks (**) denote significance at the 5% level.									
Three asterisks (***) denote significance at the 1% level.									

5. Conclusion

We examined the TOM effect in the Indian stock market from April 2007 to February 2023 and found a significantly positive TOM effect. The mean daily returns on the last trading day of the month were highest and significantly positive for the Nifty and Sensex, while the last, first, and second trading days of the month were highest and significantly positive for Nifty small and BSE small. Further, we found that there is a shift in the trading days of the TOM. Our findings show that the higher TOM returns were not associated with a higher risk level for all indices, indicating that the observed phenomenon was not due to risk compensation.

We also tested whether the TOM effect was due to the size effect and found that the TOM anomaly was more pronounced in small indices. We analysed the total trading volume and turnover in the market and found that trading volume and turnover at the TOM and ROM were significantly greater, indicating that both periods substantially contribute to the overall trade of the month. The difference between trade volume and turnover around TOM and ROM was insignificant.

Moreover, we investigated the total turnover and net buying turnover of individual investors, as well as domestic and foreign institutional investors, as explanations such as increased liquidity of individual investors and institutional window-dressing activity highlight the increasing individual or institutional trading value at the TOM. We found that total turnover and net buying turnovers of individual investors were not significantly higher at the TOM than at the ROM. When we tested net buying turnover, the evidence indicated that the net buying turnover of individual investors at the TOM was insignificantly lower than that at the ROM, implying that the hypothesis of increased demand by individual investors was not supported in the Indian stock market. This may be due to unpredictable nature of pay patterns in India. The total turnover and net buying turnover of domestic institutional traders at the TOM was not significantly different from that at the ROM, but had a significant total turnover on days -1 and -2, and net buying turnover on days -1, -2, and -3, supporting the window dressing hypothesis. The TOM effect may be due to the increased net buying turnover of domestic institutional traders during the end of the month.

Interestingly, foreign institutional investors total turnover was significantly positive on day -1, and net turnover on days +1 and +2 was significantly higher at the 10 percent level. Our results confirm that the TOM effect is not due to the increased demand of individual investors. Instead, higher total and net buying turnover by domestic and foreign institutional investors may partially cause the TOM effect. However, our study does not reveal why institutional investors and foreign investors have a higher total turnover and net buying turnover at the specific trading days and why the TOM effect is more pronounced in small indices. Therefore, future research could explore the underlying causes of these phenomena. Examining the impact of macroeconomic variables and market-related factors on the TOM effect could also be beneficial. Therefore, it is crucial to explore the potential impact of the TOM effect on portfolio and trading strategies, considering the broader context of market dynamics and the deviations from the EMH. Overall, addressing these research questions can enhance our understanding of the TOM effect and its implications for investors, policymakers, and market participants.

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