# Dissemination of Information on Investor Attention, Firm Size, and Year-End Market Dynamics: An Empirical Study of the Indian Stock Market

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*This paper investigates the dissemination and presence of the "Year-End Market Surge", commonly referred to as the "Christmas Rally", in the Indian stock market. In developed nations, this phenomenon describes a notable increase in stock prices typically observed during the last week of December and the first two trading days of January. Recent reports in the popular press suggest that a similar trend has been witnessed in the Indian stock market over recent years. However, there remains a lack of systematic research on this subject. Therefore, this study rigorously examines whether this market surge, which poses a potential challenge to the Efficient Market Hypothesis (EMH), is observable in the Indian context. Furthermore, the paper explores the dissemination of firm-specific trading patterns to identify characteristics of companies that have consistently delivered positive returns during this period over multiple years. The findings reveal that larger stock portfolios in the Indian market consistently benefit from the Year-End Market Surge effect, delivering higher abnormal returns compared to smaller portfolios. These results provide important insights into the role of firm size in capturing the benefits of this seasonal market anomaly.*

*Keywords: dissemination, year-end market surge, size effect, press, equally-weighted portfolios, average daily return*

## INTRODUCTION

According to Fama (1970), all available information is instantly reflected in a stock's price, a more theoretical than practical principle. In reality, the dissemination of information and investor attention significantly influence market efficiency. Merton (1987) was among the first to demonstrate the importance of investor attention, a concept later expanded upon by researchers like Sims (2003), Hirshleifer et al. (2003), and Peng and Xiong (2006). Their findings suggest that as investors allocate more attention to market processes, the increased flow and dissemination of information enhance market efficiency, aligning with the ideas of Grossman & Stiglitz (1980). Investor attention has long been observed concerning anomalies in market volatility or returns, particularly regarding the Day-of-the-Week (DOW) effect. Early studies by Cross (1973), French (1980), Keim et al. (1984), Rogalski (1984), and Aggarwal et al. (1989) documented that stock returns exhibit volatility that varies depending on the day of the week. Hakan Berument et al. (2001) further tested the DOW effect on stock market volatility and returns, discovering that the highest volatility occurs on Fridays and the lowest on Wednesdays, with Wednesday and Monday returns also showing notable patterns.

Expanding beyond daily effects, similar literature has explored year-end anomalies. For instance, Nippani et al. (2015) investigated the Year-End Market Surge. They found that average daily returns were significantly higher than on other days of the year in various global stock markets. Washer et al. (2016) confirmed the presence of the Year-End Market Surge in the U.S. stock market, noting a distinct impact during this time. Branco-Illodo et al. (2019) studied the U.S. market. They observed that increased consumer spending during Christmas, driven by purchases of gifts and consumables, stimulates the economic cycle, positively influencing stock prices. This phenomenon, known as the Year-End Market Surge, reflects the broader market's reaction to holiday season spending. Hirsch (2014) also noted that the stock market often exhibits surprisingly strong positive returns during the last five trading days of December and the first two days of January, further reinforcing the significance of this year-end effect.Additionally, Jakab (2014) and the popular press[1] have mentioned the Year-End Market Surge for many years. Press releases from CNBC[2] and ZEE Business[3] reveal that between 2011 and 2020, the market exhibited both positive and negative returns during the final week of December and the first two trading days of January. This analysis highlights the variability in market performance during this specific period, showcasing a range of return outcomes that reflect both gains and losses over the course of these key trading days at the year's end and the start of the new year. This proves that the S&P 500 declined 8 out of 10 times, whereas the Indian market declined 6 times during the Year-End Market Surge period. In the Indian context, the popular press asserts the presence of the Year-End Market Surge; however, no academic study has thoroughly examined it, which this study attempts to address.

This gap is particularly surprising in the Indian context given the socioeconomic background of the Indian economy, where one might expect a pronounced "Diwali effect" rather than a year-end surge. Therefore, this makes the issue more intriguing. Suppose the Year-End Market Surge is present in the Indian market. In that case, it should be studied rigorously to understand its dynamics, and to identify which companies provided positive returns during this period. The study will also investigate the dissemination of information during this critical time and analyze its impact on market efficiency, especially concerning investor attention, contributing to the broader understanding of market anomalies and the behavior of stock returns during calendar-based events.

**TABLE 1**
**SHOWS THE RETURN OF THE U.S. AND INDIAN MARKET DURING THE LAST WEEK OF DECEMBER AND THE FIRST TWO DAYS OF JANUARY FROM 2011 TO 2020**

| **Year-End Market Surge Return for the U.S. & Indian Market** | | | | |
|---|---|---|---|---|
| **Years** | **S&P 500*** | | **Nifty**** | |
| **2020** | 1.00% | **Y** | 7.81% | **Y** |
| **2019** | 0.30% | **Y** | 0.93% | **Y** |
| **2018** | 1.30% | **Y** | -0.13% | **N** |
| **2017** | 1.10% | **Y** | 2.97% | **Y** |
| **2016** | 0.40% | **Y** | 0.14% | **Y** |
| **2015** | -2.30% | **N** | -3.56% | **N** |
| **2014** | -3.00% | **N** | 2.70% | **Y** |
| **2013** | 0.20% | **Y** | 0.43% | **Y** |
| **2012** | 2.00% | **Y** | -4.30% | **N** |
| **2011** | 1.90% | **Y** | -1.90% | **N** |
| **Average** | **0.29%** | | **0.68%** | |
| **Median** | **0.70%** | | **0.29%** | |

Note: - Y – Positive return; N – Negative return.

*"Market Watch[4] - The so-called Year-End Market Surge that tends to materialize in the U.S. stock market in the final week of December and the first two trading sessions of the new year is off to its best start since 2000-01, when the market gained 5.7 (Table 2) over the period, according to Dow Jones Market Data."*

**TABLE 2**
**YEAR-END MARKET SURGE THAT TENDS OVER THE YEAR BY MARKET WATCH**

| S&P 500 Gains 1% or more on Day 1 of Year-End Market Surge | | |
|---|---|---|
| **Year** | **First Day of Year-End Market Surge** | **Santa Rally** |
| **1929** | 2.21 | 4.12 |
| **1945** | 1.4 | 0.58 |
| **1969** | 1.05 | 3.58 |
| **1974** | 1.41 | 7.2 |
| **1976** | 1.16 | 0.82 |
| **1978** | 1.69 | 3.26 |
| **1982** | 1.76 | 1.17 |
| **2000** | 2.44 | 5.7 |
| **Average** | | **3.3** |
| **Median** | | **3.42** |

Source: Dow Jones Market Data

## LITERATURE REVIEW

A vast body of literature investigates the relationship between stock returns and the day-of-the-week effect, revealing significant calendar anomalies across global markets. Early studies, such as Cross (1973) and French (1980), provide evidence of the day-of-the-week anomaly in the U.S. stock market, specifically focusing on the S&P 500 index from 1953 to 1970. Their findings support a seasonality effect that can lead to rallies in stock prices. Wong et al. (1990) expanded on this research by examining the impact of seasonality across different calendar systems—Gregorian, Chinese, and Islamic—in the Malaysian stock market. Their investigation provided robust evidence of seasonality effects, with monthly returns exhibiting significant differences depending on the calendar in question. Moreover, early studies such as Bonin et al. (1974), Officer (1975), and Rozeff et al. (1976) further demonstrated stock market seasonality by highlighting the role of investor attention. As Peng et al. (2006) postulate, the allocation of investor attention toward market factors is a limited cognitive resource. This limited resource is often directed more toward broader market or sector-wide information, rather than firm-specific data, a pattern that can significantly influence stock returns. As a result, investors tend to prioritize general market conditions and sectoral trends, which can contribute to overlooking critical firm-specific details. Vozlyublennaia (2014) investigated the short-term effects of investor attention, showing that heightened attention to market information often leads to increased stock volatility.

Similarly, Andrei et al. (2015) argue that increased investor attention amplifies both return volatility and associated risk premiums, further demonstrating the powerful role of investor focus in shaping market dynamics. The January effect is another well-documented anomaly, initially explored by Rozeff et al. (1976), who found that stock returns in the U.S. market were significantly higher during January compared to the remaining eleven months. Gultekin et al. (1983) identified similar patterns in major industrialized countries, while Berges et al. (1984) extended these findings to the Canadian stock market. The cultural significance of seasonality in financial markets also became prominent over the decades. For instance, Province (1943) discussed how increased gift-giving during Christmas drives consumer spending, a concept further supported by Branco-Illodo & Heath (2020) and Laroche et al. (2000). Goeddeke et al. (2016) echoed these findings, suggesting that gifts are often perceived as more personal than cash, which in turn leads to higher spending. The broader economic implications of holiday spending were discussed by Cairns et al. (2011), who reported a threefold increase in charitable donations during the Christmas period.

Early research into holiday effects, such as Merrill (1966), identified elevated returns surrounding holidays. Merrill's analysis of the Dow Jones Industrial Average from 1897 to 1965 demonstrated that stock prices tend to rise around holiday periods, further reinforcing the notion of calendar-based anomalies. Later,

Washer et al. (2016) investigated the "Year-End Market Surge" by analyzing U.S. stock market returns from 1926 to 2014. Their study employed t-tests, non-parametric tests, and regression analysis to evaluate investor returns during the year-end period. They found that returns were generally elevated during the surge period, with small-cap portfolios benefiting more than large-cap ones. This research utilized statistical techniques to assess return patterns, offering valuable insights into the factors that influence investor behavior during this period. The inclusion of the size effect in their analysis provides a nuanced understanding of how market anomalies affect small and large firms differently.

Oyedeko et al. (2017) extended this line of research by examining the Year-End Market Surge in the Nigerian stock market using quasi-experimental designs. Their study used the All-Share Index in the Nigeria Stock Exchange to compute monthly returns from 1985 to 2016, finding that the year-end period significantly influences stock performance, particularly due to tax-loss selling. The behavioral aspects of investment decisions during this time also show a connection between market sensations and investment risk. In a broader analysis of trading days, Stambaugh et al. (1984) explored the weekend effect in U.S. stock markets, using a value-weighted index to analyze Friday and Monday returns across firms of varying sizes. Their research found a consistent positive correlation between Friday and Monday returns, particularly for larger firms, suggesting a persistent pattern in consecutive trading day performance. In the Indian context, Bhaduri et al. (2010) investigated the relationship between yield spreads and stock market returns, focusing on dynamic trading strategies. Their study applied a probit model to identify optimal entry and exit points, highlighting how cyclical bull and bear phases influence investor behavior in the Indian stock market.

Additionally, Nageswari et al. (2011) analyzed seasonality in the Indian stock market over a decade (2000–2010), revealing that Wednesday returns peaked while Mondays exhibited negative returns, reflecting a potential day-of-the-week anomaly. Sen et al. (2014) examined the month-of-the-year effect in the Indian market, identifying calendar anomalies that affect SENSEX returns. Contrary to expectations, they found that September and November, rather than the beginning of the year, had a significant positive impact on returns. Sobti (2018) and Mishra et al. (2015) provided further insights into the random walk hypothesis and company fundamentals concerning seasonal anomalies, concluding that the Indian stock market exhibits random walk characteristics during certain rallies. Mitra et al. (2016) employed GARCH models to examine the day-of-the-week effect on Indian stock market volatility, concluding that while a significant Tuesday effect exists, there was no pronounced day-of-the-week impact on Sensex and Nifty index returns. Finally, Nippani et al. (2021) examined the Year-End Market Surge effect in the Indian market, confirming that small-cap companies outperformed mid- and large-cap firms during the year-end period. Their empirical analysis incorporated binary regressions and the inclusion of a "Santa Dummy" variable, showing the persistence of the Year-End Market Surge across firm sizes.

Despite the growing literature on market anomalies, the dissemination of findings regarding the Year-End Market Surge and other calendar-based effects remains underexplored, particularly in the context of emerging markets like India. Understanding how information dissemination impacts market efficiency is essential as investor attention becomes a critical factor in shaping stock returns. Future research should focus on information dissemination channels during periods of heightened market activity, such as year-end surges, and how this affects investor behavior and market outcomes.

## DATA

The dataset used in this study comprises daily average returns, daily average total returns, daily average market capitalization, and weighted average price data obtained from the CMIE database. The data covers the period from 2015 to 2021, specifically focusing on stock performance during the last week of December through the first two trading days of January. This timeframe was chosen to investigate potential year-end market anomalies, such as the Year-End Market Surge. The dataset includes observations from all industries listed on the exchange during this period, with the total number of observations per year as follows: 3,970 in 2015, 3,951 in 2016, 4,003 in 2017, 4,068 in 2018, 4,065 in 2019, 3,897 in 2020, and 4,079 in 2021. However, due to stock non-trading, suspensions, and missing values, the actual usable observations for the

analysis were reduced to 1,146 in 2015, 687 in 2016, 951 in 2017, 624 in 2018, 557 in 2019, 842 in 2020, and 769 in 2021. The final sample size across the entire period totaled 5,575 observations. Companies were grouped into deciles based on their market capitalization to investigate the size effect. Decile 1 represents the top 10% of companies by market capitalization (referred to as "largest" throughout the paper), while Decile 10 represents the bottom 10% ("smallest" companies). Additionally, the analysis distinguishes between large companies (Deciles 1-5) and small companies (Deciles 6-10) to explore performance differences between firms of varying sizes.

Statistical evidence is derived from calculating equally-weighted average daily returns (ADR) for firms within each decile portfolio. This method involves averaging the daily returns of each firm in the portfolio, assigning an equal weight to each firm regardless of its size or number of shares. By employing an equally-weighted approach, the analysis mitigates the potential dominance of larger firms on the overall results, thereby providing a more balanced and comprehensive view of portfolio performance. This methodology offers a clearer representation of the average daily return across all firms within a portfolio, ensuring that the larger ones do not overshadow smaller firms.

By focusing on the equally-weighted ADR, the study provides insights into the typical return experience of firms within the specified portfolios, which is crucial for understanding the impact of firm size on stock performance during the year-end period. This approach ensures that the results reflect the collective performance of the entire portfolio rather than being skewed by the returns of a few dominant firms.

## METHODOLOGY

The firm's daily data from 2015 to 2022 was analyzed to examine the positive returns generated during the Year-End Market Surge period, defined as the final week of December and January's first two trading days. This study adopts a methodology similar to that of Kenneth M. Washer (2016), who analyzed the Santa Claus Rally in relation to firm size. In line with finance theory, which posits that smaller firms tend to outperform larger firms in terms of returns, we first identified suitable proxies for broad market capitalization. The analysis involved running regression models[5] for the companies that generated positive returns during the Year-End Market Surge across all deciles, employing equally-weighted portfolios. To ensure the robustness of our analysis, the geometric mean of the variables was calculated, and stationarity tests were performed to check for the presence of a unit root in the data. The Weighted Average Daily Return (ADR)[6] was calculated as the geometric average of equally-weighted daily returns, providing a balanced view of stock performance.

Additionally, the Average Daily Total Return[7] was used to help investors understand the compounded earnings over the period, while the Average Market Capitalization[8] was computed as the geometric average of the total market value of a company's outstanding shares, reflecting its perceived value in the market. The Average Weighted Price[9] was also calculated as the geometric mean of stock prices, accounting for varying quantities of shares traded. In our study, 5,575 firms were grouped into deciles based on market capitalization, with Decile 1 representing the top 10% and Decile 10 representing the bottom 10%. We focused on identifying deciles that consistently yielded positive returns during the Year-End Market Surge. To deepen the analysis, we conducted regression tests across all deciles, assessing the performance trends over the period and the impact of different market capitalization levels on returns. The dissemination of these findings will contribute to the broader understanding of seasonal market effects, particularly the influence of firm size on stock performance during the year-end rally period, and offers important insights for both academics and investors regarding investment strategies during this unique market phase.

### Empirical Evidence

The analysis of average daily returns (ADR) for portfolios segmented by firm size, presented in Table 3, reveals that smaller firms yield higher returns than their larger counterparts. Specifically, the ADR for the smallest portfolio is 1.66 basis points (bps), while the largest portfolio reports an ADR of 0.794 bps. These findings closely align with the market return (MR) index, which stands at 1.869 bps, suggesting that

both small and large portfolios serve as effective proxies for overall market capitalization. This consistency reinforces the validity of using firm size as a representative measure for market behavior. Notably, the absolute risk, quantified through standard deviation, is higher for smaller firm portfolios, as anticipated, due to their greater volatility.

Furthermore, in Table 4, an examination of the average daily returns during the final five trading days of December and the first two days of January (2015–2022) indicates a noticeable Year-End Market Surge, where investors tend to accept higher risk in expectation of positive returns. Importantly, stationarity testing (Annexure 1) demonstrates that the dataset is stationary, with the Pr < Rho value of 0.0001 ($p < 0.05$), leading to the rejection of the null hypothesis. Thus, the fluctuations observed in ADR cannot be attributed to white noise, but rather reflect underlying market trends. This robust statistical confirmation adds credibility to the inference that the returns are not spurious but are driven by genuine market dynamics. For further reference on small-cap and large-cap market behaviors, Fama and French (1993) provide foundational insights into the relationship between firm size and returns, while Jegadeesh and Titman (1993) offer detailed analyses on momentum strategies around the turn of the year.

The analysis of the Year-End Market Surge in the Indian stock market, based on data from 2015 to 2022, reveals a consistent trend of companies delivering positive returns during the specified periods. Utilizing the SAS platform and assigning a dummy variable value of 1 for firms with positive average daily returns (ADR), the output confirms that all sampled stocks demonstrated positive returns. As shown in Table 5, a total of 2,594 companies (reduced to 1,498 after eliminating duplications) were examined. Notably, 364 companies achieved positive returns in two out of six periods, 201 companies in three out of six, 77 companies in four out of six, and 22 companies in five out of six periods. Remarkably, two companies—Elantas Beck India Ltd. and Reliance Industrial Infrastructure Ltd.—consistently generated positive returns across all six periods. This indicates these companies' strong, recurring market outperformance during the year-end window. The persistence of positive returns across multiple periods underscores the market's cyclical nature, where certain firms regularly capitalize on the Year-End Surge. This finding aligns with prior literature that documents the January Effect and seasonality in stock returns (Keim, 1983; Roll, 1983), particularly in emerging markets like India. Identifying companies with such consistent performance can provide valuable insights for investors seeking to exploit seasonal market opportunities, thereby reinforcing the utility of this research in understanding market anomalies and investment strategies in the Indian stock market.

**TABLE 3**
**DESCRIPTIVE STATISTICS OF DECILES FOR THE PERIOD 2015-2022[10]**

| Decile | Mean | Median | Std Dev | Skewness | Kurtosis |
|---|---|---|---|---|---|
| **Largest (Decile 1)** | 0.794 | 0 | 7.571 | 13.585 | 211.97 |
| **Large (Decile 1-5)** | 1.54 | 0 | 19.581 | 24.825 | 804.664 |
| **Small (Decile 6-10)** | 2.195 | -0.001 | 27.942 | 21.064 | 551.873 |
| **Smallest (Decile 10)** | 1.664 | -0.001 | 16.532 | 12.382 | 161.428 |
| **Market Return (MR)** | 1.869 | 24.144 | 22.989 | 670.467 | 0 |

**TABLE 4**
**DESCRIPTIVE STATISTICS OF THE ADR[11] FOR THE MARKET DURING THE LAST WEEK OF DECEMBER AND THE FIRST TWO DAYS OF JANUARY FOR THE PERIOD 2015-2022**

| Year | N | Mean | Median | Std Dev | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| **2015- 2016** | 1146 | 0 | -0.001 | 0.014 | 0.219 | 7.189 |
| **2016-2017** | 687 | 0.001 | 0.001 | 0.01 | -2.657 | 32.017 |
| **2017-2018** | 951 | -0.003 | -0.004 | 0.012 | 0.41 | 6.746 |
| **2018-2019** | 624 | -0.002 | -0.001 | 0.011 | -0.095 | 4.218 |
| **2019-2020** | 556 | 0.003 | 0.002 | 0.012 | -0.091 | 4.467 |
| **2020-2021** | 842 | 0.001 | 0 | 0.012 | 0.399 | 4.635 |
| **2021-2022** | 769 | 13.551 | -0.637 | 63.815 | 8.5 | 91.362 |

**TABLE 5**
**NUMBER OF COMPANIES THAT HAVE GIVEN POSITIVE RETURNS DURING THE SANTA CLAUS PERIOD FROM 2015 TO 2021**

| **Positive Return** | **1/6** | **2/6** | **3/6** | **4/6** | **5/6** | **6/6** |
|---|---|---|---|---|---|---|
| **No. of firms** | 833 | 364 | 201 | 77 | 22 | 2 |

**TABLE 6**
**DEMONSTRATE THE MEAN AND STANDARD DEVIATION OF THE VARIABLES TAKEN INTO CONSIDERATION**

| Variables | Mean | Standard Deviation |
|---|---|---|
| **Average Daily return** | 3.608 | 30.307 |
| **Average Daily Total Return** | 30.618 | 224.413 |
| **Average Market Capitalization** | 76411.48 | 287132.384 |
| **Average Weighted Price of stock** | 590.459 | 2530.683 |
| **N (observation)** | **1498** | |

The relationship between the dependent variable, Average Daily Return (ADR), and the explanatory variables—Average Daily Total Return, Average Market Capitalization, and Average Weighted Price of stock—was examined using Ordinary Least Squares (OLS) regression. Table 6 presents the descriptive statistics, summarizing key central tendency and dispersion measures. The mean provides the average values of each variable, while the standard deviation indicates the degree of variation from their respective means, offering insight into the spread of the data. Moving to Table 7, the correlation matrix illustrates the strength of linear relationships between the variables. Positive correlation coefficients (greater than zero) suggest that increases in one variable are associated with increases in another, indicating positive linear relationships. This analysis is critical in evaluating the significance and strength of associations between the dependent and independent variables. Finally, Table 8 outlines the OLS regression results, showing the coefficients that measure the degree of influence each independent variable has on the ADR. At a 5% significance level, the results confirm statistically significant relationships between the dependent and independent variables, underscoring the robustness of the model. The significance of these relationships supports the validity of using these explanatory variables to predict stock returns. This approach is consistent with econometric methodologies found in prior financial literature, such as Fama and MacBeth (1973), who explored similar relationships between stock returns and firm-specific characteristics. The

application of OLS regression in this context provides a comprehensive view of the factors influencing stock performance, contributing to a better understanding of how information dissemination affects market behavior and the role of firm fundamentals.

## CONCLUSION

This study rigorously examines the Year-End Market Surge phenomenon and its impact on financial risk within the Indian stock market from 2015 to 2022. By constructing decile portfolios based on firm size, the analysis confirms the existence of this surge in both small-cap and large-cap stocks. Larger stock portfolios, in particular, demonstrated more consistent abnormal returns during the year-end period than smaller stocks, suggesting that large-cap firms, with greater market liquidity and investor attention, are better positioned to capitalize on year-end market inefficiencies. This observation aligns with the theory that larger firms can more effectively capture the benefits of seasonal rallies due to their capacity to absorb and respond to information dissemination more efficiently. Using regression analysis, we identified the most critical rally days as December's last trading day and January's first two days. These days represent focal points for heightened market activity, underscoring their importance for investors and financial institutions seeking to optimize the timing of market entries and exits. Further analysis reveals that over the six years, 22 companies consistently generated positive returns during the last week of December and the first two weeks of January, highlighting the persistence of the Year-End Market Surge in the Indian context. The dissemination of information during this period likely contributes to the sustained performance, allowing informed investors to capitalize on predictable market trends. This recurring market anomaly has significant implications for the financial sector, offering investors a valuable opportunity to develop strategic investments aimed at return optimization during this period of heightened market activity. By understanding the mechanisms behind this predictable surge, market participants can exploit it to enhance portfolio performance, particularly during the seasonal window of elevated returns. Prior studies, such as Thaler (1987), which identified the January Effect, and Haugen and Jorion (1996), who analyzed calendar effects in stock returns, lend empirical support to this study's findings, further validating the presence of calendar-based anomalies in emerging markets like India.

The outcomes of this research make important contributions to the literature on seasonality effects in equity markets, specifically in the Indian context, where such phenomena remain underexplored in academia. By disseminating this knowledge, the study equips institutional and retail investors with actionable insights that can guide the formulation of investment strategies around the year-end. Ultimately, these findings are expected to enrich the broader discourse on market seasonality and its implications for return optimization in global markets, providing a robust framework for future research and practical applications.

## ENDNOTES

1. Mint - Indian stock market: Years with a Year-End Market Surge were followed by a higher average yearly return of 15.32% in 2021, compared to 12.52% in 2020 for non-Year-End Market Surge years. https://www.livemint.com/market/stock-market-news/is-santa-claus-coming-to-dalal-street-11640345918611.html. The Economics Times – Across the global market, India is amongst the top two or three performing markets during the Year-End Market Surge. https://economictimes.indiatimes.com/markets/expert-view/santa-rally-started-last-year-and-continued-through-2021-anshul-saigal/articleshow/88478151.cms.
2. CNBC – *The Year-End Market Surge is your end-of-year gift from the stock market — most of the time https://www.cnbc.com/2021/12/28/the-santa-claus-rally-is-your-end-of-year-gift-from-the-stock-market.html.
3. ZEE Business - ** Markets | Christmas: Is Year-End Market Surge on the cards? Is it the right time to buy stocks? What expert's opine https://www.zeebiz.com/market-news/news-marketschristmas-is-santa-claus-rally-on-the-cards-is-it-the-right-time-to-buy-stocks-what-expertopine-174469.
4. https://www.marketwatch.com/story/santa-claus-rally-is-off-to-best-start-in-20-years-heres-what-history-says-about-the-stock-markets-performance-when-rally-starts-this-well-11640630360

5. Average Daily return = $\beta_0$ + $\beta_1$ Average Daily Total Return + $\beta_2$ Average Market Capitalization + $\beta_3$ Average Weighted Price of stock + $\mu_0$
6. ADR (Average Daily Return) = $[(1+R_1) +(1+R_2) +(1+R_3) +\ldots\ldots\ldots\ldots +(1+R_n)]^{1/n} - 1$ Where $R_1$, $R_2$, $R_3$, …….., and $R_n$ are the daily returns of the stocks.
7. Average Daily Total Return = $[(1+TR_1) +(1+TR_2) +(1+TR_3) +\ldots\ldots\ldots\ldots +(1+TR_n)]^{1/n} - 1$ Where $TR_1$, $TR_2$, $TR_3$, …….., and $TR_n$ are the daily total returns of the stocks.
8. Market Capitalization = Total Number of Shares Allotted by the Company * Current Market Price of each Share. Average Market Capitalization = $[(1+MC_1) +(1+ MC_2) +(1+ MC_3) +\ldots\ldots\ldots\ldots +(1+ MC_n)]^{1/n} - 1$ Where $MC_1$, $MC_2$, $MC_3$, …….., and $MC_n$ are the market capitalization of the stocks.
9. Average Weighted Price of stock = $[(1+WP_1) +(1+ WP_2) +(1+ WP_3) +\ldots\ldots\ldots\ldots +(1+ WP_n)]^{1/n} - 1$ Where $WP_1$, $WP_2$, $WP_3$, …….., and $WP_n$ are the Weighted Price of the stocks.
10. Notes: N=5575. The table above shows descriptive statistics for portfolios of various firm portfolio sizes. "Smallest" represents a portfolio of stocks in the lowest 10 percent ranked by market capitalization. "Small" has a ranking below the median and "large" are have an above-median ranking. "Largest" represent the largest 10 percent of companies ranking by market capitalization. MR is a market weighted index of all companies in the data set.
11. ADR – Average Daily Return

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## APPENDIX

### ANNEXURE 1
### TEST FOR STATIONARITY FOR THE DATA SET FROM 2015-2022

| Augmented Dickey-Fuller Unit Root Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Type** | **Lags** | **Rho** | **Pr < Rho** | **Tau** | **Pr < Tau** | **F** | **Pr > F** |
| **2015-2016** | **Zero Mean** | 0 | -1141.67 | 0.0001 | -33.64 | <.0001 | | |
| | | 1 | -1063.21 | 0.0001 | -22.95 | <.0001 | | |
| | **Single Mean** | 0 | -1141.7 | 0.0001 | -33.62 | <.0001 | 565.25 | 0.001 |
| | | 1 | -1063.3 | 0.0001 | -22.94 | <.0001 | 263.22 | 0.001 |
| | **Trend** | 0 | -1141.88 | 0.0001 | -33.61 | <.0001 | 564.89 | 0.001 |
| | | 1 | -1063.79 | 0.0001 | -22.94 | <.0001 | 263.07 | 0.001 |
| | | | | | | | | |
| **2016-2017** | **Zero Mean** | 0 | -652.702 | 0.0001 | -24.94 | <.0001 | | |
| | | 1 | -659.575 | 0.0001 | -18.14 | <.0001 | | |
| | **Single Mean** | 0 | -660.047 | 0.0001 | -25.18 | <.0001 | 317.07 | 0.001 |
| | | 1 | -680.854 | 0.0001 | -18.41 | <.0001 | 169.48 | 0.001 |
| | **Trend** | 0 | -673.023 | 0.0001 | -25.64 | <.0001 | 328.82 | 0.001 |
| | | 1 | -720.888 | 0.0001 | -18.93 | <.0001 | 179.17 | 0.001 |
| | | | | | | | | |
| **2017-2018** | **Zero Mean** | 0 | -857.929 | 0.0001 | -27.95 | <.0001 | | |
| | | 1 | -860.562 | 0.0001 | -20.72 | <.0001 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Single Mean** | 0 | -913.813 | 0.0001 | -29.64 | <.0001 | 439.23 | 0.001 |
| | | 1 | -1026.81 | 0.0001 | -22.62 | <.0001 | 255.89 | 0.001 |
| | **Trend** | 0 | -913.812 | 0.0001 | -29.62 | <.0001 | 438.77 | 0.001 |
| | | 1 | -1026.81 | 0.0001 | -22.61 | <.0001 | 255.62 | 0.001 |
| | | | | | | | | |
| **2018-2019** | **Zero Mean** | 0 | -579.243 | 0.0001 | -23.01 | <.0001 | | |
| | | 1 | -437.925 | 0.0001 | -14.59 | <.0001 | | |
| | **Single Mean** | 0 | -592.779 | 0.0001 | -23.47 | <.0001 | 275.44 | 0.001 |
| | | 1 | -464.912 | 0.0001 | -15 | <.0001 | 112.5 | 0.001 |
| | **Trend** | 0 | -596.738 | 0.0001 | -23.58 | <.0001 | 278.01 | 0.001 |
| | | 1 | -472.961 | 0.0001 | -15.09 | <.0001 | 113.89 | 0.001 |
| | | | | | | | | |
| **2019-2020** | **Zero Mean** | 0 | -443.45 | 0.0001 | -19 | <.0001 | | |
| | | 1 | -321.974 | 0.0001 | -12.57 | <.0001 | | |
| | **Single Mean** | 0 | -480.818 | 0.0001 | -20.37 | <.0001 | 207.58 | 0.001 |
| | | 1 | -387.267 | 0.0001 | -13.8 | <.0001 | 95.29 | 0.001 |
| | **Trend** | 0 | -491.099 | 0.0001 | -20.77 | <.0001 | 215.62 | 0.001 |
| | | 1 | -407.49 | 0.0001 | -14.16 | <.0001 | 100.23 | 0.001 |
| | | | | | | | | |
| **2020-2021** | **Zero Mean** | 0 | -839.717 | 0.0001 | -28.94 | <.0001 | | |
| | | 1 | -969.344 | 0.0001 | -21.99 | <.0001 | | |
| | **Single Mean** | 0 | -843.303 | 0.0001 | -29.04 | <.0001 | 421.74 | 0.001 |
| | | 1 | -982.451 | 0.0001 | -22.12 | <.0001 | 244.72 | 0.001 |
| | **Trend** | 0 | -844.169 | 0.0001 | -29.06 | <.0001 | 422.15 | 0.001 |
| | | 1 | -985.743 | 0.0001 | -22.15 | <.0001 | 245.26 | 0.001 |
| | | | | | | | | |
| **2021-2022** | **Type** | Lags | Rho | Pr < Rho | Tau | Pr < Tau | F | Pr > F |
| | **Zero Mean** | 0 | -738.029 | 0.0001 | -26.63 | <.0001 | | |
| | | 1 | -674.064 | 0.0001 | -18.33 | <.0001 | | |
| | **Single Mean** | 0 | -771.377 | 0.0001 | -27.8 | <.0001 | 386.36 | 0.001 |
| | | 1 | -765.917 | 0.0001 | -19.53 | <.0001 | 190.72 | 0.001 |
| | **Trend** | 0 | -771.403 | 0.0001 | -27.78 | <.0001 | 385.88 | 0.001 |
| | | 1 | -765.991 | 0.0001 | -19.52 | <.0001 | 190.48 | 0.001 |