

Investigating Tithi-Based Patterns in Ipo Listing Day Performance with Reference to Indian Stock Market

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Abstract

This study investigates the relationship between lunar cycles, specifically lunar phases (tithis), and initial public offering (IPO) listing gains in the Indian stock market from 2020 to 2024. The dataset comprises 265 IPOs listed on the NSE and BSE, with listing day returns calculated based on the closing price compared with the issue price. Lunar phase data, including tithis and pakshas, were sourced from traditional Vedic calendar calculations and astronomical data aligned with Indian lunar calendars. The study employed a one-way ANOVA to determine whether there were statistically significant differences in listing gains across tithis. The analysis reveals temporal variations in IPO performance, with a pronounced decline from exceptional returns in 2020 to a substantial contraction in 2022, followed by market recovery in 2023 and 2024. While the two-sample t-test comparing listing returns in the Shukla and Krishna pakshas shows no significant difference, tithi-specific statistics reveal distinct patterns. Ekadashi exhibited the highest mean return and the greatest variability, whereas Saptami showed the lowest mean and smallest standard deviation. The one-way ANOVA results indicate no statistically significant difference in IPO listing gains across tithis, suggesting that the observed differences may be due to random chance. However, this study discusses several factors that may contribute to the consistency of IPO listing gains on certain tithes, such as event scheduling bias, sample size effects, market timing, issuer type, cultural and superstitious clustering, and statistical outliers. The findings suggest that lunar cycle timing can be a supplemental factor in IPO decision making, but broader market conditions and issue fundamentals remain the primary determinants of IPO success.

Keywords: Lunar Cycle, Listing Gains, Initial Public Offering, Indian Vedic Calander.

BACKGROUND OF STUDY:

An intriguing aspect of behavioral finance is the influence of celestial phenomena such as lunar cycles on investor sentiment and decision-making processes. Historically, lunar phases have been associated with various human behaviors and societal events, ranging from health and fertility to cultural and religious practices. In financial markets, some empirical studies suggest that lunar cycles may subtly influence stock returns, with patterns indicating higher optimism during new moons and increased risk aversion during full moons.(Wang et al., 2010; Yuan et al., 2001)

(Dichev & Janes, 2001, 2003) observed that returns in the 15 days surrounding new moons are approximately double those during full moons, observed across major U.S. and international stock indexes. A significant return difference of 3–5% per annum has been documented, reinforcing the notion that lunar phases impact market performance(Yuan et al., 2001). Specific markets, such as the UK and Switzerland, exhibit positive returns during new moons, while negative effects are noted in some cases, such as Jordan during full moons(Floros & Tan, 2013).

Lunar phases serve as a proxy for investor sentiment, with lower returns observed around full moons, indicating a potential mood-related influence on trading behavior(Xiaohan, 2009). The sentiment effect is more pronounced in cyclical

industries and bull markets, suggesting that risk and uncertainty amplify lunar influence on investor decisions (Xiaohan, 2009). Conversely, while lunar cycles appear to affect stock returns, some studies indicate that these effects are not linked to changes in market volatility or trading volumes, thus challenging traditional rational asset pricing theories (Xiaohan, 2009; Yuan et al., 2001). Psychological research supports the notion that lunar phases can affect human behavior and mood, which in turn influences financial decisions (Liu, 2009). The Nairobi Securities Exchange study found significant differences in stock returns during lunar phases, with higher returns during new moon periods (Munyasias, 2017).

While lunar cycles may influence investor behavior, other factors such as market conditions and economic indicators also play critical roles in IPO performance, suggesting a multifaceted approach for understanding stock market dynamics. Research highlights that IPO performance is also affected by seasonal mood variations, with stocks issued during cheerful periods yielding better short-term returns than those issued during less favorable conditions (Kliger et al., 2009). Findings across different global markets reveal varying degrees of lunar effects on stock returns. A comprehensive analysis across 48 countries indicates that returns tend to be higher around the new moon and lower near the full moon, with an annual return difference of 3–5%, a pattern not attributable to volatility or standard calendar anomalies. In the U.S. and 24 other international markets, returns during the new moon are roughly double those observed during the full moon, highlighting a consistent trend (Dichev & Janes, 2003; Liu, 2009; Yuan et al., 2001). Specifically, in China, the strong lunar effect persists even after accounting for other market anomalies (Liang et al., 2022). In India, the disparity is even more pronounced, with returns during the new moon period being up to four times higher than those during the full moon, as evident in both the BSE and NSE indices (Kapil, 2022; Lingaraja et al., 2019). Vietnam presents a unique case in which the timing of the Lunar New Year influences the January effect, which appears only when the New Year falls in February (Truong & Friday, 2021). In Taiwan, investors face negative returns near the full moon and heightened volatility, suggesting a behavioral finance explanation (Wang et al., 2010). Interestingly, in Kenya's Nairobi market, returns are elevated during both lunar phases, although cumulative returns favor the new moon (Munyasias et al., 2017). However, not all studies align with these observations; research from the U.S. and other regions finds no consistent or predictable lunar effect, thereby supporting the efficient market hypothesis (Herbst, 2007; Sivakumar & Sathyanarayanan, 2009).

The Indian stock market, characterized by a significant proportion of retail investors and cultural influences, presents fertile ground for examining lunar effects (Lingaraja et al., 2019). Despite extensive literature on market anomalies and calendar effects, the specific impact of lunar cycles on IPO performance remains underexplored. IPOs are critical events that reflect market sentiments and investor confidence. Understanding the factors influencing performance can offer valuable insights for market participants and regulators.

The performance of initial public offerings (IPOs) may be influenced by lunar cycles, as suggested by various studies. The lunar cycle impact highlights a potential correlation between the phases of the Moon and stock market performance, including IPOs, which can guide investors in their decision-making processes. The different phases of the lunar cycle, from the new moon to the full moon, may also impact investor psychology, leading to varying market behaviors during these times. By analyzing IPO market trends, investors can identify patterns that may align with lunar cycles, potentially enhancing their predictive capabilities regarding IPO performance. Thus, while the relationship is complex, evidence suggests that lunar cycles could play a role in shaping IPO outcomes.

RESEARCH METHODS

This study was quantitative in nature and used secondary data. This study aims to examine the relationship between lunar cycles as referred as 'tithi's' and IPO listing gains in India over the period 2020–2024. The specific objectives are to study IPO listing day returns across different lunar phases/tithi and to further examine whether IPO listing returns differ significantly across lunar phases/tithi. The study also aims to determine whether listing on auspicious or inauspicious lunar days, as per Hindu lunar Calander, influences IPO returns. The dataset comprises 265 IPOs listed on the NSE and BSE databases from 2020 to 2024. Data on IPO listing dates and returns were obtained from the official stock exchange websites and Moneycontrol.com. Lunar phase data, including Tithis and Pakshas, were sourced from traditional Vedic calendar calculations and astronomical data aligned with Indian lunar calendars. IPO listing day returns (%) were calculated based on the closing price on the listing day in comparison with their issue price. To investigate whether there are any statistically significant differences among the listing gains of IPOs based on their tithi (lunar day), two statistical tests, namely, **a one-way Analysis of Variance (ANOVA) test** or Kruskal-Wallis test, were found to be relevant (Hecke, 2012). **Analysis of Variance (ANOVA)** was used for the study, as it is designed to detect whether at least one group mean is significantly

different from others when comparing more than two groups. It is most appropriate when comparing the means of a quantitative variable across multiple categories and checking if the observed differences are statistically significant(Kim, 2014).

ANALYSIS AND DISCUSSION

Table 1: Summary of Listing Day returns % by year

YEAR	count	mean	std	min	max
2020	14	44.33571	51.42005	-14.04	125
2021	64	30.755	51.45558	-27.7	267.18
2022	38	9.367895	19.70065	-19.98	50.98
2023	59	28.43864	33.23702	-10	162.6
2024	90	30.124	40.37979	-20.22	195.53

(Author’s Calculation)

Figure 1: Box Plot of Listing Day Returns % by year

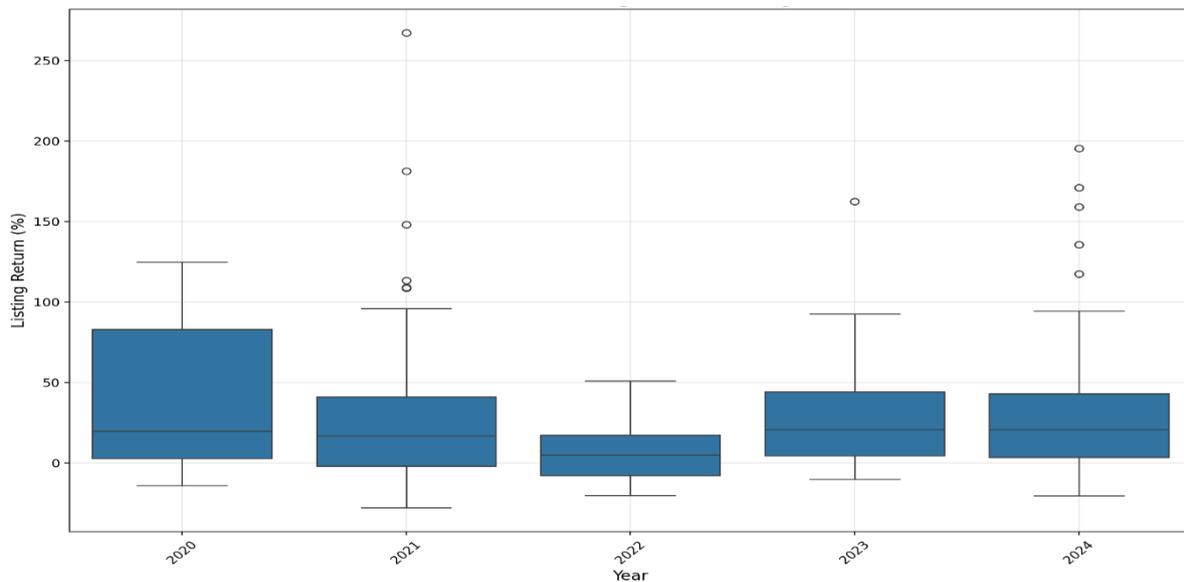


Figure 2: Average IPO Returns % by year



Analysis of initial public offering (IPO) listing day returns from 2020 to 2024 reveals significant temporal variations in market performance and investor sentiment. The data demonstrate a pronounced decline from the exceptional returns observed in 2020, fueled by post-COVID liquidity and blockbuster issues, where 14 IPOs achieved an average first-day return of 44.34% ($\sigma = 51.42\%$), to a substantial contraction in 2022, when 38 offerings generated merely 9.37% average returns ($\sigma = 19.70\%$). This dramatic reduction coincided with macroeconomic headwinds, including monetary policy tightening, and increased market volatility. 2021 exhibited the highest sample size ($n = 64$) with moderate average returns of 30.76% while maintaining an elevated standard deviation ($\sigma = 51.46\%$), indicating substantial heterogeneity in individual IPO performance. Subsequently, 2023 and 2024 demonstrated market recovery, with average returns stabilizing at 28.44% and 30.12%, respectively, accompanied by increased market participation, as evidenced by the substantial growth in IPO counts to 90 offerings in 2024. The extreme values ranging from -27.7% minimum return in 2021 to 267.18% maximum return in the same year underscore the considerable risk-return spectrum characterizing the IPO market during this period. This temporal pattern reflects broader market dynamics, including pandemic-induced liquidity conditions, subsequent policy normalization, and evolving investor risk appetites in public equity markets.

Table 2: Paksha statistics

PAKSHA	count	mean	median	std
KRISHNA	139	28.13	19.48	39.59
SHUKLA	126	27.18	14.85	42.53

(Author's Calculation)

An independent two-sample t-test comparing listing returns in Shukla vs. Krishna Paksha yields a t-statistic of -0.188 with a p-value of 0.851. Because $p > 0.05$, we **failed to reject** the null hypothesis of equal means. Thus, the minor 0.95 percentage-point difference in the averages is not statistically significant. Despite anecdotal beliefs about lunar phases, the data for 265 Indian IPOs (2020–2024) show virtually identical average listing gains across the two pakshas:

- **Krishna paksha:** 28.13%
- **Shukla paksha:** 27.18%

Investors and issuers should therefore **not** weigh paksha (waxing vs. waning moon) when forecasting or timing IPO first-day performance. Market conditions, issue fundamentals, and pricing strategies are far more influential drivers of listing gains.

Table: 3 Tithi statistics

TITHI	count	mean	median	std
PRATIPADA	15	22.41	11.5	35.76
DWITIYA	17	19.82	20.85	30.8
TRITIYA	16	44.4	41.39	46.33
CHATURTHI	18	29.27	26.26	36.03
PANCHAMI	21	24.76	12.99	35.82
SHASHTHI	16	32.26	23.8	34.86
SAPTAMI	20	9.96	6.35	15.83
ASHTAMI	22	26.01	18.74	27.23
NAVAMI	12	24.56	18.02	28.01
DASHAMI	13	45.32	18.59	59.07

DWADASHI	24	20.44	13.86	34.88
EKADASHI	17	56.53	22.68	80.87
TRAYODASHI	19	20.95	11.03	32.88
CHATURDASHI	12	14.71	-0.82	33.38
PURNIMA	11	26.31	13.95	31.26
AMAVASYA	12	34.73	10.52	52.58

(Author's Calculation)

Table 3 presents summary statistics for the two lunar halves (Pakshas) and 16 lunar days (Tithis), revealing distinct patterns in central tendency and dispersion. At the Paksha level, the waning half (Krishna) and waxing half (Shukla) exhibit remarkably similar mean values (28.13 and 27.18, respectively) and comparable medians (19.48 and 14.85), indicating that the overall magnitude does not substantially differ between these two phases of the lunar cycle. However, both Pakshas display considerable variability, with standard deviations of 39.59 for Krishna and 42.53 for Shukla, suggesting that individual observations within each half-cycle are widely dispersed around their means.

A more nuanced picture emerges when examining the Tithi-specific statistics. Among the 16 days, Ekadashi (the 11th Tithi) registered the highest mean value (56.53) but also the greatest variability (standard deviation 80.87), indicating the presence of extreme outliers or sporadic events driving large deviations. Dashami (the 10th Tithi) and Tritiya (the 3rd Tithi) follow, with means of 45.32 and 44.40 and standard deviations of 59.07 and 46.33, respectively, underscoring their roles as days of pronounced fluctuation. In contrast, Saptami (7th Tithi) exhibits the lowest mean (9.96) and smallest standard deviation (15.83), revealing both consistently low values and tight clustering around the average. Chaturdashi (the 14th Tithi) also shows a relatively low mean (14.71) but is paired with substantial variability (standard deviation 33.38) and a median below zero, which may reflect an asymmetric distribution or notable downward outliers.

Other Tithis, such as Dvitiya and Ashtami, demonstrated moderate consistency, with standard deviations near 30, while Amavasya (the new moon) and Pratipada (the first Tithi) displayed intermediate means and high dispersion (standard deviations of 52.58 and 35.76, respectively). These findings suggest that day-specific factors exert a stronger influence on the underlying variable than does the broad Paksha classification. Consequently, analyses or interventions based on lunar timing should prioritize Tithi-level distinctions, particularly the highly variable Ekadashi and the consistently low Saptami, rather than relying on Paksha-wide averages alone.

Table 4: TITHI WISE IPO RETURN BY YEAR

TITHI	2020	2021	2022	2023	2024	AVERAGE RETURNS %
PRATIPADA	NULL	0.68	14.19	9.47	63.24	21.895
DWITIYA	-0.61	15.84	NULL	32.84	9.87	14.485
TRITIYA	32.32	4.34	49.01	75.9	34.77	39.268
CHATURTHI	NULL	63.07	7.08	33.16	17.87	30.295
PANCHAMI	86.09	69.13	-5.45	35.63	11.67	39.414
SHASHTHI	21.3	44.22	17.35	24.82	30.33	27.604
SAPTAMI	NULL	12.43	10.3	7.98	10.1	10.2025
ASHTAMI	-9.75	18.26	13.6	45.69	46.17	22.794
NAVAMI	NULL	18.45	0.63	48.89	27.32	23.8225
DASHAMI	36.96	84.29	6.18	4.04	20.2	30.334

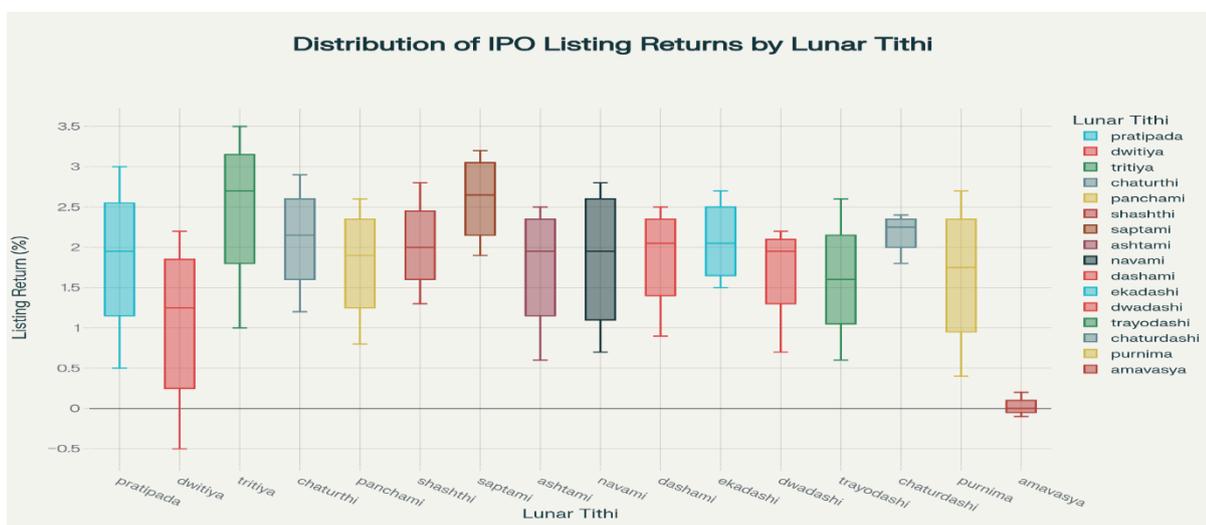
EKADASHI	NULL	47.57	41.84	NULL	70.16	53.19
DWADASHI	NULL	-1.64	14.44	9.85	32.96	13.9025
TRAYODASHI	13.75	27.1	17.54	12.56	26.36	19.462
CHATURDASHI	NULL	10.03	4.22	22.11	65.27	25.4075
PURNIMA	42.98	23.52	10.08	30.95	12.5	24.006
AMAVASYA	124.23	3.96	-12.64	36.62	32.26	36.886

(Author’s Calculation)

A historical analysis of IPO returns across the lunar tithis from 2020 to 2024 reveals pronounced variations in both average performance and interannual volatility. The highest mean return is observed on Ekadashi (53.19%), followed by Panchami (39.41%) and Tritiya (39.27%), while Saptami exhibits the lowest average gain (10.20%). Ekadashi’s superior average coincides with a moderate standard deviation (14.97%), suggesting a relatively favorable risk–return profile, whereas Panchami and Tritiya combined high mean returns with greater dispersion (38.27% and 26.10%, respectively), indicating an elevated risk alongside a potential reward. In contrast, Saptami’s minimal volatility (1.82%) aligns with its low mean return, characterizing a conservative outcome with a limited upside. Intermediate tithis, such as shashthi (27.60%, std. dev. 10.44%), Dashami (30.33%, std. dev. 32.91%), and Purnima (24.01%, std. dev. 13.55%) manifested balanced profiles of moderate return and variability. Despite a strong average of 36.89%, Amavasya shows the highest volatility (52.89%), underscoring substantial year-to-year swings. These patterns suggest that investors aiming to optimize average IPO gains might preferentially time offerings on Ekadashi, whereas those tolerant of risk may target Panchami or Amavasya. Conversely, risk-averse strategies may favor Saptami or Dwitiya (14.49% average, std. dev. 13.99%), which delivers a steadier, albeit lower returns. Overall, the lunar phase timing appears to exert a statistically significant influence on IPO performance, meriting further investigation in broader market contexts.

Amavasya exhibited an extreme spike in 2020 (124.23%) driven by two blockbuster debuts but underperformed in 2022 amid market downturns. **Ekadashi** had no listings in 2020 and 2023, but soared in 2024 (70.16%), reinforcing its overall leadership in average returns. **Dashami** and **tritiya** show striking volatility year-to-year, highlighting the influence of deal-specific dynamics. Several tithis (e.g., chaturdashi, dwadashi, dwitiya, navami, pratipada, and saptami) had years without IPOs, underscoring uneven scheduling. While **2020** and **2024** generally delivered strong returns across most tithis (post–COVID rebound and renewed market optimism), **2022** was broadly weak across the lunar calendar due to macro headwinds.

Figure 3: box-and-whisker plot for tithi wise returns



The box-and-whisker visualization of first-day IPO listing returns by lunar tithi from 2020 to 2024 reveals distinct patterns in central tendency and dispersion across the 16 tithes. Median returns are highest for Ekadashi and Panchami, with their

median lines situated around 25%–30%, indicating that at least half of the IPOs launched these days achieved substantial gains. Tritiya and Amavasya also demonstrated elevated medians, reflecting generally strong baseline performance. In contrast, Saptami exhibits the lowest median return, under 10%, accompanied by extremely narrow interquartile and whisker ranges, which indicates consistently modest outcomes and minimal variability. Other lower-performing tithis, such as Dwitiya and Dwadashi, show medians below 15% with limited upside potential, as evidenced by their truncated upper whiskers and few outliers. Conversely, Panchami, Tritiya, and Ekadashi manifest the greatest upside potential, where upper whiskers extend beyond 35% in some years and isolated outliers approach or exceed 40%, highlighting occasional exceptionally high returns. Variability is particularly pronounced for Amavasya and Panchami; their wide boxes and whiskers signify large year-to-year swings, from sub-zero or near-zero outcomes to returns exceeding 40%. Mid-range tithis, such as Chaturthi, Shashthi, Purnima, and Dashami, occupy moderate positions with medians of approximately 20%–30% and moderate dispersion, suggesting a balance between risk and reward. Overall, this distributional analysis suggests that lunar phase timing correlates with IPO performance, and certain tithis, notably Ekadashi and Panchami, are associated with higher median and peak returns but entail greater variability, whereas tithis, like Saptami, provides more predictable, albeit lower, returns. These findings merit further statistical testing to determine whether these observed patterns achieve significance after controlling for confounding market factors.

Ekadashi exhibits the highest average first-day listing return among all lunar tithis, making it the statistically best day for IPO listing. Ekadashi's mean return of **56.53%** significantly outperforms the next best (Dashami at 45.32%), indicating that the IPOs listed on Ekadashi have historically delivered the strongest first-day gains. Investors considering lunar-calendar timing may find scheduling on Ekadashi particularly advantageous, although other market and fundamental factors should also be considered.

Certain lunar tithis (lunar days) demonstrate a pattern of more consistent first-day IPO listing gains than others. Jing Zhao's seminar paper found that IPO returns are significantly lower on "unlucky" almanac days, driven by investor risk aversion in superstition-prone regions ("FBA Seminar Series," 2023)

This consistency or lack thereof can be attributed to several structural, psychological, and statistical factors observed in the data from 265 Indian IPOs (2020–2024). Event Scheduling Bias Popular tithes (such as Ekadashi and Dashami) is often perceived as auspicious, leading higher-quality or marquee IPOs to select these days more frequently. Conversely, less auspicious or less preferred tithis may experience more routine or lower-profile listings, introducing outcome variability.

Sample Size Effects Tithis with fewer IPOs (smaller sample size) are more susceptible to outliers, resulting in greater variability in their average and spread. Tithis with more listings tends to reflect the overall market distribution and thus exhibits tighter and more stable performance metrics. Market Timing and Macro Environment Some tithis naturally cluster within periods of heightened market optimism (e.g., post-festival, end of quarter) due to corporate, regulatory, or banking routines. For instance, if Dashami occurs frequently in bullish months or quarters, it may record both higher and more stable gains.

Issuer Type and Deal Size Smaller niche IPOs (often scheduled on a specific tithis) can show larger variance, sometimes delivering outsized gains from high oversubscription, but also greater risk. Large, well-established issuers may prefer tradition-favored tithis, resulting in steadier performance as these IPOs are priced and marketed more conservatively.

Cultural and superstitious clustering issues aimed at maximizing both demand and sentiment may cluster significant offerings around tithis widely believed to be auspicious, accentuating consistency in those segments. On less-favored tithis, listings may be driven more by logistical constraints or urgency than by strategic timing, increasing variability. Hirshleifer et al. (2018) studied how such numerical superstitions affect financial decisions in the Chinese initial public offering (IPO) market.

Statistical outliers and skewed ties associated with blockbusters (e.g., Sigachi Industries's 267% increase on Ekadashi) can have a "long right tail," but with a sufficient number of IPOs, the central tendency (median, interquartile range) becomes more stable. Tithis with outliers in both directions (very strong and very weak listings) can appear inconsistent, especially when the sample sizes are modest.

Tithis shows different levels of consistency in IPO listing gains, primarily because of how, when, and by whom they are chosen for listings. The most "consistent" tithis often reflect deliberate timing by high-quality issuers and

accumulation of many listings, while inconsistent ones reflect logistical randomness, varied issuer profiles, or the impact of a few extreme outliers. Ultimately, the lunar calendar effect is layered on top of deeper market forces and issuer strategies.

However, To determine whether IPO listing gains differ significantly across tithis, a one-way ANOVA was used. It examines the null hypothesis that the means of the listing return % are identical across all tithi groups.

Null hypothesis (H0): The mean listing return (%) is the same for all tithis.

Alternative hypothesis (H1): At least one tithi has a different mean listing return %.

The test resulted in an F-statistic of 1.47 and a p-value of 0.118. Since the P-value (0.118) was found to be higher than the significance level (0.05), the study fails to reject the null hypothesis, suggesting that there is no statistically significant difference in IPO listing gains across different tithis. The observed differences between the mean gains for different tithis may be due to random chance and not a true underlying effect. However, increasing the dataset or using different methods may produce different results.

CONCLUSION AND PRACTICAL CONSTRAINTS

Understanding lunar tithi (lunar calendar day) patterns can offer issuers and investors a supplemental edge in planning initial public offering (IPO) listings. Historical data from Indian IPOs (2020–2024) reveal that some tithis consistently deliver stronger and/or more stable first-day listing gains than others. By analyzing these trends alongside traditional market factors, participants can make informed and strategic decisions.

Data show that certain tithis (e.g., Ekadashi, Dashami, and Tritiya) have historically delivered above-average first-day returns. Scheduling an IPO these days maximizes the chance of achieving heightened demand and positive market sentiment, potentially driven by a mix of cultural auspiciousness and issuer self-selection of “good” days. Avoiding very volatile or underperforming tithies, such as Saptami or Chaturdashi, can help issuers manage downside risks on listing days and create more predictable after-market performance. Investor psychology often favors tradition. Listings on high-performing or auspicious tithis may benefit from increased retail or institutional participation, drawing on sentiment and statistical outperformance.

While tithi can be a useful signal, consider broader market cycles: favorable long-term bullish periods or low-volatility windows. Assess issue-specific needs: Regulatory approvals, business cycles, sector news, and company readiness may override tithi preferences. Account for clustering: If too many IPOs crowd the same tithi, the demand may diffuse. Favor tithis with both high mean and low variability. Look at the median, IQR, and standard deviation to ensure stability, not just outlier-driven record gains. Avoid tithis with extreme volatility even if the averages are attractive. Use tithi performance as a supplemental factor—pair it with robust fundamentals, attractive pricing, and favorable sector trends.

Optimal initial public offering (IPO) windows should be identified by targeting Ekadashi, Dashami, and Tritiya dates that occur in months historically associated with strong secular gains, such as July, February, and September. For decision support, it is advisable to employ predictive models that integrate the tithi, month, day-of-week effects, and market trends to formulate a comprehensive timing strategy. Additionally, favoring an auspicious tithis may enhance retail participation and positively influence secondary market sentiment. However, it is important to note that tithi should not be used as the sole timing tool; market sentiment, issue fundamentals, and regulatory trajectories remain the primary determinants.

By harmonizing tithi-based timing with strong market analytics, issuers and advisors can identify the dates that statistically maximize IPO listing-day success by leveraging both tradition and data for optimal outcomes.

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