

PUBLIC OFFERING (IPO) UNDERPRICING IN THE CONTEXT OF THE INDIAN STOCK MARKET

¹Archana.K,² Lata.M. Ambekar, ³Dr. Deepika Krishnan

¹Assistant Professor Department of Management Sambhram Academy of Management Studies,
Bangalore

²Assistant Professor Department of Management Sambhram Academy of Management Studies,
Bangalore

³Assistant Professor Symbiosis School of Banking and Finance Symbiosis International
university, Pune.

ABSTRACT

This study delves into the phenomenon of IPO (Initial Public Offerings) under-pricing in India and its implications on Nifty 50 index, both pre-pandemic and during the pandemic, with a specific focus on categorizing IPOs into three sectors: industrial, financial, and service. To analyse this, we employed the Market Adjusted Abnormal Return (MAAR) and Ordinary Least Squares Regression (OLS) model, which allowed us to investigate how market return, listing gain, oversubscription, issue price, and issue size impact IPO under-pricing and its subsequent effect on the Nifty 50 index. The results obtained through the OLS analysis revealed that, except for market index return, all the aforementioned factors exerted a significant influence on IPO under-pricing. Furthermore, we conducted t-tests to assess Market Adjusted Abnormal Return, calculated separately for each sector. This analysis revealed a significant degree of under-pricing in IPOs of industrial, financial, and service sectors. Our research underscores the fact that investors tend to prioritize the short-term profitability of IPOs over their long-term performance. These findings serve as valuable insights for investors seeking to navigate the complexities of IPOs and their initial returns.

Keywords: Initial Public Offerings; Under-pricing; Listing Gain; Pre- Covid; Post Covid; Nifty 50

JEL Classification: G01, G1, G120

1. INTRODUCTION

IPO pricing, a nuanced and crucial aspect of financial markets, has been extensively examined in academic literature. Recent studies highlight the phenomenon of IPO underpricing, where the market price on the first trading day surpasses the initial offering price, and its diverse impacts on long-term stock performance, particularly within the context of Nifty stock prices (Das et al., 2016; Manjunath et al., 2020; Kumar & Sahoo, 2021). The findings suggest that underpriced IPOs exhibit varying long-term outcomes, influencing the performance dynamics of Nifty stocks. Some IPOs, after initial underpricing, maintain positive performance trajectories, while others may face subsequent post-IPO price fluctuations affecting the Nifty index (Brav et al., 2002; Chang et al., 2014; Lowry et al., 2017). As noted by Ljungqvist et al. (2003), the market perceives underpricing

as a positive indicator, suggesting high demand and positive sentiment for a newly listed stock. This positive perception often translates into increased demand for IPO shares, leading to an initial surge in stock prices, as discussed by Honjo (2021). However, the cautionary note from Thomadakis (2012) emphasizes the need for investors to consider the long-term performance and fundamentals of the company beyond the initial underpricing-induced gains. While underpricing indeed signals market enthusiasm, its impact on stock prices is dynamic, with the short-term positive effects requiring careful evaluation against the backdrop of sustained performance. This underpricing strategy continues to play a pivotal role in shaping the functioning of IPO markets globally. In the specific context of India, where this phenomenon is evident, recent research by Chatterjee et al., (2022) underscores that a substantial portion of IPOs (76 per cent) in the primary market were underpriced, highlighting the prevalence of undervalued IPOs.

Indian IPOs adopt various pricing mechanisms, including the fixed price method, book building process, and the anchor investor mechanism, depending on company preference and regulatory requirements (SEBI, 2021). Investors engaging in underpriced IPOs often experience immediate positive returns on the first trading day, impacting the broader Nifty stock prices (Anand & Singh, 2019). However, the long-term performance of such IPOs may exhibit a more nuanced picture, as demonstrated by recent research by Wang & Wang (2021) within the Nifty context, emphasizing the importance of considering broader market dynamics in understanding IPO underpricing effects. While the existing literature provides valuable insights, recent research continues to shed light on the nuanced impacts of underpriced Initial Public Offerings (IPOs) on returns (Sundarasan et al., 2017; Wasiuzzaman et al., 2018; Rathnayake et al., 2019). But Rathnayake et al., (2019) delve into the contemporary dynamics, suggesting that underpricing remains a prevalent strategy to attract investor attention, leading to positive initial returns. However, the research emphasizes the need for investors to consider the evolving market conditions and company-specific factors, as recent underpriced IPOs have shown varying patterns of long-term performance. This aligns with the findings of Gupta et al. (2023), who explore the influence of market sentiment and economic factors on the post-IPO returns of underpriced stocks. The nuanced insights from these recent studies underscore the importance of a comprehensive understanding of underpricing dynamics, acknowledging both short-term gains and potential long-term variations in returns.

The phenomenon of IPO underpricing has garnered significant attention during the COVID-19 pandemic, marked by the unprecedented challenges introduced by the global health crisis (Dong & Huang, 2022; Baig & Chen, 2022). In a study conducted by Füllbrunn et al., (2020), the authors delve into the intricate dynamics of IPO underpricing amidst the pandemic, navigating through economic disruptions and heightened market volatility. Meanwhile, Bajo & Raimondo (2017) contribute to this discourse by investigating the role of investor sentiment during the pandemic and its impact on shaping IPO underpricing. Their findings offer valuable insights into the influence of market sentiment fluctuations on the initial returns of IPOs. Furthermore, Bhuyan et al. (2021) provide a nuanced exploration of the consequences of IPO underpricing on specific industries, focusing on the manufacturing sector in Indonesia. Their study reveals both positive and negative implications on financial metrics such as return on assets and return on equity,

emphasizing the importance of conducting industry-specific analyses to comprehend the multifaceted outcomes of underpricing. The exploration of IPO performance in India has been equally compelling, with research aiming to unravel the complexities influencing post-listing outcomes (Zou et al., 2020; Deng et al., 2023; Payne et al., 2023). delves into the factors influencing IPO performance, emphasizing the role of institutional ownership and industry-specific conditions in determining post-listing stock returns. Similarly, Arora & Singh (2019) investigate the impact of underwriters on IPO performance, offering nuanced insights into the factors that influence investor response and subsequent market behavior. These studies collectively contribute to a comprehensive understanding of the multifaceted factors shaping both IPO underpricing and performance in the Indian market, providing valuable perspectives for various stakeholders.

The existing body of literature demonstrates that IPO underpricing is a common phenomenon. However, it is worth noting that there is currently no study specifically examining IPO underpricing in a sector-wise manner. This would involve categorizing these IPOs into industry sectors such as industrial, finance, and services, and then analyzing their short-term post-listing performance, especially in the context of the COVID-19 pandemic. Understanding these sector-wise dynamics is crucial because, although investors may initially experience positive abnormal returns on the first day of trading due to underpricing, the subsequent performance in the aftermarket for these firms often diminishes. This study also adds to the existing body of knowledge on IPO underpricing by examining how IPO firms perform shortly after going public, with a specific focus on the period during the COVID-19 pandemic. The research aims to compare this short-term post-listing performance with data from the pre-pandemic era, offering insights into the impact of the unprecedented global health crisis on IPO dynamics. Exploring these implications on a sector-specific level could provide valuable insights for investors navigating the post-listing phase.

The subsequent sections of the study proceed to detail the hypotheses, data sources and methodology employed in the research process. This section outlines how the data was collected, organized, and analysed to derive meaningful insights. The subsequent sections will unveil the results obtained through the research process, offering a detailed discussion of these findings. This discussion provides a platform to analyse and interpret the results within the context of the research objectives and hypotheses. Finally, the study will conclude by summarizing the key findings, discussing their implications, and potentially suggesting avenues for further research in the field of IPO pricing under uncertainty.

1. Hypotheses :

Research on Indian Initial Public Offerings (IPOs) holds a central position in financial literature, with a specific focus on comprehending both IPO underpricing and overall performance within the Indian market (Chandler et al., 2019; Dambra et al., 2018; Helbing, 2019; Engelen et al., 2020). Considering this research design, the study formulates hypothesis to further advance our understanding of the implications of the pandemic on IPO outcomes.

Hypothesis 1: *IPOs that were underpriced on their listing day during both the COVID-19 pandemic and the pre-COVID period will exhibit statistically significant positive Market Adjusted Abnormal Returns (MAAR) over a specified post-listing time frame, indicating that underpricing serves as a signal of strong future performance in the stock market. The Market adjusted abnormal returns are Zero.*

Additionally, we hypothesize that IPOs with a higher level of over-subscription will demonstrate greater MAAR, reflecting increased investor interest and confidence in these offerings. But recently, Facebook's IPO was highly anticipated, but it faced challenges in providing substantial rewards to investors initially. The company's stock price fell shortly after the IPO due to concerns about its mobile strategy and valuation. While numerous studies have explored underpricing in various contexts in India, the specific dynamics of the IPO market during a pandemic have become a unique area of inquiry (Killins, 2019; Teti & Montefusco, 2022; Liu et al., 2023). Recent empirical evidence suggests that the primary market in India displayed remarkable resilience during the pandemic, potentially due to IPOs being undervalued, attracting investors seeking rapid returns, and experiencing oversubscription. Datar and Mao (2006) introduced the idea that issuers might intentionally undervalue IPOs to encourage a broader base of subscribers. To shed light on this intriguing scenario, our study delved into the performance and underpricing of 502 IPOs on their listing day, both in the pre-pandemic and intra-pandemic periods in India. We categorized these IPOs into industry sectors, including industrial, finance, and services.

Hypothesis 2(a): *Higher issue prices will be associated with lower levels of underpricing in IPOs during both the COVID and pre-COVID periods. This hypothesis suggests an inverse relationship between the issue price and underpricing.*

Hypothesis 2(b): *Larger issue sizes will be correlated with lower levels of underpricing in IPOs during both the COVID and pre-COVID periods. This hypothesis proposes that larger IPOs may attract more sophisticated investors, reducing underpricing.*

Hypothesis 2(c): *Higher subscription levels, indicating strong investor demand, will lead to lower levels of underpricing in IPOs during both the COVID and pre-COVID periods. This hypothesis suggests that oversubscribed IPOs will experience reduced underpricing.*

Hypothesis 2(d): *The overall performance of the market, as measured by a relevant market index, will influence underpricing in IPOs. During the COVID period, underpricing may be affected by market volatility, leading to higher levels of underpricing.*

Hypothesis 2(e): *The performance of the Nifty 50 index, a benchmark for Indian stock markets, will impact underpricing in IPOs in India during both the COVID and pre-COVID periods. A strong Nifty 50 performance may correlate with lower levels of underpricing.*

The set of hypotheses (2a-2e) put forth in this study offers a comprehensive exploration of various factors influencing underpricing in IPOs during both the COVID and pre-COVID periods. Hypothesis 2a and 2b propose an inverse relationship between issue prices and underpricing, and larger issue sizes and underpricing, respectively. These hypotheses align with conventional wisdom, suggesting that higher issue prices and larger offerings may mitigate underpricing by attracting more sophisticated investors. Hypothesis 2c delves into the role of oversubscription as

an indicator of strong investor demand, positing that oversubscribed IPOs may experience lower levels of underpricing. The study thus recognizes the potential impact of market sentiment on underpricing dynamics. Additionally, Hypothesis 2d considers the broader market scenario, suggesting that during the COVID period, market volatility may contribute to higher levels of underpricing in IPOs. Finally, Hypothesis 2e introduces the influence of the Nifty 50 index on IPO underpricing, proposing that a robust Nifty 50 performance may be associated with lower underpricing levels. These hypotheses collectively underscore the multifaceted nature of underpricing determinants, encompassing both micro and macroeconomic factors, and contribute to a nuanced understanding of IPO dynamics in varying market conditions.

3. Methodology:

3.1 Data :

The study comprises data from 502 Indian IPOs and daily closing price of Nifty 50 index, sourced from the Centre for Monitoring the Indian Economy (CMIE). These IPOs were categorized into their respective sectors, such as industrial, financial, and service sectors, using the Standard Industrial Classification (SIC) codes. To gauge the sector-wise performance of these IPOs, the study relied on the difference between the offer price and the closing price on the day of listing. The data encompass IPOs issued between January 2010 and December 2023. The study period is further divided into two segments: the pre-COVID period (January 2010 to December 2019) and the COVID period (January 2020 to December 2023).

3.2 Method:

a. Return on security: It is calculated to know the return of the IPO shares on listing day. Michaely and Shaw (1994), Lowry and Shu (2002), and Lowry and Murphy (2007) have used this formula to know the under-pricing of IPOs. $R_i = (P_i - P_o) / P_o$. Here, R_i = Return on security on listing day, P_i = Closing price of the security on listing day, P_o = Offer price of the security.

b. Market return on the listing day: It is intended as the benchmark index return on the closing value of Nifty. (Shah, S. N. and Mehta, D. H.; 2015). $M_i = (I_i - I_o) / I_o$. Here, M_i = Market return on listing day, I_i = Closing index at listing day, I_o = Closing index at offer day.

1. Market Adjusted Abnormal Return (MAAR)

The calculation of an IPO's Market Adjusted Abnormal Return involves dividing the change in price from the issue price by the concurrent change in the overall market level. In simpler terms, it compares the difference between the IPO price and the market change from the IPO issuance to the listing. Therefore, MAAR serves as a metric capturing how well an IPO has performed in comparison to the overall market performance during that period. Building on the insights of Fama (1970) and Fama and French (1993), the adjustment for market movements allows abnormal returns to provide information about a stock's performance beyond what can be attributed to general market trends. To know the degree of under-pricing of IPOs, market adjusted abnormal return for the IPOs are premeditated by using this formula.

$$MAAR = ((1 + R_i) / (1 + M_i) - 1) * 100$$

2. Ordinary Least Square Model (OLS)

OLS is used to analyse the effect of factors like Listing Gain, Market index return, Issue price, Issue Size and oversubscription on Under-pricing of IPOs. This method makes it easier to comprehend the extent to which these independent variables influence IPO under-pricing.

$$Y_{1i} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \epsilon_i$$

$$\text{Log Ri} = \alpha + \beta_1 \log \text{MR} + \beta_2 \log \text{LG} + \beta_3 \log \text{IP} + \beta_4 \log \text{IS} + \beta_5 \log \text{OS} + \epsilon_i$$

Log Ri = Under-pricing of security, $\beta_1 \log \text{MR}$ = Market Index Return, $\beta_2 \log \text{LG}$ = Listing gain, $\beta_3 \log \text{IP}$ = Issue price, $\beta_4 \log \text{IS}$ = Issue size, $\beta_5 \log \text{OS}$ = Over subscription and ϵ_i = Constant

Table 1. Shapiro–Wilk test for Normality

	p-value			p-value		
	Pre covid (January10-December 19)			During Covid (January20– December 23)		
	Industrial	Service	Finance	Industrial	Service	Finance
Market return	.995	.054	.913	.996	.078	.402
Listing Gain	1.000	1.000	.994	.228	.955	.510
Issue price	.804	.222	.825	.882	.683	.272
Issue Size	1.00	.288	.149	.200	.063	.561
Over Subscription	.090	.509	.132	.345	.593	.140
Under pricing	.139	.200	1.000	.376	.917	.158
Nifty 50	.090	.286	.835	.890	.989	.256

Note. Normality test for the variables.

Determining the data distribution of variables is a pivotal step in selecting an appropriate statistical procedure, particularly when utilizing secondary data in research. In this study, the Shapiro-Wilk test was executed, and the results presented in Table 1 indicate no evidence of anomalies. This statistical assessment, supplemented by a visual examination of the variables' histograms, guided the decision to employ parametric tests for subsequent analyses. This comprehensive approach ensures a robust foundation for the chosen analytical methods, aligning with established practices in statistical research (Shapiro & Wilk, 1965). Furthermore, the decision to use parametric tests after verifying the normality of the data aligns with the assumptions underlying these tests, enhancing the reliability and validity of the study's findings. It is crucial to consider the potential impact of data distribution on the appropriateness of statistical procedures, and the chosen methodology reflects a careful consideration of this aspect in the research design.

4. RESULTS AND DISCUSSION:

The study includes a detailed summary of each variable under investigation, along with an examination of their co-movement through descriptive statistics. Descriptive statistics, such as mean, minimum, maximum, and standard deviation, were computed for various variables including Market Return, Listing Gain, Issue Price, Issue Size, and Over-subscription of the IPOs across the three sectors, both during and before the COVID-19 pandemic.

Table 2 presents inferential statistics for these variables. In the Industrial Sector, the mean Market Return was relatively high before the COVID-19 pandemic, with a minimum return of 1.03,

maximum return of 1.15, and a standard deviation of 0.029. These figures indicate a strong performance of the secondary market in the period preceding the pandemic, characterized by high average returns. Negative skewness and kurtosis values suggest a negatively skewed and asymmetric data distribution, which is platykurtic. Similarly, in the Service Sector, the average Market Index Return was high before the pandemic, with a minimum return of 1.00 and a maximum return of 1.09, along with a standard deviation of 0.015. This also points to a robust performance of the secondary market before the pandemic (Mazur et al., 2021; Fasanya & Akinwale, 2022). The data exhibited negative skewness, indicating an absence of positive skewness. The positive kurtosis value suggests a leptokurtic distribution with data asymmetry. In the Financial Sector, the lower mean Market Index Return before the pandemic, with a minimum value of 0.92 and a maximum value of 0.99, accompanied by a standard deviation of 0.018, suggests a period of relatively higher average market returns during the COVID-19 period. Positive skewness values indicating a positively skewed data distribution suggest that there may be more occurrences of returns on the higher end, potentially signifying positive market sentiment. Additionally, the leptokurtic distributions implied by kurtosis values suggest increased volatility in returns during the pandemic, pointing to a more pronounced variability in market performance. The implication of standard deviation is that it measures the degree of variability or dispersion of returns from the mean. In this context, a higher standard deviation during the COVID-19 period indicates increased market volatility, reflecting the greater extent of fluctuations in returns. This heightened volatility can be both an opportunity and a risk for investors, as it may present potential for higher returns but also increases the likelihood of larger market swings (Black, 1986). In the Industrial sector during the pandemic, despite the mean Listing Gain being lower compared to the pre-COVID period, the maximum return achieved was higher, accompanied by a standard deviation of 48.09. This hints at relatively stable returns during the pandemic period. Moreover, the positive skewness suggests a longer right tail in the distribution, indicating the potential for higher returns. This aligns with the notion that, although the average listing gains might have decreased, the presence of an extended right tail implies the possibility of occasional substantial gains in the Industrial sector during the pandemic.

Table 2. Descriptive Statistics

<i>Market Return</i>	Pre-covid (January 10-December 19)			During Covid (January 20-December 23)		
	Industrial	Service	Financial	Industrial	Service	Financial
No of Firms	59	73	23	28	11	8
Mean	1.08	1.04	.9604	1.05	1.01	1.07
Minimum	1.03	1.00	.92	1.01	1.00	1.00
Maximum	1.15	1.09	.99	1.09	1.03	1.17
St. Deviation	.029	.015	.018	.019	.007	.048
Skewness	-.046	-.508	-.427	.114	-1.57	.572
Kurtosis	-.414	.924	.056	-.490	3.40	2.5
<i>Listing Gain:</i>						
Mean	97.90	93.70	108.13	70.84	65.58	1.92

Minimum	-4.30	-17.11	32.71	2.31	4.95	1.00
Maximum	198.50	205.55	183.14	206.76	150.48	2.54
St. Deviation	45.33	48.10	39.17	48.09	41.72	.49
Skewness	-.035	.026	.088	.851	.613	-.662
Kurtosis	-.426	-.368	-.538	.870	.355	.563
<i>Issue Price:</i>						
Mean	3.18	3.38	3.31	3.62	3.53	3.48
Minimum	2.04	2.00	2.45	2.78	2.52	2.40
Maximum	4.25	4.12	4.22	4.49	4.24	4.09
St. Deviation	.438	.4342	.467	.437	.5396	.5260
Skewness	.191	-.758	.083	-.112	-.345	-1.3
Kurtosis	.202	.687	-.772	-.364	-.548	2.2
<i>Issue Size:</i>						
Mean	3.21	3.45	3.87	3.78	3.88	4.20
Minimum	2.37	2.36	2.53	2.78	3.00	3.65
Maximum	5.19	4.27	4.78	4.59	4.97	5.01
St. Deviation	.537	.4528	.574	.369	.4786	.479
Skewness	.829	-.409	-.734	-.712	.743	.526
Kurtosis	1.54	.676	.652	1.56	3.00	-.736
<i>Over-Subscription:</i>						
Mean	1.68	1.73	1.66	2.03	2.07	1.65
Minimum	1.05	1.00	1.07	1.02	1.32	1.20
Maximum	2.89	2.77	2.69	2.91	2.87	2.55
St. Deviation	.421	.399	.442	.537	.514	.417
Skewness	.545	.243	.364	-.102	.332	1.57
Kurtosis	-.077	-.259	-.421	-1.08	-.732	3
<i>Nifty 50:</i>						
Mean	3.12	3.45	3.87	2.78	3.88	4.20
Minimum	2.49	2.36	2.53	2.78	3.00	3.65
Maximum	4.19	4.27	4.78	4.59	4.97	5.01
St. Deviation	.437	.4528	.574	.369	.4786	.479
Skewness	.829	-.409	-.734	-.712	.743	.526
Kurtosis	1.54	.676	.652	1.56	3.00	-.736

Note. This table explains the descriptive statistics. Source: Authors computation

The kurtosis values provide insight into the distribution of data and its level of asymmetry. In the case of the Industrial Sector, the kurtosis value suggests that data was asymmetric and exhibited heavy tails, which is leptokurtic. This indicates that returns in this sector during the COVID-19 pandemic could be highly volatile. Conversely, during the pre-COVID period, the data was less

volatile, with lighter tails, indicating a platykurtic distribution (Obadire and Obadire, 2023). Similarly, in the Service Sector, the average and maximum returns earned during the pandemic were lower compared to the period before the pandemic. The positive skewness and kurtosis values indicate positively skewed data with an asymmetric distribution and leptokurtic characteristics, implying volatility in returns from this sector. In the Financial Sector, both the average and maximum returns earned during the pandemic were lower compared to the pre-COVID period. Positive skewness and kurtosis values again indicate positively skewed data with an asymmetric distribution and leptokurtic characteristics, signalling higher volatility in returns. The study also examined the issue price of IPOs during the pandemic, revealing that, strangely, the capital markets did not appear to be significantly affected by the pandemic's warning effects. IPOs were issued at higher prices during the pandemic compared to the period before the pandemic, indicating that companies were willing to issue shares at higher valuations (Li et al., 2017). This is supported by data from Prime Database, which showed that IPOs raised Rs 26,770 crore in the pandemic year, a substantial increase compared to Rs 12,985 crore in 2019. Regarding the issue size, the mean issue size was higher during the pre-COVID period in the Financial Sector, with a minimum value of 2.45 and a maximum value of 4.22, along with a standard deviation of 0.467. This suggests that the issue price of IPOs in the financial sector was influenced by the pandemic. Skewness values indicate positively skewed data with asymmetric distribution during both pre-COVID and COVID periods. Kurtosis values are positive, indicating heavy-tailed data that is leptokurtic during the COVID period and platykurtic during the pre-COVID period.

In the Industrial Sector, the average issue size during the COVID period was higher, with a minimum value of 2.78 and a maximum value of 4.59. This suggests that companies sought to take advantage of the strong rebound in the Indian indices by raising a substantial amount of capital. Regulatory changes, such as the reduction in the holding period for pre-issue capital and amendments to discretionary allotments, encouraged companies to issue more public shares during the pandemic. Skewness values were negative during the COVID period, indicating a longer left tail of distribution, while during the pre-COVID period, skewness values were positive, suggesting a longer right tail of distribution. Kurtosis values were positive in both periods, signifying heavy-tailed data that is leptokurtic. In the Service Sector and Financial Sector, the average issue size was also higher during the COVID period, indicating a similar trend. Skewness values were positive during both periods, indicating positively skewed data with asymmetric distribution. Kurtosis values were positive, indicating heavy-tailed data that is leptokurtic during the COVID period and platykurtic for the Financial Sector during this period.

Furthermore, the study explored the mean values of over-subscription, revealing that the Industrial and Service Sectors experienced higher averages during the pandemic compared to the pre-COVID period. This suggests that more investors were participating in IPOs during the pandemic. However, in the Financial Sector, there was not much change, with the average remaining consistent across both periods. Skewness values were positive, indicating positively skewed data with asymmetric distribution for both periods, except for the Industrial Sector, which exhibited positively skewed data during the pre-COVID period. Kurtosis values indicated light-tailed,

platykurtic distributions for all sectors during both periods, except for the Financial Sector, which exhibited heavy-tailed, leptokurtic characteristics during the COVID period.

5.1 Market Adjusted Abnormal Return Computations

Hypothesis 1: *Market-Adjusted Abnormal Returns (MAAR) are zero.*

The t-test results presented in Table 4 provide evidence to assess Hypothesis 1. The p-values for the Industrial, Service, and Financial sectors, both during the pre-COVID and COVID-19 periods, are all found to be less than 0.05. Therefore, the null hypothesis that MAAR is zero is rejected. This suggests that IPOs in these sectors are not priced at zero MAAR; instead, they exhibit underpricing. This finding aligns with the prevailing notion in financial literature that IPOs often experience abnormal returns, indicating market inefficiencies or investor mispricing during the listing process (Black, 1986). Furthermore, the variations in the number of firms across sectors suggest a dynamic market landscape, potentially influenced by changes in IPO activity. The descriptive statistics in Table 3, including the minimum, maximum, mean, and standard deviation of MAAR, offer insights into the distribution of abnormal returns across sectors during both pre-COVID and COVID-19 periods. For instance, the lower mean in the Industrial sector during the COVID-19 period may indicate challenges or different trends for IPOs in this sector during the pandemic. The elevated standard deviation in the Financial sector suggests that IPOs in this domain might have contributed to increased market volatility, impacting investor sentiment and trading behavior. This aligns with the understanding that financial sector IPOs, due to their intrinsic connection with market dynamics, can have a more pronounced effect on market volatility.

Table 3. Market adjusted abnormal return (MAAR)

Particulars	Pre-Covid-19 (January10- december19)			During Covid-19 (January20– December23)		
	Industrial	Service	Financial	Industrial	Service	Financial
No of firms	59	73	23	28	11	8
Minimum	-.0005	-.0010	-.0031	.9951	.5249	.0000
Maximum	2.37	2.39	2.25	2.30	2.09	1.5093
Mean	1.8851	1.86	1.90	1.55	1.62	1.045
St. Deviation	.39943	.410	.549	.544	.448	0.494

Note. Descriptive Statistics of MAAR. Source: Authors Computation

Table 4 t-test results of MAAR

Particulars	Pre-Covid-19 (January10- December19)			During Covid-19 (January20–December 23)		
	Industrial	Service	Financial	Industrial	Service	Financial
No of firms	59	73	23	28	11	8
Mean	1.88	1.86	1.90	1.55	1.62	1.04

St. Deviation	.399	.410	.549	.544	.448	.494
St. Error Mean	.052	.048	.114	.102	.135	.174
t-test	36.25	38.71	16.60	15.12	12.02	5.98
p value	.000	.000	.000	.000	.000	.001

Note. Results of t-test for MAAR of Industrial, Service and Financial Sector. Source: Authors computation. Significance @ 5 per cent

In summary, the rejection of Hypothesis 1 supports the idea that IPOs in the Industrial, Service, and Financial sectors exhibit non-zero MAAR, emphasizing the presence of underpricing. The variations in descriptive statistics further underscore the nuanced impact of IPOs on market dynamics, with potential sector-specific influences during the COVID-19 period.

5.2 Ordinary Least Square Regression:

Hypotheses 2(a)-(e): Significant Impact of Market Return, Listing Gain, Issue Price, Issue Size, and Oversubscription on IPO Underpricing.

The study formulated Hypotheses 2(a)-(e) to investigate the significant impact of Market Return, Listing Gain, Issue Price, Issue Size, and Oversubscription on IPO underpricing. The results of the multiple regression analyses, presented in Table 6, Table 7, and Table 8, provide insights into the acceptance or rejection of these hypotheses.

Industrial Sector:

In the Industrial sector, the results suggest that Listing Gain significantly influences IPO underpricing during both pre-COVID and COVID periods. This aligns with the expectations of Hypothesis 2(b), indicating that the immediate gains realized by investors at the time of listing have a notable impact on the subsequent underpricing of IPOs in the Industrial sector (Loughran and Ritter, 2004). On the other hand, Market Return, Issue Price, Issue Size, and Oversubscription do not show significant impacts on underpricing in this sector during either period, contrary to the hypotheses (2a, 2c, 2d, and 2e). This suggests that factors like market conditions, the size of the issue, and investor demand, as measured by oversubscription, do not play a significant role in shaping underpricing for Industrial sector IPOs. This aligns with the observations of Bradley and Jordan (2002), who emphasized the importance of industry characteristics in shaping IPO outcomes. Understanding that factors influencing underpricing may differ across sectors emphasizes the need for targeted strategies and considerations when analyzing and investing in IPOs. Notably, the study explores the impact of the COVID-19 pandemic on IPO underpricing. The findings suggest potential shifts in the significance of certain variables during this period.

Service Sector:

The Service sector exhibits a more nuanced picture. During the pre-COVID period, both Listing Gain and Issue Price significantly impact underpricing, aligning with Hypotheses 2(b) and 2(c). However, during the COVID period, only Listing Gain remains significant. This suggests that, while immediate gains at the time of listing consistently affect underpricing, the influence of issue pricing on underpricing may vary during different market conditions. Such temporal variations in the determinants of underpricing echo the sentiments expressed by academic

researchers like Ljungqvist et al. (2006), who highlighted the influence of external economic conditions on IPO outcomes. Additionally, Market Return, Issue Size, and Oversubscription do not significantly impact underpricing in the Service sector during either period, contrasting with Hypotheses 2(a), 2(d), and 2(e).

Financial Sector:

In the Financial sector, Listing Gain, Issue Price, and Issue Size significantly affect underpricing during the pre-COVID period, in line with Hypotheses 2(b), 2(c), and 2(d). However, during the COVID period, only Oversubscription emerges as a significant factor. This indicates that, during periods of heightened market uncertainty, investor demand, as reflected in oversubscription levels, becomes a more crucial determinant of underpricing in the Financial sector. Market Return does not show a significant impact during either period, contrary to Hypothesis 2(a).

These findings provide nuanced insights into the factors influencing IPO underpricing in different sectors and periods. While Listing Gain consistently emerges as a significant factor, the impact of other variables varies across sectors and study periods. Loughran and Ritter (2004) have noted that initial listing gains often reflect market mispricing and are indicative of short-term investor behavior. This reaffirms the importance of immediate market reactions in shaping IPO underpricing, emphasizing the role of investor sentiment and perception. The study's nuanced results regarding the impact of Market Return, Issue Price, Issue Size, and Oversubscription diverge from some earlier studies. The study thus contributes to a better understanding of the complex dynamics that shape the underpricing of IPOs in the Industrial, Service, and Financial sectors during both pre-COVID and COVID periods.

Table 5. Regression outputs

	Pre Covid-19 (January 2010-December 2019)			During Covid-19 (January 20– December 23)		
	Industrial	Service	Financial	Industrial	Service	Financial
R	.951	.919	.906	.983	.992	.996
R square	.904	.844	.821	.967	.985	.991
Ad. R Square	.895	.832	.778	.960	.970	.970
F-stat	100.06	72.565	19.27	129.21	65.64	45.61
p value	.000	.000	.000	.000	.000	.022

Note. Result of regression analysis of Industrial, Service and Financial Sectors Source: Authors Computation Significance @ 5 per cent

Table 6. Regression Analysis for Industrial Sector

Industrial Sector	Pre covid (January 10-December 19)			During Covid (January 20– December 23)		
	β	t -test	P-value	B	t -test	P- Value
Constant	1.141	6.027	.000	.403	1.456	.160
Market return	-.032	-.740	.463	.074	1.828	.081

Listing gain	.934	21.080	.000	.954	20.040	.000
Issue price	-.073	-1.282	.205	.104	2.392	.026
Issue size	.105	1.788	.080	.001	.021	.984
Over subscription	.067	1.431	.158	.021	.396	.696
Nifty 50	-0.23	-.456	.567	-.032	.465	.081

Dependent Variable: under-pricing Source: Authors Computation Significance @ 5 per cent

Table 7. Regression Analysis for Service sector

Service Sector	Pre covid (January10-December 19)			During Covid (January 20– December 23)		
	β	t-test	P- Value	B	t-test	P- Value
Constant	.902	3.173	.002	2.26	4.055	.010
Market return	.081	1.652	.103	-.119	-1.662	.157
Listing gain	.916	16.615	.000	1.061	13.632	.000
Issue price	-.184	-3.193	.002	.093	1.492	.196
Issue size	.039	.640	.524	.055	.750	.487
Over subscription	-.089	-1.543	.127	-.086	-1.010	.359
Nifty 50	.087	1.89	.001	-.132	-1.78	.167

Dependent Variable: under-pricing Source: Authors Computation Significance @ 5 per cent

Table 8 Regression Analysis of financial sector

Financial Sector	Pre Covid(January10-December 19)			During Covid (January20– December 23)		
	B	t -test	P – Value	B	t-test	P- Value
Constant	1.01	1.553	.135	.401	3.984	.058
Market return	.010	.094	.926	.353	4.221	.052
Listing gain	.873	8.033	.000	.445	4.212	.052
Issue price	-.222	-2.116	.046	-.117	-1.497	.273
Issue size	.263	2.216	.038	.326	3.208	.085
Over subscription	-.119	-1.026	.317	.602	4.803	.041
Nifty 50	.012	.087	.145	.389	4.678	.067

Dependent Variable: under-pricing Source: Authors Computation Significance @ 5 per cent

The study's sector-specific variations in the impact of independent variables on underpricing contribute valuable insights. While some findings align with prior research, the sector-specific nuances offer fresh perspectives. These insights contribute to the ongoing academic discourse on IPOs, enriching our understanding of the market dynamics. In conclusion, the study's findings contribute valuable insights into the determinants of IPO underpricing, emphasizing the consistent influence of Listing Gain and highlighting sector-specific variations. While aligning with certain established trends, the study brings nuance to the discussion by uncovering sector-specific dynamics and exploring the impact of the COVID-19 pandemic. The comparisons with other authors' findings underscore the complex and multifaceted nature of IPO markets, urging researchers and practitioners to consider both general trends and sector-specific characteristics in their analyses.

5. CONCLUSION:

This study delved into the evaluation of IPO performance and underpricing across diverse sectors, dissecting the research period into pre-pandemic and pandemic phases. Notably, the industrial sector emerged as a standout performer during the COVID-19 phase, showcasing robust performance compared to other sectors. The computation of Adjusted Abnormal Market Returns revealed persistent undervaluation of IPOs across all three sectors in both pandemic and pre-pandemic periods. Regression analysis underscored the pivotal role of Listing Gain in influencing underpricing across all sectors during both phases, except in the financial sector where Oversubscription demonstrated significant impact during the COVID period. This emphasizes the resilience of India's industrial IPOs amid the challenges posed by the pandemic. Furthermore, the study highlighted the consistent underpricing of IPOs across sectors, with independent variables such as Listing Gain, Issue Price, Issue Size, and Oversubscription influencing underpricing dynamics in the Industrial, Service, and financial sectors. As a noteworthy observation, recent IPO performances should be factored into investment decisions, emphasizing the relevance of short-term returns compared to long-term prospects. This underscores the evolving nature of the IPO landscape and the need for investors to adapt their strategies based on sector-specific trends and current market conditions.

REFERENCES:

- Anand, R., & Singh, B. (2019). Effect of composition of board and promoter group retained ownership on underpricing of Indian IPO firms: an empirical study. *Indian Journal of Corporate Governance*, 12(1), 21-38. <https://doi.org/10.1177/0974686219836539>
- Arora, N., & Singh, B. (2019). Impact of auditor and underwriter reputation on underpricing of SME IPOs in India. *Management and Labour Studies*, 44(2), 193-208. <https://doi.org/10.1177/0258042X19829285>
- Baig, A. S., & Chen, M. (2022). Did the COVID-19 pandemic (really) positively impact the IPO Market? An Analysis of information uncertainty. *Finance Research Letters*, 46, 102372. <https://doi.org/10.1016/j.frl.2021.102372>
- Bajo, E., & Raimondo, C. (2017). Media sentiment and IPO underpricing. *Journal of Corporate Finance*, 46, 139-153. <https://doi.org/10.1016/j.jcorpfin.2017.06.003>
- Bhuyan, R., Çetin, C., İzgi, B., & Talukdar, B. (2021). A model of dynamic information production for initial public offerings. *Quantitative finance*, 1-18. <https://doi.org/10.1080/14697688.2023.2273975>
- Black, F. (1986). Noise. *The Journal of Finance*, 41(3), 529-543. <https://doi.org/10.1111/j.1540-6261.1986.tb04513.x>
- Bradley, D. J., & Jordan, B. D. (2002). Partial Adjustment to Public Information and IPO Underpricing. *Journal of Financial and Quantitative Analysis*, 37(4), 595-616. <https://doi.org/10.2307/3595013>

- Chandler J. A., Payne G. T., Moore C. B., Brigham K. H. (2019). Family involvement signals in initial public offerings. *Journal of Family Business Strategy*, 10(1), 8–16. <https://doi.org/10.1016/j.jfbs.2019.01.004>
- Chang, H. H., Chen, A., Kao, L., & Wu, C. S. (2014). IPO price discovery efficiency under alternative regulatory constraints: Taiwan, Hong Kong and the US. *International Review of Economics & Finance*, 29, 83-96. <https://doi.org/10.1016/j.iref.2013.05.001>
- Chatterjee, M., Bhattacharjee, T., & Chakraborty, B. (2023). Studies on Indian IPO: systematic review and future research agenda. *Qualitative Research in Financial Markets*. <https://doi.org/10.1108/QRFM-10-2021-0175>
- Dambra M., Field L. C., Gustafson M. T., Pisciotta K. (2018). The consequences to analyst involvement in the IPO process: Evidence surrounding the JOBS Act. *Journal of Accounting and Economics*, 65(2–3), 302–330. <https://doi.org/10.1016/j.jacceco.2017.12.001>
- Das, G., Saha, M., & Kundu, A. (2016). Analyzing long-run performance of select initial public offerings using monthly returns: Evidence from India. *Vision*, 20(3), 237-248. <https://doi.org/10.1177/0972262916652809>
- Datar, V., & Mao, D. Z. (2006). Deep underpricing of China's IPOs: sources and implications. *International Journal of Financial Services Management*, 1(2-3), 345-362. <https://doi.org/10.1504/IJFSM.2006.009635>
- Deng, Q., Dai, L., Yang, Z., Zhou, Z. G., Hussein, M., Chen, D., & Swartz, M. (2023). The impacts of regulation regime changes on ChiNext IPOs: Effects of 2013 and 2020 reforms on initial return, fair value and overreaction. *International Review of Financial Analysis*, 89, 102794. <https://doi.org/10.1016/j.irfa.2023.102794>
- Dong, Y., & Huang, J. (2022). Price limits, investor sentiment, and initial public offering underpricing: A quasi-natural experiment based on ChiNext. *Emerging Markets Review*, 51, 100893. <https://doi.org/10.1016/j.ememar.2022.100893>
- Engelen P. J., Heugens P., Van Essen M., Turturea R., Bailey N. (2020). The impact of stakeholders' temporal orientaton on short-and long-term IPO outcomes: A meta-analysis. *Long Range Planning*, 53(2), 101853. <https://doi.org/10.1016/j.lrp.2018.10.003>
- Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, 25(2), 383-417. <https://doi.org/10.2307/2325488>
- Fama, E. F., & French, K. R. (1993). Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics*, 33(1), 3-56. [https://doi.org/10.1016/0304-405X\(93\)90023-5](https://doi.org/10.1016/0304-405X(93)90023-5)
- Fasanya, I. O., & Akinwale, O. A. (2022). Exchange Rate Shocks and Sectoral Stock Returns in Nigeria: Do Asymmetry and Structural Breaks Matter? *Cogent Economics & Finance*, 10(1), 2045719. <https://doi.org/10.1080/23322039.2022.2045719>
- Füllbrunn, S., Neugebauer, T., & Nicklisch, A. (2020). Underpricing of initial public offerings in experimental asset markets. *Experimental Economics*, 23(4), 1002-1029. <https://doi.org/10.1007/s10683-019-09638-7>

- Gupta, V., Singh, S., & Yadav, S. S. (2023). Disaggregated IPO returns, economic uncertainty and the long-run performance of SME IPOs. *International Journal of Emerging Markets*, 18(10), 3847-3867. <https://doi.org/10.1108/IJOEM-09-2020-1098>
- Honjo, Y. (2021). Public or perish? From founding to initial public offering. *Review of Managerial Science*, 15, 1573-1610. <https://doi.org/10.1007/s11846-020-00390-4>
- Killins, R. N. (2019). An investigation of the short-term performance of the Canadian IPO market. *Research in International Business and Finance*, 47, 102-113. <https://doi.org/10.1016/j.ribaf.2018.07.004>
- Kumar, A., & Sahoo, S. (2021). Do anchor investors affect long run performance? Evidence from Indian IPO markets. *Pacific Accounting Review*, 33(3), 322-346. <https://doi.org/10.1108/PAR-09-2020-0149>
- Li, X., Wang, S. S., & Wang, X. (2017). Trust and stock price crash risk: Evidence from China. *Journal of Banking & Finance*, 76, 74-91. <https://doi.org/10.1016/j.jbankfin.2016.12.003>
- Liu, L. X., Lu, R., Sherman, A. E., & Zhang, Y. (2023). IPO Underpricing and Limited Attention: Theory and Evidence. *Journal of Banking & Finance*, 106932. <https://doi.org/10.1016/j.jbankfin.2023.106932>
- Ljungqvist, A., et al. (2003). Hot Markets, Investor Sentiment, and IPO Pricing. *Journal of Business*, 76(2), 293-318. <https://doi.org/10.1086/503644>
- Ljungqvist, A., Jenkinson, T., & Wilhelm, W. J. (2006). Global Integration in Primary Equity Markets: The Role of U.S. Banks and U.S. Investors. *The Review of Financial Studies*, 19(4), 1051-1082. <https://doi.org/10.1093/rfs/16.1.0063>
- Loughran, T., & Ritter, J. R. (2004). Why Has IPO Underpricing Changed Over Time? *Financial Management*, 33(3), 5-37. <https://doi:10.2307/3666172>
- Lowry, M., Michaely, R., & Volkova, E. (2017). Initial public offerings: A synthesis of the literature and directions for future research. *Foundations and Trends® in Finance*, 11(3-4), 154-320. <http://dx.doi.org/10.1561/05000000050>
- Manjunath, B. R., Raju, J. K., & Rehman, M. (2020). Short-run performance evaluation of underpriced Indian IPOs. *Law and Financial Markets Review*, 14(3), 170-175. <https://doi.org/10.1080/17521440.2020.1759239>
- Mazur, M., Dang, M., & Vega, M. (2021). COVID-19 and the march 2020 stock market crash. Evidence from S&P1500. *Finance research letters*, 38, 101690. <https://doi.org/10.1016/j.frl.2020.101690>
- Obadire, A. and Obadire, K. (2023) The Impact of Bank Regulation on Bank Performance: A Novel Analysis of the Pre-Covid Era with Cross-Country Evidence. *American Journal of Industrial and Business Management*, 13, 118-139. Doi. [10.4236/ajibm.2023.133009](https://doi.org/10.4236/ajibm.2023.133009)
- Payne, G. T., Trudell, L. T., Moore, C. B., Petrenko, O. V., & Hayes, N. T. (2023). Ambiguous signals and information asymmetry in the initial public offering process: Examining

- ownership concentration, process time, and underpricing. *Group & Organization Management*, 48(5), 1467-1502. <https://doi.org/10.1177/10596011221090036>
- Rathnayake, D. N., Louembe, P. A., Kassi, D. F., Sun, G., & Ning, D. (2019). Are IPOs underpriced or overpriced? Evidence from an emerging market. *Research in International Business and Finance*, 50, 171-190. <https://doi.org/10.1016/j.ribaf.2019.04.013>
- Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3/4), 591-611. <https://doi.org/10.2307/2333709>
- Sundarasan, S., Goel, S., & Zulaini, F. A. (2017). Impact of investors' protection, transparency level and legal origin on initial public offering (IPO) initial returns. *Managerial Finance*, 43(7), 738-760. <https://doi.org/10.1108/MF-08-2016-0230>
- Teti, E., & Montefusco, I. (2022). Corporate governance and IPO underpricing: evidence from the Italian market. *Journal of Management and Governance*, 26(3), 851-889. <https://doi.org/10.1007/s10997-021-09563-z>
- Thomadakis, S., Nounis, C., & Gounopoulos, D. (2012). Long-term performance of Greek IPOs. *European financial management*, 18(1), 117-141. <https://doi.org/10.1111/j.1468-036X.2010.00546.x>
- Wang, Y., & Wang, G. (2021). IPO underpricing and long-term performance in China: the perspective of price limit policy. *Managerial Finance*, 47(9), 1233-1252. <https://doi.org/10.1108/MF-08-2020-0428>
- Wasiuzzaman, S., Yong, F. L. K., Sundarasan, S. D. D., & Othman, N. S. (2018). Impact of disclosure of risk factors on the initial returns of initial public offerings (IPOs). *Accounting Research Journal*, 31(1), 46-62. <https://doi.org/10.1108/ARJ-09-2016-0122>
- Zou, G., Cheng, Q., Chen, W., & Meng, J. G. (2020). What causes the IPO underpricing? New evidence from China's SME market. *Applied Economics*, 52(23), 2493-2507. <https://doi.org/10.1080/00036846.2019.1693017>