# Evaluation of Nexus Between Short-Run Return Measures of IPOs in India

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## Abstract

**Purpose : This study aimed to provide a better understanding of the initial performance of initial public offerings (IPOs) on the day of listing by separating the gains on the listing day into primary and secondary market returns. An industry-wise evaluation of different return measures was done, and a year-on-year analysis was also conducted to understand more about the underpricing anomaly of IPOs.**

**Methodology : The short-run IPO performance was analyzed using market-adjusted average returns (MAAR), focusing on the role of different factors in determining underpricing. The initial returns were divided into primary and secondary returns, and a sectoral analysis was conducted to evaluate the behavior of IPOs on the first day of trading. The quantitative analysis considered the returns from the issue date to the listing day opening price and compared the listing day opening and closing prices of all sample IPOs.**

**Findings : The sectoral analysis revealed a reversal of the level of underpricing during the secondary market, which explains the listing day performance of IPOs under different industries over the last decade. According to the findings of this study, the subscription rate is a major determinant of short-run IPO performance.**

**Practical Implications : To improve the short-run performance of IPOs, issuers should focus on increasing their subscription rates. This study recommended that corporations should publish credible, accurate, and adequate information and invite active participation from shareholders.**

**Originality : Unlike prior research on IPOs, this study separated listing day gains into primary and secondary market returns, carried out an industry-wise evaluation of different return measures, and analyzed IPO behavior on the first day of trading to provide improved insights into the underpricing anomaly of IPOs.**

***Keywords :*** **initial public offerings, listing day evaluation, India, underpricing, primary market, secondary market, sectoral analysis, short-run performance**

**JEL Classification Codes : G14, G24, G32**

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Potential firms must raise additional capital to seek lucrative investment opportunities that promote business growth. The two primary ways to raise new capital are through debt and equity financing, with equity financing generally preferred because of its advantages over debt financing. Equity financing does not obligate firms to pay fixed interest or principal during the firm's lifespan. While larger firms need additional capital from a wider range of investors, necessitating the launch of an initial public offering (IPO), smaller firms often choose private placement (Dzimiri & Radikoko, 2015; Fabozzi & Peterson, 2003).

The very first round of fundraising conducted by a company from the public to generate additional funds is titled an IPO. Although this benefits investors through increased liquidity, it comes at direct and indirect costs to business, including dilution of shareholding and underpricing. Underpricing, first described by Reilly and Hatfield (1969), is the mispricing of IPOs, which causes losses for the issuing firm. According to Rock's (1986) research, this is a global phenomenon with varying degrees of prevalence that is caused by information asymmetry among stakeholders. According to the Winners' Curse Hypothesis, firms underprice to avoid losing uninformed investors who cannot distinguish between desirable and undesirable IPOs (Katti & Phani, 2016).

Underpricing of an IPO can positively impact future offerings by the same firm. This is because investors still remember the benefit they received from the underpriced IPO and anticipate similar benefits from future offerings, such as further public offerings (FPOs) or seasoned public offerings. This phenomenon is known as the "Underpriced IPOs leaving a good taste" concept and was studied by Allen and Faulhaber (1989). It was classified by Welch (1989) as the signaling hypothesis of IPO underpricing.

IPO underpricing has been attributed to factors such as information cascading, demand uncertainty, lack of proper criteria, regulation, and non-alignment of objectives among stakeholders. According to Katti and Phani (2016), the concept of information cascading is one of the motivators behind IPO underpricing, whereby initial investors motivate others to subscribe. According to Singh et al.'s (2021) multilayer perceptron model, technical factors played a dominant role in ascertaining the post-listing prices of IPOs in the Indian market. Although no single theory can fully explain IPO underpricing, a combination of different factors can be used to understand it.

Based on the size of the issue offer and market capitalization, Singh and Kalra (2019) studied the short-term IPO performance to methodologically evaluate factors influencing IPO underpricing. This was done by using market-adjusted initial returns on the day of listing. However, the analysis can be extended by dividing initial returns into primary and secondary returns and conducting sectoral analysis to better understand IPO behavior on the first day of trading.

By dividing the total initial returns into primary market returns and secondary market returns and drawing conclusions about the performance of the IPOs between the period of issue and listing as well as during the listing day (intra-day), we try to extend the analysis to further investigate the underpricing anomaly. Hence, following Perera and Kulendran (2014) and Ferdous et al. (2021), the initial returns have been segregated by taking the returns from the issue date to the listing day opening price and then comparing both listing day opening and closing prices of all the sample IPOs.

## Literature Review

As no country remains unaffected by the consequences of this "black hole" in the IPO literature, underpricing anomaly holds global history and continues to be a global mystery. Many studies have been conducted to understand the behavior of IPOs in different markets —from the implementation of price limits being the driving force for instigating investor sentiments and thus leading to higher underpricing in the Chinese Stock Market (Dong & Huang, 2022; Mahmood et al., 2010) to the application of artificial neural networks on the Indian IPO market resulting in technical factors being major drivers of underpricing (Singh et al., 2021). A similar study was conducted on IPOs in Sri Lanka by Perera and Kulendran (2014), which also found a similar trend of underpricing.

Gupta (2020) investigated the listing performance of Indonesian IPOs; whereas, Singh and Anand (2020) found positive returns of 8.66% in the Indian SME IPO market.

Several studies have identified diverse factors impacting underpricing and acting as driving forces. In their analysis of the Indian IPO market from 2015–2019, Singh and Kalra (2020) found that institutional buyers heavily influenced the underpricing of the first offerings to the public. They also found that the quality of the issuer's financial statements and the reputation of the underwriter played a crucial role in determining the underpricing of IPOs. Gupta (2011) attempted to study the impact of market conditions, oversubscription, and market efficiency on IPO underpricing; whereas, Singh and Maurya (2018) explained the interrelationship between IPO underpricing and potential regressors such as corporate governance and ownership structure. Similarly, it has been reported that one dominant factor contributing to varying degrees of underpricing is the non-alignment of objectives of issuers, underwriters, and investors (Katti & Phani, 2016).

However, there has not been much research that does a dissection of the listing day returns into primary and secondary returns to independently analyze the behavior of such returns and the role played by various factors in affecting the dissected returns. And this is a major unaddressed gap in the literature on IPO underpricing. This study adds value to the existing literature by analyzing the listing day returns of IPOs in India from 2009 – 2020 by segregating the initial returns into primary market returns and secondary market returns. This approach provides a more comprehensive and detailed analysis of the underpricing phenomenon in the Indian IPO market.

Furthermore, as mentioned in the Objectives section, the study also includes a sectoral analysis, which provides investors with a broader perspective on the industry-wise underpricing pattern. The study adds to the body of published literature on the Indian IPO market by filling this knowledge gap and assisting in the development of a greater awareness of IPO market behavior on the primary day of listing. It also offers guidance to investors and decision-makers.

## Objectives

After reviewing the previous studies conducted to gauge underpricing in various countries as well as India, the following objectives have been set for this study:

- To analyze the listing returns by segregating the initial performance of the IPOs into three categories: primary market performance (PRIM), secondary market performance (SECON), and total market performance (TR).
- To do a year-wise analysis of the three returns specified above to gauge the performance spread over the last decade post-U.S. financial crisis, 2008.
- To conduct industry analysis and evaluate the performance based on industries, being divided for their primary and secondary market performance.
- To study the impact of various factors on the returns obtained by analyzing the returns for those variables shortlisted through a literature review along with taking all industry dummies.

## Data and Methodology

Following the research conducted by Ferdous et al. (2021), an effort was made to assess the first-day return of IPOs listed on the National Stock Exchange (NSE) by dividing it into three categories: initial market return, intermediate market return, and overall market return. The data were taken for those companies that went public in India post the US financial crisis, that is, from 2009–2020, to comprehend the results of the study without including an economic shock to the stock market that occurred in 2008. A total of 280 IPOs spread across 11 years

were analyzed for their initial performance, and quantitative analysis was conducted to find the cause behind underpricing or overpricing detected from them. Data were collected through the websites of the National Stock Exchange, Chittorgarh, Capitaline, Prime Database, Screener, etc., using Python software.

The following are the hypotheses of the study:

- **H01 :** Initial and intermediate returns cannot be separated from the original returns of IPOs.
- **Ha1 :** Initial and intermediate returns can be separated from the original returns of IPOs.
- **H02 :** The degree of underpricing between main and secondary returns is not significantly different.
- **Ha2 :** The degree of underpricing between main and secondary returns is significantly different.

The approach to finding out the initial performance of the IPOs has been modified apropos the methodology used by Ferdous et al. (2021). Using this method, the first-day initial returns were sub-categorized into primary market returns and secondary market returns so that a comprehensive understanding of the initial performance of the IPOs could be developed. Studies based on the US market have adopted this method, and some Australian studies have also tried to evaluate the initial performance using this method; however, it is a novel approach for the Indian stock market. The return was dissected into primary and secondary categories to better understand the behavior of the Indian IPO returns and analyze their significance. The following three categories of returns were calculated to reach the final performance analysis.

### *Raw Return*

Under raw return, the primary return was calculated by taking the excess of the first-day listing price (open) over the offer price of the IPO and then dividing the difference by the offer price. This returns the primary market return as referred to as PRIM in the formula below:

$$PRIM = \frac{LP(O) - IP}{IP}$$

where,

$PRIM$ = primary market return,

$LP(O)$ = listing price (open), and

$IP$ = issue price/offer price.

Furthermore, the excess of the first-day listing price (close) over the first-day listing price (open) was calculated and divided by the first-day listing price (open) to calculate the secondary market return, as referred to SECON in the formula below:

$$SECON = \frac{LP(C) - LP(O)}{LP(O)}$$

where,

$SECON$ = secondary market return,

$LP(C)$ = listing price (close), and

$LP(O)$ = listing price (open).

Finally, the primary and secondary market returns were clubbed together to find out the overall return by taking the excess of the first-day listing price (close) over the offer price and dividing it by the offer price, thus resulting in a total return (TR).

$$TR = \frac{LP\,(C) - IP}{IP}$$

where,

$TR$ = total return,

$LP\,(C)$ = listing price (close), and

$IP$ = issue price/offer price.

### *Market Return*

These raw returns obtained using the formulas given above were adjusted for the market performance by taking Nifty returns over the same period and applying them over the raw returns to adjust them to obtain market-adjusted average returns (MAAR). The NIFTY returns were calculated as follows:

$$M\_PRIM = \frac{M\,(O) - M\,(IP)}{M\,(IP)}$$

where,

$M\_PRIM$ = primary market return for NIFTY index,

$M(O)$ = value of NIFTY index on the day of IPO listing (open), and

$M(IP)$ = value of NIFTY index on the day of IPO issue.

$$M\_SECON = \frac{M\,(C) - M\,(O)}{M\,(O)}$$

where,

$M\_SECON$ = secondary market return for NIFTY index,

$M$(C) = value of NIFTY index on the day of IPO listing (close), and

$M(O)$ = value of NIFTY index on the day of IPO listing (open).

$$M\_TR = \frac{M\,(C) - M\,(IP)}{M\,(IP)}$$

where,

$M\_TR$ = total market return for NIFTY index,

$M\,(C)$ = value of NIFTY index on the day of IPO listing (close), and

$M(IP)$ = value of NIFTY index on the day of IPO issue.

### *Market-Adjusted Average Return*

Finally, the raw returns were adjusted for market returns to obtain market-adjusted average returns for all the

sample IPOs taken and were categorically bifurcated between primary MAAR, secondary MAAR, and total MAAR as follows:

$$MAAR\,(PRIM) = \left[\frac{1 + PRIM}{1 + M\_PRIM} - 1\right] * 100$$

where,

*MAAR* (*PRIM*) = primary market-adjusted average returns,

*PRIM* = primary market return, and

*M_PRIM* = primary market return for NIFTY index.

$$MAAR\,(SECON) = \left[\frac{1 + SECON}{1 + M\_SECON} - 1\right] * 100$$

where,

*MAAR* (*SECON*) = secondary market-adjusted average returns,

*SECON* = secondary market return, and

*M_SECON* = secondary market return for NIFTY index.

$$MAAR\,(TR) = \left[\frac{1 + TR}{1 + M\_TR} - 1\right] * 100$$

where,

*MAAR* (*TR*) = total market-adjusted average returns,

*TR* = total return, and

*M_TR* = total market return for the NIFTY index.

The results obtained from the above methodology are supported with the *t*-statistics to report the significance of the performance of the IPOs as compared to market fluctuation.

### *Industry Classification*

To perform a sectoral analysis of the sample IPOs, we categorized them into 11 different industry divisions using the Global Industry Classification Standard (GICS) criteria. GICS is a hierarchical system that classifies companies into 11 broad sectors, including consumer staples, energy, financials, communication, healthcare, industrials, IT, material, real estate, consumer discretionary, and utilities. It was developed by MSCI and S&P Dow Jones Indices in 1999 to capture the depth and evolution of industry sectors. The industrial returns of the IPOs have been further divided into primary, secondary, and total returns to better analyze their industry-wise performance and understand the patterns.

These sectors have been further categorized into 24 industry groups and further into 69 industries as per the

**Table 1.** ***Industry Classification***

| Industry (GICS) | Number of IPOs |
|---|---|
| Communication | 17 |
| Consumer Discretionary | 42 |
| Consumer Staples | 22 |
| Energy | 8 |
| Financials | 38 |
| Healthcare | 28 |
| Industrials | 63 |
| IT | 15 |
| Material | 22 |
| Real Estate | 12 |
| Utilities | 13 |
| **Total** | **280** |

company's principal activity of the business. As shown in Table 1, the maximum IPOs that got listed during 2009–2020 belong to the "industrials" category, followed by "consumer discretionary." However, only eight IPOs belong to the "energy" sector. The above sectoral bifurcation has helped in understanding the performance in a better way.

Table 2 gives a small summary of the average issue price and the age of the IPOs belonging to 11 different categories as per the GICS criteria. An overview of the aforementioned information reveals that, on an average, a company launched its IPO after 15 years of its incorporation during the sample period of 2009–2020. In other words, the time taken by most firms to launch their IPOs and become public is 15 years, irrespective of the industry they belonged to. Moreover, the average price of an IPO has been somewhere between INR 200 and INR 400 at the

**Table 2.** ***IPO Count, Average Issue Price, and Average Age***

| Row Labels | Count of IPO | Average of Price Issue | Average of Age (Years) |
|---|---|---|---|
| Communication | 17 | 248 | 15.24 |
| Consumer Discretionary | 42 | 311 | 21.93 |
| Consumer Staples | 22 | 295 | 18.41 |
| Energy | 8 | 337 | 21.25 |
| Financials | 38 | 388 | 29.45 |
| Healthcare | 28 | 386 | 17.04 |
| Industrials | 63 | 335 | 21.73 |
| IT | 15 | 248 | 14.40 |
| Material | 22 | 176 | 22.73 |
| Real estate | 12 | 226 | 18.08 |
| Utilities | 13 | 342 | 20.31 |
| **Grand total** | **280** | **314** | **21.13** |

**Table 3.** ***Number of IPOs from 2009 – 2020***

| Year of Listing | Number of IPOs |
|---|---|
| 2009 | 20 |
| 2010 | 65 |
| 2011 | 37 |
| 2012 | 11 |
| 2013 | 3 |
| 2014 | 5 |
| 2015 | 21 |
| 2016 | 26 |
| 2017 | 37 |
| 2018 | 24 |
| 2019 | 17 |
| 2020 | 14 |
| **Grand total** | **280** |

time of issue, with the highest average being that of the "financials" sector. The average issue price of the "financial" sector has been INR 388, being the highest among all. On the other hand, the "industrials" category shows the lowest average price of INR 176.

### *Year-on-Year Analysis*

To analyze the performance of IPOs on an annual basis, the returns have been calculated individually for every year, post-2008 U.S. Financial Crisis, that is, starting from 2009–2020. According to Table 3, the calendar year in which the maximum number of IPOs got listed on the Indian stock exchange is 2010, post which there seems to be a fall in the number of issues. The IPO market again picked up in 2015 post the NDA government came into power. However, the initial years of COVID-19 again faced a decline, the number falling to 14 in 2020.

## Analysis and Results

Table 4 lists the market-adjusted average returns for all 280 sample companies, subdivided into primary, secondary, and total returns. Furthermore, a sectoral and year-on-year analysis has also been conducted on the sample data, as follows:

The short-run performance of a total of 280 companies, which came out with an IPO during 2009–2020, has been analyzed to understand the listing day returns subdivided as primary, secondary, and total returns. Primary returns show the market-adjusted average returns of all IPOs from the issue date till the listing date (open), the secondary returns being an indicator of returns during the day of listing (open and close); whereas, the total returns reflect the returns from issue date till listing (close). Firstly, the raw returns are derived, which are then adjusted using the NIFTY index returns (market returns). These returns are individually analyzed so that a better picture of the initial performance of IPOs over the last decade can be gauged.

**Table 4.** ***Results of Sectoral Analysis and Year-on-Year Analysis***

| Sample Classification | *N* | Primary | | Secondary | | Total | |
|---|---|---|---|---|---|---|---|
| | | MAAR | *t*-Stat | MAAR | *t*-Stat | MAAR | *t*-Stat |
| All sample companies | 280 | 13.368 | 6.86*** | 2.252 | 1.58 | 15.313 | 6.43*** |
| **By Industry** | | | | | | | |
| Communication | 17 | **29.31** | 1.98* | **–3.47** | –1.21** | **28.61** | 1.40** |
| Consumer Discretionary | 42 | **6.74** | 2.18** | **3.35** | 1.54 | **10.88** | 2.43** |
| Consumer Staples | 22 | **10.87** | 1.83* | **4.02** | 0.81 | **16.70** | 1.77* |
| Energy | 8 | **8.78** | 2.52** | **5.61** | 0.58 | **14.01** | 1.57 |
| Financials | 38 | **13.34** | 3.71*** | **–1.97** | –0.78 | **11.28** | 2.49** |
| Healthcare | 28 | **7.32** | 2.74** | **2.37** | 0.35 | **9.37** | 1.4 |
| Industrials | 63 | **13.69** | 4.35*** | **4.23** | 1.89* | **18.34** | 4.50*** |
| IT | 15 | **10.48** | 1.43 | **4.28** | 0.34 | **18.34** | 1.03 |
| Material | 22 | **36.89** | 2.49** | **–9.51** | –1.66 | **16.16** | 1.69 |
| Real Estate | 12 | **0.40** | 0.14 | **10.62** | 1.64 | **12.26** | 1.32 |
| Utilities | 13 | **8.00** | 1.4 | **13.47** | 1.89* | **21.16** | 2.70** |
| **By Listing Year** | | | | | | | |
| 2009 | 20 | **4.620** | 2.12** | **6.003** | 0.88 | **10.879** | 1.43 |
| 2010 | 65 | **16.614** | 2.78*** | **0.531** | 0.19 | **15.184** | 2.43** |
| 2011 | 37 | **2.104** | 1.36 | **8.480** | 0.99 | **10.883** | 1.25 |
| 2012 | 11 | **5.909** | 1.4 | **–1.224** | –0.81 | **4.466** | 1.13 |
| 2013 | 3 | **4.003** | 0.72 | **0.238** | 0.09 | **4.392** | 0.59 |
| 2014 | 5 | **31.592** | 2.19* | **–2.752** | –0.9 | **27.753** | 1.98 |
| 2015 | 21 | **8.741** | 2.59** | **1.634** | 0.82 | **10.564** | 2.55** |
| 2016 | 26 | **11.927** | 3.70*** | **0.651** | 0.34 | **12.663** | 3.35*** |
| 2017 | 37 | **21.395** | 3.65*** | **0.778** | 0.68 | **22.469** | 3.56*** |
| 2018 | 24 | **5.445** | 1.25 | **2.051** | 1.7 | **7.484** | 1.42 |
| 2019 | 17 | **–14.164** | –2.02* | **–2.791** | –2.05** | **–17.951** | –2.13** |
| 2020 | 14 | **42.934** | 3.47*** | **0.853** | 0.26 | **43.728** | 3.33*** |

***Notes.*** ***Significant at 1%, **Significant at 5%, and *Significant at 10%.

### *Analysis 1 : Primary Market Analysis (PRIM)*

### *Overall Analysis*

According to Table 4, the results obtained reflect an overall primary return of 13.37% on average. This indicates that, on average, the IPOs listed from 2009 – 2020 have been underpriced to the level of 13.37% as per the primary performance on listing day. The results are highly significant at 10%, 5%, and 1% levels of significance. Underpricing in the primary market is in tandem with the results of other studies conducted, such as that of the U.S. by Bradley et al. (2009) and of Australia by Perera and Kulendran (2014) and Ferdous et al. (2021). However, the level of primary market underpricing in India is comparatively lower at 13.37% as against 27.5% in the U.S., 25.47% (2006–2011), and 20.7% (2011–2015) in Australia, according to the results of studies quoted above.

### *Sectoral Analysis (as per GICS Criteria)*

As previously mentioned, GICS can group businesses into 11 broad sectors. The analysis of this study shows that out of a total of 280 companies taken from 2009–2020, 12 belong to the "real estate" category, which has shown the least primary market underpricing at 0.40%, although not significant. On the other hand, the "materials" industry has given a maximum primary market return of 36.89%, significant at 10% and 5% levels of significance. The industry that has got the lowest number of companies belonging to it is the "energy" sector. This category has a total of eight companies in it; however, the primary market returns are positive at 8.78%. The "industrials" sector, with 68 companies falling in the category, has been underpriced at 13.69% as per the primary market. Overall, one can notice that throughout the study, all sectors have shown significant underpricing.

### *Year-on-Year Analysis*

To conduct a year-on-year analysis, market-adjusted average returns have been calculated individually for every year beginning from 2009 – 2020 and subdivided into primary, secondary, and total returns on the day of listing. As far as the primary market returns are concerned, except for 2019, when IPOs have shown significant overpricing such that the listing day primary returns have resulted to be negative to the extent of 14.16%, all other years have shown significant underpricing in the primary market. The year 2020 has the highest listing day returns, to the extent of 42.93%. These results are highly significant at a 1% level of significance. After 2019, during the COVID-19 global outbreak lockdown, the country's young encountered a sharp increase in financial literacy, and they started making disciplined market investments. Due to the high subscription rate of IPOs and euphoria among the youth to invest, there seem to be drastic listing day returns in IPOs issued in 2020. The underpricing was significantly high at 31.59% in 2014, when only five IPOs were listed on the stock exchange. Yet, in 2010, the year in which maximum IPOs were listed, the underpricing was at a level of 16.61%. Overall, one can observe an increasing trend in the level of primary market underpricing over the years.

### *Analysis 2 : Secondary Market Analysis (SECON)*

### *Overall Analysis*

A marginal increase of 1.58% during the listing day reflects a positive sentiment for the IPOs on average during the first day of getting listed. In other words, from the time an IPO is listed, on the very first day of trading, till the time trading for that day closes, returns are positively increasing by approximately 1.6% throughout 2009–2020. It can be concluded that the Indian IPOs have been reported to be further underpriced in the secondary market by 1.58%. These findings agree with the research conducted by Bradley et al. (2009). However, an Australian study reported the opposite. According to the studies by Perera and Kulendran (2014) and Ferdous et al. (2021), the secondary market flipped the returns of the IPOs that showed positive returns in the primary market. One probable reason reported by them is the selling pressure put in by the fly-by investors who sell their holdings post realizing the underpricing premium. The case is the opposite in the case of India; there has been an upsurge in underpricing in the secondary markets.

### *Sectoral Analysis (As per GICS Criteria)*

During the secondary market, it is observed that three industries, namely "communication," "financials," and "material," have shown negative returns during the secondary market. It means that in the case of these industries,

the returns have been flipped, and underpricing has got reduced during the day of listing, that is, in the secondary market. A drastic reduction in underpricing has been found in the "material" industry to the extent of 9.51%, and the lowest reduction in underpricing of around 1.97% has been observed in the "financials" sector.

Rest all other industries have increased underpricing during the secondary market. The utility industry has experienced the highest increase during the secondary market, amounting to 13.47% overall. Another interesting observation in the results of the secondary market is that in the case of the "real estate" industry, the underpricing has increased by 10.62% during the listing day such that a very nominal listing gain of 0.40% at the beginning of the listing day has turned out to be substantial toward the end of the day.

### *Year-on-Year Analysis*

In 2012, 2014, and 2019, the secondary market reflects overpricing to the extent of 1.2%, 2.7%, and 2.8%, respectively. The results show negative returns for these 3 years during 2009–2020. All other years have shown positive returns in the secondary market, the highest being in 2009 and 2011. It reflects that underpricing has increased during the secondary market in most of the years. Overall, one can observe and conclude from Table 4 that underpricing is on a decreasing trend in the secondary market.

### *Analysis 3 : Total Returns (TR)*

### *Overall Analysis*

By the end of the listing day, the total market returns show an overall underpricing of 280 IPOs issued during 2009–2020, to be around 15.31%. The underpricing has been found to increase in the secondary market, quite opposite to the results of the previous study done in Australia, as mentioned above. As a result of the increase in underpricing, the overall returns have reached 15.31% from 13.37% toward the end of the listing day. And these results are found to be highly significant at a 1% level of significance.

### *Sectoral Analysis (As per GICS Criteria)*

Comparing the total returns across various industries, it can be observed that the highest level of underpricing toward the end of the listing day has been shown in the "communication" industry, where the total return comes out to be 28.61% over 12 years. However, the lowest returns have been observed in the "healthcare" sector, which signifies the least underpricing. Due to extreme selling pressure in the "material" industry, the initial returns have been substantially reduced to 16.16% from 36.89% in the primary market.

### *Year-on-Year Analysis*

Akin to primary market returns, the total returns also reflect overpricing in 2019 and underpricing in all other years taken in the study. The highest underpricing was observed in 2020 to the extent of 43.73% ; whereas, the lowest underpricing was observed in 2013 to the extent of 4.4%. Overall, the results reported above show an increasing trend in underpricing.

### *Regression Analysis*

The short-run performance of the IPOs has been further analyzed by regressing the market-adjusted abnormal

returns (MAAR) with all the 11 industry dummies as independent variables, taking the issue characteristics as control variables. This analysis has been conducted using primary, secondary, and total market returns as dependent variables in three different models. The independent variables used for all three analyses have been defined as follows:

### *Issue Characteristics*

- **Age :** The age of the company from the time of incorporation to the time when the IPO has been listed (in years).
- **Issue Size :** The amount of capital raised through the issue of IPO (in crores).
- **Subscription (QIB) :** The number (in multiple) that qualified institutional buyers have subscribed to.
- **Subscription (NII) :** The number (in multiple) that non-institutional investors have subscribed to.
- **Subscription (RII) :** The number (in multiple) retail individual investors have subscribed to.
- **Price Issue :** The price at which the IPO has been issued to the public.

***I1* :** Dummy of the communication industry.

***I2* :** Dummy of the consumer discretionary.

***I3* :** Dummy of the consumer staples.

***I4* :** Dummy of the energy industry.

***I5* :** Dummy of the financials industry.

***I6* :** Dummy of the healthcare industry.

***I7* :** Dummy of industrials.

***I8* :** Dummy of the IT industry.

***I9* :** Dummy of the material industry.

***I10* :** Dummy of the real estate industry.

***I11* :** Dummy of the utility industry.

The dependent variables used to study the relationship in the three models are as follows:

- **MAAR (PRIM) :** Market-adjusted average returns on the main market expressed as a logarithmic value.
- **MAAR (SECON) :** Market-adjusted average returns on the secondary market expressed as a logarithmic value.
- **MAAR (TR) :** Market-adjusted average returns on the overall market expressed as a logarithmic value.

To test the impact of various industries on the underpricing of IPOs and to study their relationship, linear regression has been conducted after testing the assumptions of regression and normalizing the entire data using PYTHON software. Due to normalization, variation in the units of measurement has been smoothed out, and the entire data have been converted into values between 0 and 1. The dummy variables, however, are already in binary

units. The results obtained, after regressing the three returns (individually) with all the independent variables, have been explained in the following paragraphs :

The regression results confirm the model's viability for the "primary returns" and "total returns" categories because the *F* - statistics are highly significant at a 1% significance level. This shows that the model best matches the data, which can be used to investigate the causal relationship between various uncorrelated variables on the primary and cumulative returns. However, as shown in Table 5, the secondary returns do not show a significant value of the overall model.

**Table 5.** ***Regression Results***

| Variables | Panel A | Panel B | Panel C |
|---|---|---|---|
| Constant | **0.167** | **0.327** | **0.176** |
| | **(12.135)*** ** | **(17.378)*** ** | **(11.552)*** ** |
| Age (years) | –0.077 | –0.034 | **–0.085** |
| | (–1.463) | (–0.522) | **(–1.509)*** |
| Issue size (in crores) | 0.023 | –0.024 | 0.002 |
| | (0.420) | (–0.352) | (0.026) |
| Subscription QIB | **0.19** | 0.097 | 0.251 |
| | **(2.261)** ** | (0.942) | (2.805) |
| Subscription NII | **0.194** | –0.136 | 0.025 |
| | **(1.960)*** | (–1.114) | (0.233) |
| Subscription RII | **0.292** | 0.071 | **0.325** |
| | **(4.037)*** ** | (0.801) | **(4.207)*** ** |
| Price issue | –0.027 | 0.037 | 0.007 |
| | (–0.468) | (0.509) | (0.115) |
| *I1* (Communication) | –0.002 | 0.064 | 0.04 |
| | (–0.028) | (0.924) | (0.670) |
| *I2* (Consumer Discretionary) | 0.082 | 0.018 | 0.094 |
| | (1.338) | (0.239) | (1.433) |
| *I3* (Consumer Staples) | 0.047 | –0.065 | –0.073 |
| | (0.803) | (–0.900) | (–1.172) |
| *I4* (Energy) | –0.033 | 0.004 | –0.013 |
| | (–0.622) | (0.055) | (–0.226) |
| *I5* (Financials) | –0.018 | 0.125 | 0.062 |
| | (–0.276) | (1.595) | (0.911) |
| *I6* (Healthcare) | 0.041 | –0.005 | 0.031 |
| | (0.712) | (–0.067) | (0.499) |
| *I7* (Industrials) | Excluded | Excluded | Excluded |
| *I8* (IT) | –0.002 | 0.012 | 0.005 |
| | (–0.043) | (0.181) | (0.090) |
| *I9* (Material) | –0.019 | 0.024 | 0.003 |
| | (–0.343) | (0.352) | (0.053) |
| *I10* (Real Estate) | –0.006 | 0 | –0.007 |
| | (–0.105) | (–0.004) | (–0.132) |

| | | | |
|---|---|---|---|
| *I11* (Utilities) | 0.037 | –0.001 | 0.02 |
| | (0.658) | (–0.17) | (0.343) |
| | **Model Summary** | | |
| *R*-square | 0.36 | 0.03 | 0.272 |
| Adjusted *R* Square | 0.321 | –0.029 | 0.227 |
| Durbin–Watson test | **1.958** | **1.703** | **1.704** |
| *F* statistics | **9.254*** ** | 0.509 | **6.127*** ** |

***Notes.*** ***Significant at 1%, **Significant at 5%, and *Significant at 10%.

Moreover, the adjusted $R^2$ value of the three models is low as compared to the desired value, with the explanatory percentage being approximately 30% in all three cases. According to Perera and Kulendran (2014), a low $R^2$ value does not lead to the conclusion of the model being misspecified but can be accepted if the goal is to study a theory and not go into forecasting. The findings are similar to those of studies conducted by Ferdous et al. (2021), Dimovski and Brooks (2004), Perera (2015), and Perera and Kulendran (2012), where again, such a model gave a low adjusted $R^2$ value when industry dummies were taken. In all three cases, the Durbin-Watson test returned a value less than 2, confirming that there is no auto-correlation among the independent variables.

Apart from subscription rate by QIBs, NIIs and RIIs, and age of the firm, none of the other explanatory variables show a significant relationship with the three returns of the IPOs, although one can observe that the sign of relationship reversed in most industries while secondary and total returns were calculated. The significant positive relationship between the subscription rate by QIB investors and the market-adjusted returns is in contrast with the study conducted by Singh and Kalra (2020), where the relationship between investment by QIBs and market returns was found to be negative. This shows that the higher subscription by QIBs may not necessarily mean lower underpricing.

The relationship between different explicating factors and the three dependent variables MAAR(PRIM), MAAR(SECON), and MAAR(TR) is explained as follows:

- **Age :** For age, all three returns show a negative value, thus confirming the inverse relationship between age and underpricing. As a result, we can conclude that a firm with more age tends to have lesser underpricing on the first day of listing due to better experience and knowledge of the pricing of the IPO.

- **Issue Size :** As far as issue size is concerned, the relationship with the secondary market returns is found to be negative; whereas, the primary and total market returns show a positive relationship with the size of the issue of an IPO. The higher the issue's size, the higher the primary and total returns on the first day of listing; however, there may be lower returns during the day of listing for bumper IPOs.

- **Subscription Structure :** Instead of taking one overall subscription rate, the rates have been bifurcated between the subscription by qualified institutional buyers, retail institutional investors, and non-institutional investors (Singh & Kalra, 2020). The regression results show a positive relationship between the subscription rate and underpricing, the results of the primary market being highly significant. Although only the NII subscription rate seems to have a negative relationship with MAAR in the secondary market, thus reflecting an inverse relationship between subscription by NIIs and underpricing. Also, the positive relationship between subscription rate by RII and underpricing is highly significant, indicating oversubscription by retail investors is a strong indicator of high returns on listing day.

↳ **Price Issue :** A negative relationship between the issue price and listing day returns indicates that if the issue price of the firm coming out with an IPO is high, the returns will be low. However, this is not the case in the secondary and total returns market.

### *Industry Analysis*

Table 5 shows a negative relationship between communication, energy, financial, IT, material, and real estate industries and underpricing in the primary market. On the other hand, consumer discretionary, consumer staples, healthcare, and utility industries show a direct relationship with underpricing of IPOs in the primary market. Although the *t*-statistics are insignificant, the sign reverses in the case of the communication, energy, financials, IT, and materials industries in the secondary market. It means that the underpricing increases for these industries on the day of listing. On the other hand, in the case of consumer staples, healthcare, and utilities, the market returns decrease during the listing day, that is, in the secondary market.

As far as the total returns are concerned, only three industries, namely consumer staples, energy, and real estate, seem to have a negative relationship with the adjusted returns, the rest of all other industries directly impacting underpricing. But due to the insignificant relationship between the industries and the three return measures, it can be concluded that the industries, bifurcated as per the GICS criteria, do not play a major role in determining the initial returns of IPOs in India as neither of them gave significant results.

## Conclusion

A thorough analysis of the listing day returns of the IPOs from 2009 – 2020 has been conducted by segregating the initial returns, traditionally calculated to gauge the "underpricing anomaly," into primary market returns and secondary market returns. The raw returns, having adjusted by the market returns, with NIFTY as the base index, indicated underpricing in the Indian market to the extent of 13.37%, which further increased during the listing day by 1.58% as against previous research conducted by Ferdous et al. (2021) and Perera and Kulendran (2014). The total returns thus reflect an overall underpricing rate of 15.31% from 2009 – 2020.

According to the year-over-year analysis, underpricing is increasing in both the initial and overall markets, but it has been found that it is declining in the secondary market, with "selling pressure by fly-by investors" being the most likely cause. The highest returns were found to be present in the IPOs of 2020 when the lockdown due to the COVID-19 pandemic resulted in a drastic increase in the subscription rate of IPOs due to better awareness and knowledge among youngsters. Thus, H01 and H02 have been rejected.

Having observed the trends in returns and subscriptions of IPOs, 2020 can be termed a year of euphoria in the capital market. The sectoral analysis reflected an overall increasing trend in underpricing throughout the study, with the healthcare sector facing the lowest total returns. The materials industry saw a 20% reduction in underpricing during the day of listing, returning to MAAR of 16.16% toward the end of the listing day. Overall, the impact of subscription rates by QIBs, NIIs, and RIIs is the most influential factor in determining the overall returns of IPOs, the results coinciding with the results of Singh and Kalra (2020). This research adds value to the existing literature by adding a different angle to study the initial returns in a more comprehensive and detailed way through bifurcation between primary and secondary returns.

## Managerial and Theoretical Implications

The following potential managerial and theoretical implications have been identified:

**(1)** Managers of companies planning to go public should focus on increasing their subscription rates to improve the short-run performance of their IPOs. This can be achieved by providing credible, accurate, and adequate information to potential shareholders and encouraging their active participation.

**(2)** Investors should take into account the underpricing anomaly in IPOs while making investment decisions. This can help them make informed decisions and minimize their risks.

**(3)** The findings of the study suggest that subscription rate is a major determinant of short-run IPO performance. Hence, managers should focus on attracting quality institutional investors, QIBs, NIIs, and RIIs, to improve their IPO's overall returns.

**(4)** The study highlights the need for companies to provide accurate and transparent information to potential investors. This can help in reducing the level of underpricing and increase investors' confidence in the IPO.

**(5)** The sectoral analysis conducted in the study can help managers and investors in understanding the IPO behavior of different industries on the first day of trading. This can help them make informed investment decisions and improve the overall performance of the IPO.

**(6)** The study adds to the existing literature on IPOs by providing a different angle to study the initial returns in a more comprehensive and detailed way through the bifurcation between primary and secondary returns. This can help in developing more accurate models for predicting IPO performance.

**(7)** The study has identified the limitations of the research and suggests future scope for more comprehensive research. This can help identify the impact of qualitative factors such as corporate governance and management quality on IPO returns and develop a more thorough outlook on IPO success.

Overall, the study provides valuable insights for managers and investors in the IPO market, highlighting the need for accurate and transparent information, the importance of subscription rates, and the need to consider sectoral differences in IPO behavior. It also suggests future research to expand the scope of understanding IPO returns and their determinants.

## Limitations of the Study and Suggestions for Future Research

The study has some limitations that need to be considered while interpreting its findings. Firstly, the study's time frame is limited to the period between 2009 and 2020, which may not accurately reflect the current market conditions. Secondly, the analysis focuses only on the Indian IPO market and may not be generalizable to other countries. Thirdly, the study solely examines initial returns and does not provide any insight into the long-term returns of IPOs. Finally, the study does not consider the impact of qualitative factors such as corporate governance and management quality on IPO returns.

The study's future scope could be expanded by including long-term returns analysis to provide a more thorough outlook on IPO success. One could also contrast Indian IPOs with those from other nations to understand cross-country differences in underpricing. Additional research could be done to determine the impact of qualitative elements like corporate governance and managerial caliber on IPO returns. The research can also include other securities like bonds and mutual funds to provide a more comprehensive review of capital market performance.

## Authors' Contribution

Prof. Amit Kumar Singh developed the concept and qualitative and quantitative designs to conduct the empirical study. Shivani Kalra extracted reputable research papers from various sources, filtered them using keywords, and created concepts and codes that were pertinent to the study's design. Prof. Kawal Gill confirmed the analytical techniques. Shivani Kalra did the numerical calculations before writing the manuscript in collaboration with the other two authors.

## Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.


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