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Pricing and performance of IPOs: Evidence from Indian stock market

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Abstract: This study examines listing day performance of IPOs, book-built and fixed-price IPOs, post-listing aftermarket performance of IPOs, book-built and fixed-price IPOs in the Indian stock market. We examine pricing as well as long run performance of 464 (365 book-built IPOs and 99 fixed-price IPOs) Indian IPOs that went public between 2001 and 2011. The study covers 15 years from the financial year 2001 to 2015. Analysis of the results reveals that compared to fixed-price IPOs, book-built IPOs are underpriced by lesser magnitude. Moreover, book-built IPOs are associated with negative cumulative average abnormal returns (CAARs) up to five years and beyond, the negative CAARs associated with fixed-price IPOs turn positive after one and one-half year and continue to be positive thereafter.

Subjects: Corporate Finance; Credit & Credit Institutions; Investment & Securities

Keywords: IPOs; underpricing; underperformance; book-building; fixed-price IPO

JEL classifications: G10; G12; G32

1. Introduction

There have been two major anomalies concerning IPO literature worldwide—listing day underpricing and post-listing underperformance in the medium to long run. Closing price on the listing day for IPOs has been much higher than the issue price which is termed as "underpricing" of IPOs. When the

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PUBLIC INTEREST STATEMENT

Initial public offering (IPO) is the process by which a firm sells its equity shares to the public for the first time. One of the challenges for the investors is to evaluate the pricing of the IPOs because IPO firms do not have historical price information. Various theories have been developed by the researchers from time to time explaining why the offering price of IPOs is set well below the first day trading price. Contrary to underpricing, the same IPOs underperform their benchmark in the long run. This paper studies these two anomalies in the Indian context by taking a sample of 464 IPOs that have come to the market during 2001–2011. In studying the listing day performance, four different prices—opening, high, low and closing on the first trading day are used. The three-year and five-year performances have been negative and significant for the whole sample and for book-built issues, while they are positive and significant for fixed-price issues.

returns of these IPOs are calculated for one, three or five years (starting from the closing price on the listing day), the market-adjusted returns have been significantly negative. Loughran and Ritter (2002) in their study report that for the period of 1990–1998, companies that went public in the US accounted for underpricing to the tune of US $27 billion. Had these shares been issued at the closing market price on the listing day, (instead of the original issue price), the total issue proceeds would have been higher by an amount equal to the amount of underpricing. This huge amount of underpricing was twice as large as the US $13 billion fees paid to the investment bankers. They also noted that the average IPO in their study accounted for underpricing of US $9.1 million. Ritter (1991) finds that firms that went public in the US during the period 1975–1984 have significantly underperformed in the long run. By comparing these "IPO firms" with "firms matched by size and industry", from the closing price on the listing day to their three-year anniversaries, study showed that IPO firms underperformed their matching firms by 29%. The ratio of the terminal wealth of IPO firms to that of matching firms were only 0.831with a numerator of $1.3447 for IPO firms and a denominator of $1.6186 for seasoned firms.

Indian market need to be studied because of the strides it has made in the post-liberalisation period. Many reforms were introduced by the Securities and Exchange Board of India (SEBI) to ensure transparency in the Indian stock market. These reform measures include dematerialisation, demutualisation of stock exchanges, electronic trading system, shorter trading cycles, rolling settlement, circuit filters, derivatives trading, credit rating, IPO grading, lock-in period for promoter holding, price–volume tracking in the trading system, time bound application and allotment of securities, buy-back of shares, mandatory disclosure of securities pledged by promoters with banks for raising loan and book-building process for IPOs. These reforms have transformed Indian stock market and attracted the capital from foreign institutional investors (FIIs) by way of direct investment and portfolio investment. India has national as well as regional stock exchanges but the trading volume is restricted to two prominent exchanges, The Bombay Stock Exchange (BSE) and the National Stock Exchange of India limited (NSE). The total market capitalisation of BSE is around Rs.1,44,90,494 crores as of 17 November 2017. Out of 5,567 companies listed on BSE, 5,146 companies have shares listed on the equity segment. However, about 2,924 companies are traded on the market with 22,70,86,007 orders being placed by the investors. BSE has introduced a number of stock market indices to track the market movement. The prominent among them are the S&P BSE Sensex, S&P BSE Sensex 50, S&P BSE-100, S&P BSE-200, S&P BSE mid-cap, S&P BSE small-cap. Apart from these general indices, there are also sectoral indices. NSE is relatively younger exchange but has captured the market share of the daily volumes both on cash and derivatives segment. Trading mechanism on both these stock exchanges in India is based on an open electronic limit order book where order matching is done by the trading computer. The entire process is order driven where orders placed by investors are matched with the best available limit orders, automatically. This means, both buyers and sellers remain unidentified in the entire process. Such order-driven market ensures more transparency in the entire process. All orders are placed through registered brokers who provide online trading facility to retail investors. However, institutional investors can use Direct Market Access (DMA) option where they can use trading terminals provided by their brokers and place orders directly into the trading system. The settlement cycle for equity spot market is T+2 rolling settlement. With all these features, Indian market presents an interesting scenario to study one of the issues of capital market, the performance of IPOs. While there have been well-documented studies on the western market on the pricing and performance of IPOs, the literature on the Indian market is scanty in this area. Therefore, we examine pricing as well as long run performance of IPOs in Indian stock market.

The present paper is arranged as follows: The first section provides conceptual background of two of the IPO anomalies that are studied in the current paper. The second section discusses briefly the earlier research conducted on these two anomalies. The third section discusses the objectives of the study and the hypotheses to be tested. The fourth section deals with the methodological issues. The fifth section presents the results of the study about both short run and long run performance of IPOs in India. The last section makes concluding remarks and suggestions for future study.

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2. Review of literature

The review of literature has been divided into two parts. First part deals with listing day underpricing and second part deals with long run performance.

2.1. Listing day underpricing

Baron (1982) developed an "information asymmetry theory" in which the investment banker is better informed than the issuer regarding the market conditions and pricing of the issue. The issuer must reward the investment banker for the superior information. Consequently, the decision to set the issue price is delegated to investment banker which is set by him below its true value for his own benefits. However, testing Baron's model Muscarella and Vetsuypens (1989) find that even IPOs of investment banks (self-marketed offerings) are characterised by statistically significant underpricing when compared to other IPOs; thus, contradict the model. Also, Cheung and Krinsky's (1994) study failed to establish lower degree of underpricing for the sample of investment bankers' IPOs. Rock (1986) developed another version of information asymmetry theory in which he claimed underpricing is required because of the information asymmetry between two groups of investors—informed and uninformed. Informed investors subscribe only to "good issues" and they stay away when "bad issues" come to the market. Because of this, the uninformed group gets only bad issues; hence, they stay away from the market. Therefore, to attract even uninformed investors to the market, all the issues are compulsorily underpriced. Using a sample of IPOs listed on Stock Exchange of Singapore, Lee, Taylor, and Walter (1999) showed that large investors (better informed) tend to preferentially request participation in IPOs with higher initial returns which is consistent with Rock's model.

Analysing "hot issue" market of the 1980s in the US (between January 1980 and March 1981), Ritter (1984) documents average initial return of 16.3% for the rest of the 1977–1982 period, as against 48.4% for the hot issue period. Taking a sample of 664 firm commitment and 364 best efforts offers, Ritter (1987) found underpricing of 14.8 and 47.78% for these two sub-groups.

Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) developed "signalling model" explaining why underpricing occurs. According to the model, underpricing is a deliberate action by the issuers to signal the superior quality of the issuing firms. They do so with the hope of recouping this loss by means of charging higher price for follow-on public offerings. Low-quality firms cannot do this because their true picture will be revealed before they approach the market again. Findings of Hameed and Lim (1998) supported the signalling theory, that is, high-quality firms underpriced their IPOs to signal their quality. However, Garfinkel (1993), through reports of underpricing of IPOs, documented that underpricing is not a signal of the quality of the issuing firms. Welch (1992) has developed "herding" theory explaining why IPOs are underpriced. According to the theory, IPOs come to the market sequentially and later potential investors take their decisions by observing the purchasing decisions of earlier investors. The demand for issues is so elastic that even risk-neutral issuers underpriced their issues to avoid failure. Testing both Rock's winner's curse and Welch's herding theory, Amihud, Hauser, and Kirsh (2003) found that underpricing is negatively related to the rate of allocation to uninformed investors which confirms the presence of adverse selection. Also, investors either subscribe overwhelmingly or largely abstain from new issues which confirm the herding effect.

Affleck-Graves, Hegde, Miller, and Reilly (1993) found that in the US NYSE listed IPOs, on an average, are underpriced by 4.82% while AMEX listed IPOs are underpriced by 2.16%. Testing the "lawsuit avoidance" theory of IPO underpricing, Lowry and Shu (2002) documented that firms which have greater legal exposure are likely to underprice their issues by a significantly larger amount. However, Drake and Vetsuypens (1993) found that IPOs that were sued for mis-statements in the IPO prospectus or registration statement in the US were not overpriced; in fact, were underpriced as other IPOs of similar size. Michaely and Shaw (1994) attributed underpricing to the presence of information asymmetries between informed and uninformed investors; thus, support the information asymmetry theory. However, the study found little support for signalling theory. Firms with greater

underpricing are associated with weaker future earnings performance, fewer and smaller dividend initiations, and less frequent trips to the capital market.

Dewenter and Malatesta (1997) found that IPOs of state-owned companies in the UK are significantly more underpriced than their private sector counterparts, while in the case of Canada and Malaysia the opposite is true. Examining why managers do not sell any of their own shares in an IPO, but wait until the end of the lockup period, Aggarwal, Krigman, and Womack (2002) found that firms with greater underpricing receive significantly more recommendations from the research analysts in the months which are closer to the lockup expiration than do firms with less underpricing. Ljungqvist and Wilhelm (2002) found that initial returns (underpricing) are directly related to information production and inversely related to institutional allocations. In their prospect theory, Loughran and Ritter (2002) found that IPOs that are underpriced are usually those where the issue price and the initial market price are higher than what was initially expected.

Examining the pricing of US IPOs by foreign firms that are already seasoned in their home countries, Burch and Fauver (2003) found that these IPOs are underpriced (on an average) experiencing a first day return of 12.7%. Demers and Lewellen (2003) examined the impact of IPO underpricing on the website traffic of internet companies and found that underpricing is positively associated with post-issue growth in web-traffic for the IPO companies. In their comparative analysis of the pricing and aftermarket performance of IPOs by ADRs and a matching sample of US firms, Ejara and Ghosh (2004) found that ADR IPOs are significantly less underpriced than comparable US IPOs. IPOs from developed countries are more underpriced and privatisation of IPOs are less underpriced than non-privatisations. Examining the intraday patterns of IPOs in Hong Kong, Cheng, Cheung, and Po (2004) found that underpricing of IPOs occurs only at the pre-listing market and disappears afterwards i.e. Hong Kong market is efficient in adjusting for IPO underpricing. Cook, Kieschnick, and Ness (2006) found that initial returns (underpricing) are positively correlated with pre-issue publicity for IPOs. Testing the relationship between underpricing and share ownership dispersion in the aftermarket, Hill (2006) found that IPO underpricing did not play a significant role in determining the proportion of block holding in the share ownership structure of the firm, either at the IPO or over the long run.

Lowry and Murphy (2007) found no evidence that firms which go public in the US (with IPO options to their top executives) are underpriced as compared to firms not granting such options. This implies that the top executives of firms with such options do not deliberately set the offer price low to increase the value of these options.

In India, Narasimhan and Ramana (1995) found significant underpricing of Indian IPOs consistent with international observations. Study also revealed that premium issues are underpriced than par issues. Attempting to identify the causal variables responsible for underpricing of Indian IPOs, Chaturvedi, Pandey, and Ghosh (2006) found that the extent of oversubscription of an IPO determines the first day gain; signals that lead to oversubscription are market index during the period of IPO, type and nature of business, foreign collaboration, or the track record of promoters/company. Garg, Arora, and Singla (2008) also documented that Indian IPOs are significantly underpriced and noted that the level of underpricing does not vary much in the hot and cold IPO market. Studying book-built and fixed-price IPOs in India, Bora, Adhikary, and Jha (2012) found underpricing of 21.42% for fixed-price IPOs and 18.22% for book-built IPOs. However, when adjusted for market movement, the corresponding figures are 16.71 and 16.75, respectively. Einar (2015) using a sample of more than 5,000 IPOs, documented significant abnormal returns up towards 5% (excluding Initial Day Returns) during the first months of trading. These abnormal returns are greater and more persistent if general market conditions are strong, supporting a bounded rationality explanation.

2.2. Long run performance

Investigating the long run aftermarket performance of US IPOs from the closing price on the listing day up to 250 trading days (one year), Aggarwal and Rivoli (1990) found that investors who purchased these IPO shares at the closing price on the listing day lose significantly after adjusting for

market movement. Ritter (1991) found that companies that went public in the US between 1975 and 1984 substantially underperformed a sample of matching firms. Loughran (1993) reported that IPOs underperform during the six calendar years after going public. Examining the long run return performance of IPOs in Hong Kong, Mcguinness (1993) found that during the two year (500 trading days) post-listing period, the returns were positive for the first few months of listing; but the trend reversed resulting in a long-term decline in returns with significant negative returns between listing day and the 400th and 500th days of listing.

Levis (1993) documented that IPOs in the UK underperformed different benchmarks 36 months following their listing. Study also reported that the negative return persisted by the fourth and fifth year anniversaries of public listing. Aggarwal, Leal, and Hernandez (1993) reported negative long run performance of IPOs for three of the Latin American countries—Brazil, Chile and Mexico. Loughran and Ritter (1995) showed that companies issuing stock—both IPOs and FPOs—in the US between 1970 and 1990, have given negative long run returns to investors when adjusted using a control sample of non-issuers. Examining the long run performance of German IPOs that went public during the early years of the German reunification, Steib and Mohan (1997) found that these IPOs, on an average, performed poorly in the long run.

Relating the long run growth projections to the long run aftermarket performance of IPOs, Rajan and Servaes (1997) found that firms which initially had superior projected growth substantially underperformed indicating that investors appear to believe the inflated long-term growth projections. Page and Reyneke (1997) reported that IPOs in South Africa listed on Johannesburg Stock Exchange (JSE) significantly underperform a set of comparable firms matched by size and P/E ratio and relevant JSE sector indices. Carter, Dark, and Singh (1998) reported that market-adjusted underperformance of IPOs over the three-year holding period is less severe for IPOs which are handled by more prestigious underwriters. Brav, Geczy, and Gompers (2000) found that underperformance primarily is concentrated among small firms with low book-to-market ratios. Gompers and Lerner (2003) reported underperformance of US IPOs up to five years using event time buy and hold abnormal returns. However, underperformance disappears when cumulative abnormal returns are used. Further, using calendar time analysis, study showed that IPOs return at least as much as the market does over the same period.

Jaskiewicz, González, Menéndez, and Schiereck (2005) reported negative market-adjusted long run performance for German and Spanish IPOs of family-owned businesses. IPOs of non-family businesses (from both countries) performed insignificantly better. A study by Álvarez and González (2005) revealed negative long run abnormal stock returns for Spanish IPOs. This study further revealed positive relationship between five-year performance of IPO stocks on the one hand, and initial underpricing as well as the number of SEOs by the IPO firms between second and fifth year of IPO, on the other. Such a relationship was attributed to the "signaling theory" which states that high-quality firms underpriced their IPOs with the intention of selling more stocks, later. Investigating the impact of R&D activities on the long run performance of IPO shares, Guo, Lev, and Shi (2006) reported that long run underperformance is basically confined to non-R &D IPOs; high R&D IPOs outperform low R&D IPOs which, in turn, outperform non-R&D IPOs in the long run. Contrary to most of the international findings, Ahmad-Zaluki, Campbell, and Goodacre (2007) found significant overperformance of Malaysian IPOs using equally weighted event time CARs and BHRs using two market benchmarks. However, such positive performance was not found to be significant when matched companies are used as the benchmark or when value-weighted scheme is used. Using IPO data from Shanghai Stock Exchange, Cai and Liu (2008) found underperformance for Chinese IPOs which is in line with the existing poor long run performance of IPOs, worldwide.

On the Indian front, Madhusoodanan and Thiripalraju (1997) studied both short run and long run performance of Indian IPOs taking a sample of 1922 IPOs that went public between 1992 and 1995. This study reported underpricing of Indian IPOs consistent with international findings. In the long run, Indian IPOs offered positive returns which contradicted most of the international findings. Using

BHARs and a sample of 438 IPOs that went public between June 1992 and March 2001, Sehgal and Singh (2007) found that the long run returns have been negative between 18 and 40 months of holding while CAAR exhibited the existence of underperformance in the second and third years. Hoechle et al. (2017) by studying a sample of 7,487 US IPOs between 1975 and 2014, showed that mature firms in terms of Carhart-alphas significantly underperformed over two years (with underperformance peaking one year after going public). They applied a "regression-based portfolio sorts approach (RPS)", which allows to decompose the Carhart-alpha into firm-specific characteristics and explain one-year IPO underperformance using a multitude of market and firm characteristics in a statistically robust setting.

3. Objectives and hypotheses

3.1. Objectives of the study
This study analyses both initial pricing and long run performance of IPOs. Therefore, the objectives of the study are:

(1) To ascertain the listing day performance (underpricing) of IPOs in India.
(2) To analyse listing day performance of book-built and fixed-price IPOs, separately.
(3) To ascertain post-listing aftermarket performance of IPOs in India.
(4) To analyse post-listing aftermarket performance of book-built and fixed-price IPOs, separately.

3.2. Hypotheses
The study examines initial and post-listing performance of IPOs. Therefore, the hypotheses being tested are:

(1) The IPOs are not underpriced based on the listing day performance.
(2) Investors cannot earn abnormal returns from IPOs in the post-listing period performance.

4. Methodological issues

4.1. Sample and data
The sample of 464 IPOs (365 book-built IPOs and 99 fixed-price IPOs) that went public from the financial year 2001 to 2011 are selected for the study. The study period covers 15 years from the financial year 2001 to 2015. The sample is restricted to IPOs that are compulsorily listed on Bombay Stock Exchange (BSE). Daily share prices have been taken from the corporate database of CMIE–Prowess.

4.2. Methodology to evaluate initial return or underpricing
Michaely and Shaw (1994), Lowry and Shu (2002), and Lowry and Murphy (2007) have computed underpricing of IPOs from the issue price to the closing price on the listing day as under:

$$\text{IR}_i = \frac{P_{i1} - P_{i0}}{P_{i0}}$$

where IR_i is the IPO subscriber's initial raw return from security i, P_{i1} is the closing price of the IPO scrip on the first day of trading and P_{i0} is the offer/issue price of the IPO scrip. Benchmark-adjusted underpricing or abnormal initial return is computed as the initial raw return from the IPO minus the return on the market index over the same period which is computed as under:

$$\text{AIR}_i = \frac{P_{i1} - P_{i0}}{P_{i0}} - \frac{P_{m1} - P_{m0}}{P_{m0}}$$

where AIR_i is the benchmark-adjusted abnormal initial return from IPO stock i. P_{m1} denotes the closing level of the benchmark index on the listing day of the IPO scrip and P_{m0} is the closing level of the benchmark index on the IPO offering day. In our study, apart from closing price, we also consider opening, high, and low prices (all unadjusted) on the listing day and the contemporaneous market indices to compute underpricing, both raw and market-adjusted. Also, we consider five market indices to compute market-adjusted underpricing—BSE 100, BSE 200, BSE 500, BSE Sensex and S&P CNX Nifty. The average underpricing, both raw and market-adjusted, for the whole sample is computed as under:

$$R_t = \sum_{t=1}^{n} R_{it}/n$$

where, R_t is the average raw/benchmark-adjusted underpricing for the sample of IPO firms, R_{it} is the raw/benchmark-adjusted underpricing of stock i and n is the sample size. To test the significance of average underpricing of the sample, following parametric t-test is employed:

$$t(R_t) = \frac{R_t}{SE(R_t)}$$

where, R_t = The average raw/benchmark-adjusted underpricing for the sample and $SE(R_t)$ = Standard Error of average raw/benchmark-adjusted underpricing and is calculated as under:

$$SE(R_t) = \frac{\sigma(R_t)}{\sqrt{n}}$$

where, $\sigma(R_t)$ = Standard Deviation of average raw/benchmark-adjusted underpricing and n = Number of observations in the sample or sample size.

4.3. Methodology to evaluate post-listing performance

Present study uses cumulative average abnormal return (CAAR) to evaluate the long run performance of IPOs. Excluding the initial return, which is based on the offer price and listing day closing price, daily returns are computed using the adjusted closing price starting from the listing day. The daily raw return for security i, is computed as under:

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}}$$

where, R_{it} is the raw return on security i for day t, P_{it} is the adjusted closing price of security i on day t and P_{it-1} is the adjusted closing price of security i on day $t-1$.

The market return for the same period is computed as under:

$$R_{mt} = \frac{I_t - I_{t-1}}{I_{t-1}}$$

where, R_{mt} is the market returns on day t, I_t is the closing index level on day t and I_{t-1} is the closing index level on day $t-1$.

Daily benchmark-adjusted returns are calculated as daily raw return on the security minus the daily benchmark return for the corresponding day. Using return on BSE 200 as the market return, the benchmark-adjusted return (abnormal return) for stock i on day t is defined as:

$$AR_{it} = R_{it} - R_{mt}$$

where, AR_{it} is the benchmark-adjusted return for stock *i* on day *t*, R_{it} is the raw return for stock *i* on day *t*, and R_{mt} is the return on BSE 200 used as the benchmark return for the same period. The average benchmark-adjusted return (average abnormal return) on a portfolio of *n* stocks for day *t* is the equally weighted arithmetic average of the benchmark-adjusted returns:

$$AAR_t = \frac{1}{n} \sum_{i=1}^{n} AR_{it}$$

where, AAR_t is the average abnormal return (benchmark-adjusted) on a portfolio of *n* stocks for day *t*, *n* is the number of stocks in the portfolio on day *t* and AR_{it} is the benchmark-adjusted abnormal return for stock *i* on day *t*. The cumulative benchmark-adjusted aftermarket performance (cumulative average abnormal return) from day *u* to day *v* is the summation of the average benchmark-adjusted returns or AARs:

$$CAAR_{u,v} = \sum_{t=u}^{v} AAR_t$$

where $CAAR_{u,v}$ is the cumulative average abnormal return or the cumulative benchmark-adjusted aftermarket performance from day *u* to day *v* and AAR_t is the average abnormal return on a portfolio of *n* stocks for day *t*. When a firm in portfolio *p* is delisted from the BSE, the portfolio return for the next day is an equally weighted average of the remaining firms in the portfolio. The cumulative market-adjusted return for various days, thus, involves daily rebalancing of the portfolio with the proceeds of a delisted firm equally allocated among the surviving members of the portfolio *p* for each subsequent day.

4.4. Parametric significance test

In testing the long run performance of IPOs in the aftermarket, the CAAR provides information about the average price behaviour of securities during the post-listing period. If markets are efficient, the AARs and CAARs should be close to zero. Parametric "*t*-test" is used to assess significance of AARs and CAARs. The 5% level of significance with appropriate degree of freedom is used to test the null hypothesis of no significant abnormal returns post-listing. The conclusions are based on the results of *t*-values on AARs and CAARs for the post-listing period. The *t*-test statistics for AAR for each day during the post-listing period is calculated as under:

$$t(AAR_t) = \frac{AAR_t}{SE(AAR_t)}$$

where AAR_t is the average abnormal return on day *t* and $SE(AAR_t)$ is the standard error of average abnormal return on day *t* which is computed as under:

$$SE(AAR_t) = \frac{SD(AAR_t)}{\sqrt{n}}$$

where, $SD(AAR_t)$ is the standard deviation of average abnormal return on day *t* and *n* is the number of stocks in portfolio *p* on day *t*.

The *t*-test statistics for CAAR for each day during the post-listing period is calculated as under:

$$t(CAAR_t) = \frac{CAAR_t}{SE(CAAR_t)}$$

where, $SE(CAAR_t)$ is the standard error of CAAR on day *t* which is computed as under:

$$SE(CAAR_t) = \frac{SD(CAAR_t)}{\sqrt{n}}$$

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SD(CAAR$_t$) is the standard deviation of CAAR on day t which is computed as under:

$$SD(CAAR_t) = SD(AAR_t) * \sqrt{N}$$

where, N is the total number of days for which AAR is cumulated.

5. Analysis of the results of the study
The results of the study are analysed in this section.

5.1. Listing day performance
Table 1 displays the listing day performance of 464 IPOs that went public.

The results presented in Table 1 reveals that listing day gains, when computed using the closing price, varies little over 28%—both raw and market-adjusted. Investors who are lucky enough to sell their allotted shares at the high price on the listing day make a listing day gain which is little over 50%, while investors who sell their allotted shares immediately on listing i.e. at the opening price, make a gain which is in the range of 24–25%. In addition, the investors who sell their shares at the low price on the listing day could make a gain of around 8%. All these measures of underpricing, both raw and market-adjusted, are found to be statistically significant at 1%. One interesting observation about the different measures of underpricing is that there is not much of difference between raw underpricing and market-adjusted underpricing. This is attributed to the fact that post-2000, SEBI has tightened the rules with respect to listing delays and, thus, the market returns between IPO opening and IPO listing becomes insignificant. Such a phenomenon is consistent with Loughran and Ritter (2002) who noted that market movement between issue opening and listing is so small (an average of 0.05% per day) that it will have little impact on the measure of underpricing. Another observation worth mentioning is that the difference between underpricing computed using high price and low price is more than 40%.

Table 1. Listing day performance of 464 IPOs				
Type of return	**Listing day price**			
	Opening price	**High price**	**Low price**	**Closing price**
Average raw return (%)	25.21*** (7.91)	51.21*** (13.30)	8.19*** (3.25)	28.85*** (8.60)
BSE 200-adjusted return (%)	24.88*** (8.07)	50.93*** (13.62)	7.96*** (3.33)	28.65*** (8.88)
BSE 100-adjusted return (%)	24.76*** (8.10)	50.81*** (13.67)	7.85*** (3.31)	28.54*** (8.89)
BSE sensex-adjusted return (%)	24.72*** (7.92)	50.74*** (13.42)	7.78*** (3.20)	28.46*** (8.71)
Nifty-adjusted return (%)	24.63*** (7.89)	50.67*** (13.41)	7.70*** (3.17)	28.40*** (8.70)
BSE 500-adjusted return (%)	24.84*** (8.06)	50.90*** (13.63)	7.92*** (3.31)	28.61*** (8.87)

Note: Parametric *t*-test values are shown in parenthesis.

***Significant at 1% level.

After its introduction in 1995, book-building method became more and more popular among the issuers and many issuers started adopting this method of pricing the issues instead of the traditional fixed-price method. The study next analyses the listing day performance of book-built and fixed-price IPOs, separately.

Table 2 shows the listing day performance of IPOs that went public and have followed book-building route.

By comparing the results of the study presented in Table 2 with Table 1, we noticed that various measures of underpricing for book-built issues are much less in magnitude than their corresponding measures for the whole sample which includes fixed-price issues as well. Specifically, when the low price on the listing day is used, raw return, BSE 200-adjusted, BSE 100-adjusted, and BSE 500-adjusted measures of underpricing are found to be significant at 5%; while Sensex-adjusted and Nifty-adjusted measures are found to be significant only at 10% level. Both raw and various market indices-adjusted measures of underpricing using the closing price on the listing day are found to be in the range of 21–22%, while the corresponding measures are around 28% for the whole sample. Different measures of underpricing using the opening price are in the range of 17–18%, while the corresponding measures for the whole sample are around 25%. While different measures of underpricing using, high price are in the range of 41–42%, the corresponding measures for the whole sample are found to be around 50%.

The listing day performance of fixed-price IPOs are presented in Table 3.

Comparing various measures of underpricing for fixed-price IPOs (revealed in Table 3) against the corresponding measures for book-built issues (disclosed in Table 2), one can clearly make out that fixed-price issues are underpriced compared to book-built issues. This is in line with the international findings that book-building leads to better price discovery; therefore, lower underpricing (Benveniste & Spindt, 1989). Using the opening price, the various measures of underpricing for the fixed-price IPOs are almost three times the corresponding measures for book-built issues, while the underpricing measures using the high price are more than double the corresponding measures for book-built issues. Underpricing measures using low price are between 3.0 and 3.5% for book-built issues,

Table 2. Listing day performance of 365 book-built IPOs				
Type of return	**Listing day price**			
	Opening price	**High price**	**Low price**	**Closing price**
Average raw return (%)	17.85*** (12.27)	41.84*** (16.37)	3.49** (2.12)	22.05*** (8.77)
BSE 200-adjusted return (%)	17.35*** (12.71)	41.40*** (16.70)	3.07** (2.00)	21.68*** (8.93)
BSE 100-adjusted return (%)	17.32*** (12.69)	41.37*** (16.67)	3.06** (1.99)	21.66*** (8.92)
BSE sensex-adjusted return (%)	17.26*** (12.58)	41.28*** (16.57)	2.99* (1.93)	21.58*** (8.85)
Nifty-adjusted return (%)	17.25*** (12.53)	41.32*** (16.59)	2.99* (1.92)	21.61*** (8.86)
BSE 500-adjusted return (%)	17.32*** (12.71)	41.37*** (16.71)	3.03** (1.98)	21.64*** (8.93)

Note: Parametric *t*-test values are shown in parenthesis.

*Significant at 10% level.

**Significant at 5% level.

***Significant at 1% level.

Table 3. Listing day performance of 99 fixed-price IPOs				
Type of return	**Listing day price**			
	Opening price	**High price**	**Low price**	**Closing price**
Average raw return (%)	52.37*** (3.84)	85.72*** (5.73)	25.51** (2.56)	53.92*** (4.34)
BSE 200-adjusted return (%)	52.63*** (3.98)	86.07*** (5.95)	25.98*** (2.73)	54.34*** (4.57)
BSE 100-adjusted return (%)	52.18*** (3.98)	85.64*** (5.97)	25.52*** (2.72)	53.89*** (4.57)
BSE sensex-adjusted return (%)	52.21*** (3.89)	85.63*** (5.83)	25.47*** (2.63)	53.84*** (4.44)
Nifty-adjusted return (%)	51.84*** (3.86)	85.16*** (5.80)	25.06*** (2.59)	53.44*** (4.42)
BSE 500-adjusted return (%)	52.59*** (3.98)	86.02*** (5.95)	25.94*** (2.73)	54.30*** (4.57)

Note: Parametric *t*-test values are shown in parenthesis.
**Significant at 5% level.
***Significant at 1% level.

whereas they are found to be more than 25% for fixed-price issues. Finally, using the closing price on the listing day, book-built issues are underpriced by about 21–22%, while the fixed-price issues are underpriced by about 53–54% using the same price on the listing day. Overall, the listing day performance of IPOs in India leads us to reject the first hypothesis that IPOs are not underpriced based on the listing day performance.

5.2. Post-listing performance
Table 4 presents average abnormal returns (AARs), cumulative average abnormal returns (CAARs) and t-test statistics for the first 60 days (three months) from listing for the entire sample of 464 IPOs.

Analysis of short run or three months' post-listing performance of IPOs from Table 4 reveals that soon after listing, Indian IPOs underperform the market (which is in line with most of the international findings). Twelve of the 60 post-listing daily AARs are positive, with only one of them being significant at 5% level i.e. day 50 with AAR and *t*-statistic of 0.004 and 2.09, respectively. Among the remaining 48 negative AARs, 14 are significant at 5% level and 6 are significant at 1%. Except for day one for all the remaining 59 days, CAARs have been negative. Further analysis reveals that of the 59 negative CAARs, 57 have been significant at 1% level. In addition to the short run analysis, Figure 1 displays long run or five years (1,250 trading days) post-listing performance of AAR and CAAR.

Even beyond three months post-listing, IPOs that have gone public consistently underperformed their benchmark as shown in Figure 1. The CAAR for the sample is having consistently declining trend up to five years post-listing. The five-year post-listing performance (trading day 1,250) registers CAAR and the corresponding *t*-statistic of −0.30 and −3.67, respectively, indicating that the long run performance of IPOs that have gone public during the post-2000 decade has been negative (abnormal loss) and significant at 1% level. Such statistically significant abnormal loss associated with both short run and long run performance of IPOs in India is consistent with various international findings and this leads us to reject the hypothesis that investors cannot earn abnormal returns from IPOs in the post-listing period performance.

To understand whether there is any industry effect in the long run performance of IPOs, we divide the sample firms based on the industry groups. A large number of sample firms are from "infrastructure" with a size of 136 out of total 464 IPOs. The post-2000 decade in India witnessed massive

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Table 4. Sixty-days post-listing performance of 464 IPOs								
Day	AAR_t	t-statistic	$CAAR_t$	t-statistic	Day	AAR_t	t-statistic	$CAAR_t$	t-statistic
1	0.0023	0.5953	0.0023	0.5953	31	−0.0039	−2.0448	−0.0943	−8.8728
2	−0.0043	−1.2834	−0.0019	−0.4081	32	−0.0019	−1.0201	−0.0962	−9.1127
3	−0.0094	−3.4830	−0.0113	−2.4219	33	−0.0004	−0.2084	−0.0966	−8.7492
4	−0.0026	−1.0046	−0.0139	−2.6729	34	−0.0039	−2.3684	−0.1005	−10.5403
5	−0.0069	−2.5841	−0.0208	−3.4687	35	−0.0036	−2.1526	−0.1041	−10.6494
6	−0.0066	−2.7524	−0.0274	−4.6459	36	−0.0001	−0.0505	−0.1042	−10.4740
7	−0.0036	−1.4313	−0.0310	−4.6831	37	0.0010	0.5241	−0.1032	−9.3557
8	−0.0059	−2.4633	−0.0369	−5.4763	38	0.0018	0.9010	−0.1014	−8.3850
9	−0.0013	−0.5684	−0.0382	−5.6171	39	−0.0028	−1.7020	−0.1042	−10.3289
10	−0.0024	−1.0766	−0.0406	−5.7023	40	−0.0039	−2.3861	−0.1080	−10.5746
11	−0.0052	−2.5051	−0.0458	−6.6874	41	−0.0037	−2.1406	−0.1117	−10.1767
12	−0.0018	−0.8488	−0.0476	−6.4058	42	−0.0012	−0.7087	−0.1129	−10.4439
13	−0.0010	−0.5123	−0.0486	−6.7574	43	0.0006	0.3886	−0.1123	−10.3146
14	−0.0008	−0.3289	−0.0494	−5.7656	44	−0.0004	−0.2497	−0.1127	−9.6929
15	−0.0038	−1.8876	−0.0531	−6.9062	45	0.0015	0.7255	−0.1112	−8.1096
16	−0.0074	−4.1886	−0.0605	−8.5962	46	−0.0003	−0.1649	−0.1115	−8.3870
17	−0.0034	−1.7257	−0.0638	−7.9658	47	−0.0019	−1.0500	−0.1135	−9.0365
18	−0.0006	−0.3197	−0.0645	−7.9042	48	−0.0024	−1.5733	−0.1159	−10.8912
19	0.0001	0.0275	−0.0644	−7.6871	49	0.0000	0.0121	−0.1158	−10.1307
20	−0.0022	−1.2062	−0.0666	−8.3255	50	0.0037	2.0893	−0.1121	−8.9536
21	−0.0028	−1.6448	−0.0693	−9.0247	51	0.0007	0.4410	−0.1114	−9.3297
22	−0.0015	−0.9011	−0.0708	−9.1545	52	−0.0011	−0.5964	−0.1125	−8.8096
23	−0.0026	−1.4177	−0.0734	−8.2758	53	−0.0003	−0.1862	−0.1128	−9.5878
24	−0.0012	−0.5899	−0.0746	−7.6234	54	−0.0024	−1.3771	−0.1151	−9.1819
25	−0.0004	−0.2003	−0.0750	−8.3357	55	−0.0033	−1.9450	−0.1184	−9.4622
26	−0.0016	−0.8212	−0.0765	−7.9012	56	−0.0020	−1.2954	−0.1204	−10.4638
27	−0.0037	−2.0572	−0.0802	−8.6560	57	−0.0014	−0.7911	−0.1218	−9.2959
28	−0.0011	−0.5628	−0.0813	−7.9987	58	0.0005	0.3156	−0.1212	−9.6165
29	−0.0042	−2.5471	−0.0855	−9.6076	59	0.0024	1.4657	−0.1188	−9.3802
30	−0.0050	−2.9238	−0.0904	−9.7525	60	0.0002	0.1350	−0.1186	−9.3866

pumping of funds into infrastructure by both the government and private sector. According to a report by the Planning Commission (2011) the total investment in infrastructure during the eleventh five-year plan (2007–2012) is estimated at around Rs.20,00,000 crores. Out of this amount, 70% investment was from Government and 30% from private sector. As against this, the first two years of the 11th five-year plan had witnessed private sector investment in infrastructure of 34.32 and 33.73%. A few of the areas to which infrastructure IPOs belong are power generation, railways, port building, gas pipelines, rural infrastructure, etc. Other industries in our sample are: Chemicals and Engineering (79), Fast Moving Consumer Goods (FMCG) (64), Media and Entertainment (58), Software and Information Technology (56), Banking and Finance (39), Pharma and Healthcare (28) and Agriculture and Allied Activities (04).

When the long run performance of IPOs is studied industry-wise, we find that FMCG IPOs severely underperformed consistently up to five years and beyond. The CAAR and relevant t-statistic for periods of 60 days, 250 days, 750 days and 1,250 days are found to be −0.1319 (−3.3695), −0.1768 (−2.6678), −0.5858 (−3.1646) and −0.7392 (−3.6807), respectively. The largest sub-group of

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Figure 1. Five years post-listing performance of AAR and CAAR for 464 IPO's.
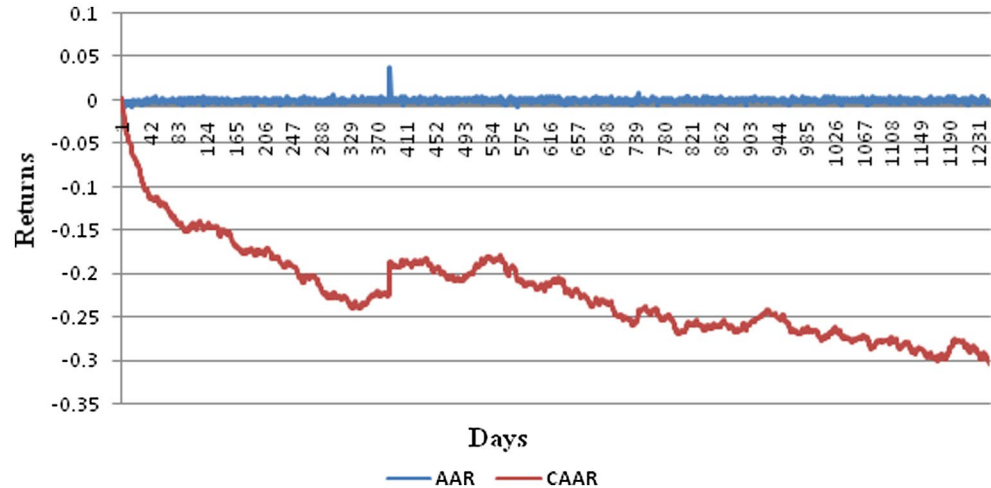
infrastructure IPOs, though underperform, the underperformance is not found to be severe. The corresponding figures for the above four periods for infrastructure IPOs are −0.0839 (−3.66), −0.2795 (−0.6057), −0.4514 (−1.17) and −0.0292 (−0.0641), respectively.

While it is important to know the long run performance, it is interesting to know how the IPOs in India have performed in the short run. We present the short run post-listing performance of book-built IPOs that have gone public during the period 2001–2011 in Table 5.

Analysing 60-days post-listing performance of book-built IPOs presented in Table 5, there is no significant difference between the performance of sub-sample and the entire sample. Even though 13 of the AARs are positive, none is found to be significant. Among the remaining 47 negative AARs, 14 are significant at 5%; while 7 are significant even at 1%. Regarding CAARs, only 2 are positive though not significant. Among the remaining 58 negative CAARs, 57 are significant at 5% and, of them; 56 are significant at 1% also.

Figure 2 displays the long run or five-year (1,250 trading days) aftermarket performance of book-built IPOs.

The long run performance of book-built IPOs also has been negative and significant which is in line with the performance of the whole sample. By the end of five years post-listing, the CAAR and the corresponding *t*-statistic have been −0.57 and −6.33, respectively. The degree of underperformance for the sub-sample of book-built IPOs has been much more severe, specifically by the end of year five, when compared to the performance of whole sample. Once again, considering the significantly negative short run and long run performance of book-built IPOs, study leads us to reject the second hypothesis that investors cannot earn abnormal returns post-listing. Finally, study analyses the post-listing performance (both three-months and five-years) of the sub-sample of fixed-price IPOs.

Analysing the short run or 60-days post-listing performance of fixed-price IPOs presented in Table 6, we find that even though 20 AARs are positive, none is found to be significant. Among the remaining 40 negative AARs, only 5 are significant at 5% level and only 1 is significant at 1% level. Therefore, in analysing AARs, we are unable to get a clear trend about the three-months post-listing performance of fixed-price IPOs. However, about CAARs, all 60 are negative while 51 of them are significant at 5%, 47 are significant at 1% level. This reveals that Classified-price IPOs underperform in the short run. Further, Figure 3 shows the performance trend of AAR and CAAR over the long run or five-years from listing.

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Table 5. Sixty-days post-listing performance of 365 book-built IPOs								
Day	AAR_t	t-statistic	$CAAR_t$	t-statistic	Day	AAR_t	t-statistic	$CAAR_t$	t-statistic
1	0.0055	1.2895	0.0055	1.2895	31	−0.0040	−2.0097	−0.0917	−8.3485
2	−0.0029	−0.8181	0.0026	0.5169	32	−0.0018	−0.9221	−0.0935	−8.4649
3	−0.0105	−3.5273	−0.0079	−1.5347	33	−0.0009	−0.4379	−0.0943	−8.3278
4	−0.0050	−1.7660	−0.0129	−2.2794	34	−0.0021	−1.2205	−0.0964	−9.6269
5	−0.0077	−2.5995	−0.0206	−3.1151	35	−0.0041	−2.2854	−0.1006	−9.3741
6	−0.0072	−2.7072	−0.0278	−4.2440	36	0.0012	0.7243	−0.0993	−9.6455
7	−0.0044	−1.6035	−0.0322	−4.4134	37	0.0007	0.3670	−0.0986	−8.3017
8	−0.0064	−2.4032	−0.0386	−5.1031	38	0.0016	0.7270	−0.0970	−7.3521
9	−0.0008	−0.3352	−0.0394	−5.5540	39	−0.0046	−2.7490	−0.1016	−9.7871
10	−0.0022	−0.9503	−0.0417	−5.6153	40	−0.0023	−1.4172	−0.1039	−9.9980
11	−0.0060	−3.0028	−0.0477	−7.1691	41	−0.0050	−2.7104	−0.1089	−9.2489
12	−0.0018	−0.7845	−0.0495	−6.1260	42	−0.0017	−0.9750	−0.1106	−10.0959
13	0.0008	0.3867	−0.0487	−6.1567	43	0.0020	1.1151	−0.1086	−9.2876
14	0.0003	0.1434	−0.0483	−5.3572	44	−0.0009	−0.4877	−0.1095	−8.8810
15	−0.0036	−1.7501	−0.0519	−6.5414	45	0.0029	1.3880	−0.1066	−7.7098
16	−0.0073	−3.6873	−0.0592	−7.4547	46	−0.0016	−0.8074	−0.1082	−8.1510
17	−0.0044	−2.0598	−0.0636	−7.1999	47	−0.0010	−0.5530	−0.1092	−8.6653
18	−0.0002	−0.0891	−0.0638	−7.1264	48	−0.0029	−1.8020	−0.1121	−10.2310
19	0.0011	0.5224	−0.0627	−6.9275	49	−0.0007	−0.4260	−0.1128	−10.2245
20	−0.0020	−0.9936	−0.0647	−7.2208	50	0.0023	1.2097	−0.1105	−8.3837
21	−0.0006	−0.3108	−0.0653	−7.6802	51	0.0026	1.4326	−0.1079	−8.3494
22	−0.0015	−0.8295	−0.0668	−8.0671	52	−0.0017	−1.0057	−0.1096	−9.0796
23	−0.0033	−1.6302	−0.0701	−7.2753	53	−0.0008	−0.4731	−0.1104	−8.9117
24	−0.0012	−0.5759	−0.0713	−6.8526	54	−0.0039	−2.1363	−0.1143	−8.5110
25	−0.0009	−0.5008	−0.0722	−7.8592	55	−0.0032	−1.9078	−0.1175	−9.3705
26	−0.0013	−0.6578	−0.0735	−7.1744	56	−0.0010	−0.6025	−0.1185	−9.9304
27	−0.0035	−1.8592	−0.0770	−7.8780	57	−0.0009	−0.5220	−0.1194	−8.8822
28	−0.0029	−1.4559	−0.0799	−7.5664	58	0.0003	0.1813	−0.1191	−8.8870
29	−0.0042	−2.3581	−0.0841	−8.8657	59	0.0008	0.5305	−0.1183	−9.8931
30	−0.0036	−2.0427	−0.0877	−9.0301	60	−0.0007	−0.3702	−0.1189	−8.7822

Figure 2. Five years post-listing performance of AAR and CAAR for 365 book-built IPO's.
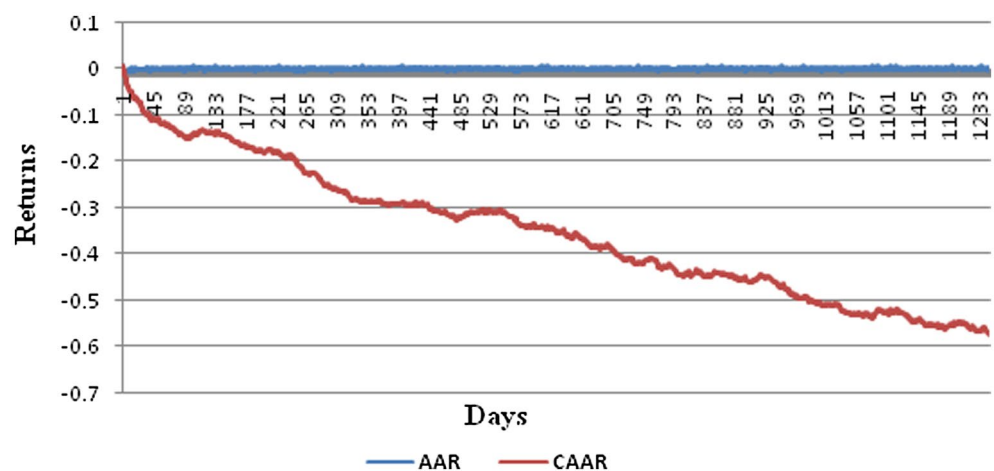
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Table 6. Sixty-days post-listing performance of 99 fixed-price IPOs								
Day	AAR_t	t-statistic	$CAAR_t$	t-statistic	Day	AAR_t	t-statistic	$CAAR_t$	t-statistic
1	−0.0092	−0.9462	−0.0092	−0.9462	31	−0.0037	−0.7038	−0.1042	−3.5694
2	−0.0093	−1.0928	−0.0185	−1.5372	32	−0.0023	−0.4581	−0.1065	−3.7644
3	−0.0052	−0.8412	−0.0237	−2.1962	33	0.0013	0.2441	−0.1052	−3.4245
4	0.0062	0.9908	−0.0175	−1.4071	34	−0.0104	−2.4390	−0.1156	−4.6393
5	−0.0042	−0.6660	−0.0218	−1.5372	35	−0.0014	−0.3542	−0.1170	−5.0511
6	−0.0044	−0.7979	−0.0262	−1.9235	36	−0.0050	−1.1074	−0.1220	−4.5257
7	−0.0005	−0.0839	−0.0267	−1.7157	37	0.0018	0.3993	−0.1202	−4.3525
8	−0.0038	−0.7220	−0.0305	−2.0561	38	0.0025	0.5374	−0.1176	−4.0243
9	−0.0031	−0.5118	−0.0336	−1.8414	39	0.0040	0.9020	−0.1137	−4.1396
10	−0.0031	−0.5174	−0.0367	−1.9115	40	−0.0095	−2.0998	−0.1231	−4.3139
11	−0.0020	−0.3249	−0.0388	−1.8680	41	0.0012	0.2751	−0.1220	−4.4354
12	−0.0018	−0.3414	−0.0405	−2.2384	42	0.0005	0.1129	−0.1214	−3.9545
13	−0.0079	−1.6977	−0.0485	−2.8818	43	−0.0043	−1.0408	−0.1257	−4.6326
14	−0.0048	−0.7983	−0.0533	−2.3657	44	0.0013	0.2840	−0.1244	−4.1267
15	−0.0044	−0.7963	−0.0576	−2.7223	45	−0.0036	−0.6178	−0.1280	−3.2748
16	−0.0075	−1.9784	−0.0651	−4.2765	46	0.0043	0.7579	−0.1237	−3.2067
17	0.0006	0.1234	−0.0646	−3.4570	47	−0.0053	−0.9980	−0.1290	−3.5677
18	−0.0022	−0.4802	−0.0668	−3.4555	48	−0.0008	−0.1931	−0.1298	−4.4241
19	−0.0038	−0.7916	−0.0705	−3.4114	49	0.0026	0.5132	−0.1272	−3.6342
20	−0.0028	−0.6965	−0.0733	−4.1322	50	0.0090	1.9465	−0.1182	−3.6030
21	−0.0108	−2.8639	−0.0841	−4.8675	51	−0.0061	−1.5044	−0.1243	−4.2913
22	−0.0016	−0.3739	−0.0856	−4.3579	52	0.0013	0.2261	−0.1231	−3.0668
23	−0.0002	−0.0497	−0.0859	−3.9535	53	0.0016	0.3662	−0.1215	−3.9230
24	−0.0010	−0.1968	−0.0869	−3.4365	54	0.0034	0.7909	−0.1181	−3.7586
25	0.0017	0.3382	−0.0852	−3.3830	55	−0.0035	−0.7133	−0.1216	−3.3565
26	−0.0024	−0.4916	−0.0876	−3.4662	56	−0.0058	−1.3911	−0.1274	−4.0884
27	−0.0043	−0.9175	−0.0919	−3.7786	57	−0.0030	−0.6242	−0.1304	−3.5869
28	0.0056	1.0975	−0.0863	−3.1672	58	0.0013	0.2977	−0.1291	−3.9669
29	−0.0044	−1.0410	−0.0907	−3.9710	59	0.0083	1.6063	−0.1208	−3.0504
30	−0.0099	−2.1961	−0.1005	−4.0933	60	0.0034	0.8305	−0.1174	−3.6837

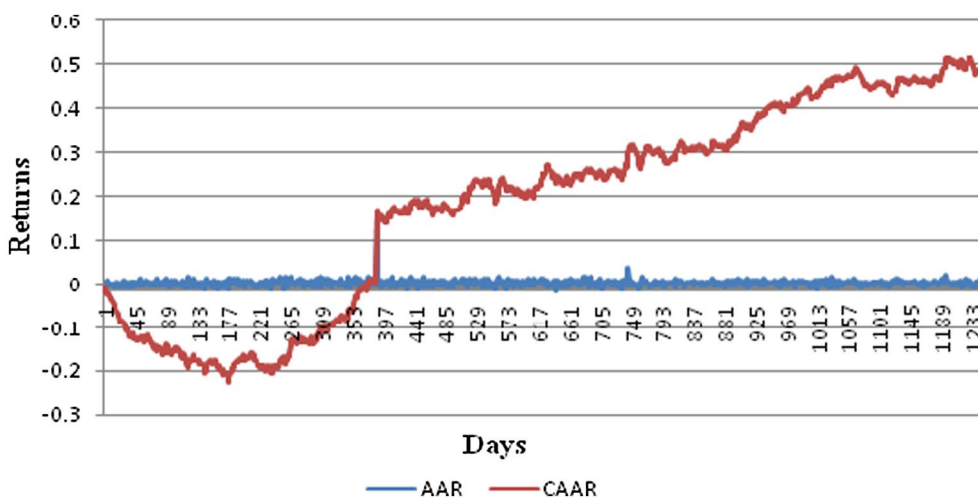**Figure 3. Five years post-listing performance of AAR and CAAR for 99 fixed-price IPO's.**

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Table 7. one-year, three-year and five-year post-listing performance of IPOs						
	one-year post-listing		three-year post-listing		five-year post-listing	
	(250 days post-listing)		(750 days post-listing)		(1,250 days post-listing)	
	CAAR	*t*-statistic	CAAR	*t*-statistic	CAAR	*t*-statistic
Whole sample	−0.19	−6.39	−0.24	−3.78	−0.30	−3.67
(*N* = 464)						
Book-built issues	−0.20	−7.69	−0.42	−6.58	−0.57	−6.33
(*N* = 365)						
Fixed-price issues	−0.17	−1.69	0.32	1.99	0.48	2.82
(*N* = 99)						

The results of the study presented in Figure 3 reveals that in line with the three-month performance, CAARs have been negative for about one and a half year from listing (till day 374). However, after this (day 375 onwards), CAAR turns positive and this positive performance continues. By the end of five years post-listing (trading day 1,250), the CAAR and the corresponding t-statistics have been 0.48 and 2.82, respectively, indicating that the long run post-listing performance has been positive and significant for fixed-price issues. Consequently, this leads us to reject the hypothesis— that investors cannot earn abnormal returns in the long run. Such positive performance of fixed-price issues is, in fact, the reason why the underperformance for the whole sample is less severe when compared to that of book-built issues in the long run.

Table 7 presents one-year, three-year and five-year post-listing performance of IPOs.

It is clear from the results presented in Table 7 that there is not much of difference in the one-year post-listing performance between the entire sample and book-built sub-sample. However, by the end of three years post-listing, even though the whole sample underperforms (CAAR = −0.24), the magnitude of underperformance is less when compared to the underperformance of book-built issues for the same period (CAAR = −0.42). This is attributed to the fact that three years post-listing, fixed-price issues register positive performance (CAAR = 0.31) and this positive performance of fixed-price issues partially offsets the negative performance of the whole sample. By the end of five years, the positive performance of fixed-price issues becomes much more evident; thus, the gap between the negative performance of whole sample and book-built sub-sample further widens. Overall (except for the one-year performance for fixed-price issues) this study leads us to reject the second hypothesis—that investors cannot earn abnormal returns from IPOs in the post-listing period performance. With regard to the one-year performance for fixed-price issues (even though it is negative) it is not significant; thus, we accept the hypothesis that investors cannot earn abnormal returns in the post-listing period.

6. Conclusions

This study finds that IPOs in India are underpriced based on their performance on the first trading day. The finding of this study is consistent with the findings of Narasimhan and Ramana (1995), Madhusoodanan and Thiripalraju (1997), Karmakar (2002), Chaturvedi et al. (2006), Sehgal and Singh (2007), and Garg et al. (2008). Bora et al. (2012) reported that Indian IPOs are underpriced when measured using offer price and the opening price on listing day (which is again consistent with our measure using the same prices). Also, Cheung and Krinsky (1994) and Cheng et al. (2004) documented underpricing using similar measure. Both of these studies found that underpricing is significant when computed using offer-to-open measure. While, Cheung and Krinsky reported that underpricing is positive and significant for subscribers who sell their IPO shares even after the market opens on the listing day but not for the day traders, Cheng et al. reported that underpricing exists

only in the pre-listing market (offer-to-open) and vanished once trading begins. Consistent with Benveniste and Spindt (1989), Ljungqvist, Jenkinson, and Wilhelm (2003) and Sherman (2005), who argued that book-building leads to better price discovery, and, therefore, lower underpricing of IPOs, we document that book-built IPOs in India are underpriced by lesser magnitude. This confirms the findings of Bora et al. that book-built IPOs in India are less underpriced when compared to fixed-price IPOs.

However, the positive return documented on the listing day is not sustained thereafter. The short run post-listing performance i.e. three-months return computed from the closing price on listing day turns negative and significant. This is consistent with Garg et al. (2008) who computed long run underpricing using offer price/first day opening price to closing price on 90th and 120th trading day and find that Indian IPOs are overpriced in the long run.

As far as the medium run performance is concerned (except for fixed-price IPOs), the one-year (250 days) performance has been negative and significant which is consistent with the findings of Aggarwal and Rivoli (1990), and Mcguinness (1993) for the same period. The one-year return for fixed-price IPOs is not significant (though negative). The three-year (750 days) and five-year (1,250 days) returns have been negative and significant except for fixed-price IPOs which is positive and significant for these two periods. Again, such negative return documented over the medium and long run is consistent with various international findings i.e. Aggarwal and Rivoli (1990), Aggarwal et al. (1993), Jaskiewicz et al. (2005), and Álvarez and González (2005), to mention a few. However, the notable exceptions are Ahmad-Zaluki et al. (2007) who reported significant positive returns for Malaysian IPOs up to three years post-listing and Madhusoodanan and Thiripalraju who found that the long run performance of IPOs in India has also been positive and high.

In recent years, the IPO market in India has witnessed many landmark developments like the introduction of ASBA (Application Supported by Blocked Amount), grading of IPOs, launching of IPO Index, introduction of Anchor Investors, introduction of Safety Net for IPOs, derivatives, circuit filter, price–volume tracking by the SEBI to detect price manipulations. Therefore, future studies on IPOs may link to these developments. For example, the grading of IPOs which is based on the fundamentals of the issuing company may be correlated to the initial as well as long run performance of the IPOs. The listing day and long run performance of IPOs that have gone public after the launching of S&P BSE IPO index in 2009 may be tested against the performance of this IPO index. Also, the return from this index (which includes IPO stocks for up to two years from listing) may be tested against the returns from a portfolio consisting of seasoned securities to see whether IPOs offer better investment opportunities than seasoned securities to the investors.

The important implications of our study are that like in many other capital markets, companies in India time their issues. They come out with their IPOs during the time when the market sentiment is high. In the long run, the same IPOs which had initially offered positive return, underperform. Considering the existence of such windows of opportunity for issuers, policy-makers must come out with measures to protect the long run interest of investors. The retail investors while investing in IPO shares should consider the fundamentals and prospects of IPO companies rather than the prevailing market sentiments. Otherwise, they will incur loss due to the underperformance of IPOs in the long run.

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