

UNDERPRICING OF INDIAN IPOs: PRE AND POST STOCK MARKET CRASH (2008)

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Abstract

It has been observed throughout the world, including India, that IPOs are underpriced as they get listed at a price which is higher than the listing price. A number of studies have found that stock market crashes or significant economic downturns and the resulting declines in stock markets affect the IPO market and the pricing performance of IPOs. Stock market crashes may cause a short term change or a long-term change in the stock market which would in turn affect the underpricing of IPOs. In 2008 the Indian stock market crashed. The market fell by almost 60 percent in less than a year which was the highest fall experienced by the Indian stock market in recent history. The present paper attempts to determine the effect of this crash on the pricing performance of Indian IPOs by comparing the underpricing of IPOs issued during the three years period prior and three years period post the stock market crash of 2008. The comparison of the underpricing in the pre and post-crash period reveals that the IPOs issued after the crash were underpriced to a lesser extent in comparison to the IPOs issued before the crash. This is evidenced by the significantly lower initial returns of the IPOs issued after the stock market crash of 2008.

Keywords: *IPOs, Underpricing, stock market crash, initial returns*

I. Introduction

A number of investors subscribe to an initial public offering (IPO) with the intention of making short-term gains by selling the shares allotted to them upon listing of the share at a price higher than the offer price (referred to as initial returns). The price of an IPO must be based on the intrinsic value of the share coupled with the demand and supply conditions of stock in the market as well as the general stock market conditions which significantly affect IPO activities.

The market price of the share on the first day of listing (commonly referred to as listing price) is indicative of the demand for the stock and hence, the price the market is willing to pay for the issued share. Listing price is therefore considered to reflect the market's view of the intrinsic value or the fair value of the shares offered (Purnanandam & Swaminathan, 2004). This means that the

issuer should ideally offer the shares at a price close to the listing price.

However, it has been observed throughout the world, including India, that IPOs are underpriced as they are issued at a price which is lower than the listing price. Several explanations have been elucidated by different researches for the existence of underpricing including, irrational behaviour of investors, informational asymmetry among the investors, issuing firms and the investment banks and informational cascade theory. A few researches have also observed significant effect of economic downturns, financial crisis and stock market crashes on IPO market and IPO underpricing.

A stock market crash was experienced in India in 2008. The market experienced a fall of almost 60 percent from its highest level in January to its lowest level in

October. This was the highest fall experienced by the Indian stock market in the recent history. The stock market crash adversely affected the IPO activity in India. The capital mobilisation through initial public offerings (IPOs) in the Indian market hit rock bottom in 2008-2009 with only 21 IPOs entering the market (Handbook of Statistics on the Indian Securities Market 2010). The total amount raised via this route aggregated only Rs. 2,082 crore, the lowest since 2003-2004. Although, there have been numerous studies on underpricing of IPOs and on the factors that affect underpricing of IPOs, few studies are available in India that have focussed on the impact of the stock market crash of 2008 on IPO underpricing. The present research investigates whether the findings in other countries of an impact of adverse economic conditions and stock market crashes on IPO underpricing are observed in the Indian context as well. This will shed light on the effect of stock market crashes on the various aspects of primary issues market and will finally help to determine whether crashes lead to more efficient markets. This would prove invaluable to investors who generally stay away from stock markets after crashes.

II. Literature Review

One of the earliest studies that documented the underpricing phenomenon was by Stoll and Curley (1970). Subsequently, underpricing has been found to be a worldwide phenomenon by studies conducted in different countries. However, the extent of underpricing has varied among different countries. For instance underpricing in the USA over a long period of time averaged between 10 to 20 percent, but it has been found to be as high as 100 percent in 2000 due to the internet bubble. The average underpricing in France was found to be 10 percent during 1990 to 2003, which was lower than the average underpricing of 35 percent observed in Germany during the

same period (Ljungqvist, 2004). Jog and Riding (1987) found an average degree of underpricing ranging from 9 to 11.5 percent for Canadian IPOs issued from 1971 to 1983. Aggarwal et al. (1993) also observed underpricing in the Latin American countries of Brazil, Chile and Mexico. The initial one-day returns were found to be 78.5 percent for Brazilian offerings in 1980-1990, 16.7 percent for Chilean IPOs issued from 1982 to 1990, and a meagre 2.8 percent for Mexican IPOs issued during 1987-1990. In Greece an initial return of 9.07 percent was found for the period 1993-1997 (Tsangarakis, 2004).

IPOs issued in Asian countries also provided initial returns upon listing. In Thailand, the initial returns were 19.97 percent for IPOs listed between 2000 and 2005 (Vithessonthi, 2008). In Bangladesh, Islam et al. (2010) found that the IPOs provided very high initial returns of 480.72 percent for the period 1995-2005. IPOs in India were also observed to be underpriced but there is a lot of variation in the degree of underpricing found by different studies conducted over different time periods. Initial return of IPOs in India was as high as 289 percent for the period from 1990 to 1996 (Karmakar, 2002) to as low as 27.26 percent for the period 1999 to May 2006 (Kumar, 2006).

Underpricing is beneficial to investors as positive initial returns accrue to investors on the listing day but it is costly to the issuer. This then raises a question as to why underpricing exists despite the free-pricing of IPOs. Further it can be asked whether it is a consequence of the deliberate action of the issuer or is due to some other reasons which are beyond the control of the issuer such as economic downturns or stock market crashes.

A number of theoretical reasons are given by experts to explain the underpricing of IPOs. Rock (1986) floated the idea

of information asymmetry between well-informed investors and less-informed investors as the reason for such underpricing of IPOs. According to him, the issuing firms are required to sell at a discount so as to keep the less-informed investors interested in the stock market. Allen and Faulhaber (1989) propounded the signalling theory whereby firms firstly, signal their good quality through underpricing and subsequently garner better prices for future issues. Information revelation theory was developed by Benveniste and Spindt (1989) which attributed underpricing to the presence of information asymmetry between the issuing firm and the investors whereby some investors, usually institutional investors, have superior information about the valuation of the firm than the issuing company. The issuing firm deliberately underprices its IPOs to reward these investors for revealing their information to the firm in the preselling stage and to compensate these investors for the cost of collecting the information. Ljungqvist et al. (2006) proposed the irrationality of investors as the possible cause for underpricing of IPOs.

A number of studies have found that stock market crashes or significant economic downturns and the resulting declines in stock markets affect the IPO market and IPO underpricing. Vithessonthi (2008) found that the initial return for IPOs issued in Thailand after the Asian financial crisis of 1997 was less than the previously reported initial return for the IPOs issued before the financial crisis. Sundarasan and Rajangam (2009) also noted a significant drop in underpricing in Malaysia after the Asian financial crisis. Sundarasan and Rajangam (2009) concluded that after the Asian Financial crisis the investors were relatively more informed and there may have been a change in investors' psychology. The financial crisis may have resulted in a

more efficient market.

In contrast, Ang and Boyer (2009) found higher underpricing in the period after 1987 United States stock market crash. This was to compensate the investors for the higher risk perceived by them. The crash had led to a higher degree of risk aversion and hence a change in the psyche of the market. They observed that there was not only an increase in underpricing, but also a change in the quality of firms issuing IPOs after the 1987 crash period. This was evidenced by the reduced number of IPOs by riskier firms, that is, firms which had lower profits, more debt, lower revenue and smaller issue size. This indicated that there was a short-term change in risk aversion by investors. It can therefore be seen that stock market crashes may cause a short term change or a long-term change in the market which would in turn affect the underpricing of IPOs.

It is clear from the above review that IPOs, in India and in other countries, have been found to be underpriced but the degree of underpricing has varied. Studies conducted in other countries have also observed a significant effect of stock market crashes and economic crisis on the pricing performance and quality of IPOs. However, significant deviations have been found in the findings of different studies. Moreover rare studies are available that have attempted to determine the effect of such stock market crashes on the Indian IPO market. The present study is a humble attempt to fill this gap by finding out the effect of 2008 stock market crash on the underpricing of IPOs in the Indian capital market.

III. Research Methodology

The present study compares pricing performance of Indian IPOs pre and post the 2008 market crash. This has been done by comparing the degree of under-

pricing (or overpricing) of IPOs issued in the pre-crash period (a period of three years prior to the crash) with the degree of under-pricing (or overpricing) of IPOs issued in the post-crash period (a period of three years after the crash). Thus, first the Indian stock market crash of 2008 has been identified and its exact timing has been determined.

Although there is no single definition of stock market crash, Kohn defines a stock market crash as “a large and sudden drop in securities prices” and refers to a crash as “a precipitous fall in securities prices”. Stock market crash refers to a steep double-digit percentage decline in a stock market index. According to Jones (2008) a double-digit percentage fall over five minutes qualifies as a stock market crash. Mishkin and White (2002) defined a stock market crash as a 20 percent decline in stock prices over a 12-month period. As per the definition of stock market crash by Business Dictionary a crash may persist for months and does not just refer to a single date but to a period. Furthermore, Patel and Sarkar (1998) defined a stock market crash as “an event when the regional price index declines, relative to the historical maximum, more than 20 per cent for the developed markets, and more than 35 per cent for the emerging markets.”

A stock market crash was experienced in 2008 in India. The NSE CNX Nifty, a stock index of fifty stocks listed on NSE, having reached a peak of 6357 points (and closing at 6287 points) on 8 January 2008, fell by 8.7 percent (on the basis of previous close to current close) on 21st January 2008 and by 5.94 percent on 22 January 2008, a total of over 14 percent over a two-day period on 21st and 22 January. On 22nd January, it touched a low of 4448 points which is 30 percent lower than the maximum level (intraday high) of 8th January, 2008. Clearly, the

Indian stock market crashed on 21st and 22nd January of 2008.

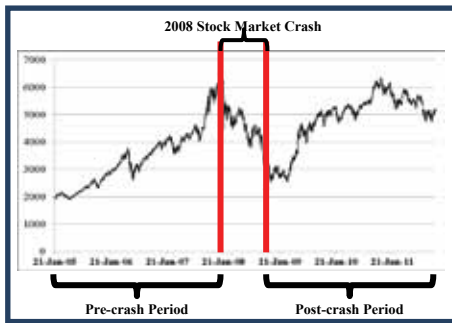
Thereafter, the stock market continuously declined, and experienced crashes on 8th, 10th and 16th October of 2008 as the daily decline (measured from previous high to current low) recorded has been in double-digit. There was another extremely sharp fall in Nifty on 24th and 27th October 2008. On 24th October, 2008 Nifty recorded a decline of 12.2 percent which is the highest single day decline for 2008 and is also the only double-digit decline (in closing values of Nifty) for a single day for 2008. The total decline in Nifty from the closing value on 8th January 2008 to 24th October 2008 reached 58.9 percent. The market touched its bottom on 27 October, 2008, having touched an intraday low level of 2253 points and closed at its lowest level of 2524 points since it achieved its peak in early 2008. Nifty declined by a total of 14.2 percent on 24th and 27th October from its close on 23rd October, 2008. It is quite evident that the stock market crashed once again on 24th and 27th October, 2008. It has also been observed that by 27th October, 2008, Nifty had fallen by an exorbitant 3763 points from its highest close of 6287 points in January. This was a fall of almost 60 percent in less than a year and was the highest fall experienced by the Indian stock market in recent history, which is much higher than the decline of 35 percent specified by Patel and Sarkar (1998) for defining stock market crashes in emerging markets. Thus, the Indian stock market crashed from 21st January to 27th October, 2008 and this crash is clearly visible in Figure 1.

Figure 1: Chart of Nifty from 1 January 2007 to 31 December 2009



As the Indian stock market crashed from 21st January, 2008 to 27th October, 2008, the three year period from 21st January 2005 to 20th January 2008 is taken as the pre-crash period and the three year period from 28th October 2008 to 27th October 2011 is taken as the post-crash period. Figure 2 shows the stock market crash of 2008 and also demarcates the pre-crash and post-crash periods.

Figure 2: Chart of Nifty Showing the Pre-Crash and Post-Crash Periods



The sample of the study includes IPOs made in India during the period of three years prior to the stock market crash of 2008, that is, from 21 January 2005 to 20 January 2008, and three years subsequent to the crash, that is, from 28 October 2008 to 27 October 2011 and which got subsequently listed on the National Stock Exchange (NSE). The IPOs which got listed during the crash period, that is, from 21 January 2008 to

27th October 2008, are excluded from the sample as their returns might have been affected by the crash.

For an IPO to get included in the sample, it has to further meet the following criteria:

- The initial public offering should have been equity share offering.
- The issuer company should not have been previously listed on any stock exchange. Any companies which were delisted earlier and got subsequently listed during the period under study are excluded.

The sample of study includes 188 IPOs during the pre-crash period and 110 IPOs during the post-crash period. Secondary sources of data have been used for this study which primarily included PROWESS, the database on stock market research of Centre for Monitoring Indian Economy (CMIE), websites of NSE, BSE, and SEBI.

Underpricing has generally been measured by different researchers by determining the initial return. Initial Returns are computed by taking the percentage difference between the offer price (the issue price) and the closing price of the stock on the first day of listing. In the present study, underpricing is measured by determining the initial returns (IR) as per the equation below:

$$IR_j = \left[\frac{P_1 - P_0}{P_0} \right] \times 100 \tag{1}$$

Where,

IR_j is the initial return on the stock j on listing.

P_1 is the closing price on the first day of trading on listing of the stock (listing price)

P_0 is the issue price

The independent samples t-test has been used for comparing the initial return of the pre-crash period IPOs with that of post-crash period IPOs as this is a widely used tool for comparing difference of

means of two independent tools. However, where the returns of the two periods have not been found to be normally distributed as per the Shapiro-Wilk and the Kolmogorov-Smirnov tests of normality, a non-parametric test, namely the Independent-Samples Mann-Whitney U test has been applied to make the comparison.

IV. Results and Analysis

It can be seen from Table I that there is a decline in the number of IPOs entering the market after the stock market crash of 2008, with the number of IPOs reducing from 188 in the pre-crash period to 110 in the post-crash period.

IPOs issued in both the pre-crash and post-crash periods have provided statistically significant positive mean initial returns, thereby showing that IPOs have been generally underpriced by the issuers irrespective of the market conditions. The mean initial return has declined from 34.05 percent for IPOs issued in the pre-crash period to 9.52 percent for IPOs issued in the post-crash period. Of the 188 IPOs of the pre-crash period, 52 IPOs are overpriced as they have provided negative initial returns (with mean IR of -13.05 percent) while 136 IPOs are underpriced, having provided positive mean initial returns mean of 52.06 percent. Forty-three of the total post-crash IPOs provided negative initial returns with a mean of -22.13 percent and the remaining 67 IPOs provided positive initial returns with mean of 29.83 percent.

The mean initial return of the IPOs issued in the post-crash period (9.52 percent) is found to be significantly different from the mean initial return of the IPOs issued in the pre-crash period (34.05 percent) on the basis of the results of two independent samples t-test given in Table I.

Table I: Initial Returns (IR) of IPOs (Pre and Post Stock Market Crash 2008)

PERIOD	Number of IPOs	Mean IR (in %)	Median IR (in %)	Std. Deviation of IR (in %)	t statistic (d.f.)	p value (sig.)
Pre-Crash Period (Three years prior to the stock market crash of 2008)	188	34.05**	22.81	53.70	3.69 (187)	0.000
Post-Crash Period (Three years post the stock market crash of 2008)	110	9.52**	6.06	35.90	2.78 (109)	0.006
t test for difference in means (t (d.f.), p value)	4.71 (290.8), p = 0					
One year prior to stock market crash 2008	76	35.06**	20.27	62.60	4.68 (75)	0.000
One year post stock market crash 2008	13	11.84	2.08	38.23	1.12 (12)	0.285
t-test for difference in means (t (d.f.), p value)	1.20(87), p = 0.2					
Two years prior to stock market crash 2008	141	29.41**	15.66	51.46	6.79 (140)	0.000
Two years post stock market crash 2008	71	12.54**	6.45	29.73	3.65 (70)	0.001
t-test for difference in means (t (d.f.), p value)	3.02 (204.02), p = 0.003**					

* Significant at 5% level of significance
 ** Significant at 1% level of significance

The Mann-Whitney test has also been applied as the tests of normality have shown that the initial returns of IPOs in the pre-crash period (W (188) = 0.824, p = 0 and D (188) = 0.122, p= 0) are not normally distributed at 5 percent level of significance and neither are the initial returns of IPOs in the post-crash period (W (110) =0.968, p = 0.01 and D (110) = 0.112, p=0.002). The results of Mann-Whitney test in Table II show that mean rank of the pre-crash period initial return (164.32) is higher than that of the post-crash period initial return (124.16). The results of Mann-Whitney test confirm the results of the independent samples t-test that the initial returns of the pre-crash period IPOs are statistically significantly different from those of the post-crash period IPOs.

Table II: Mann-Whitney Test of Difference in Initial Returns of IPOs (Three Years Prior to and Post Stock Market Crash)

Period	Number of IPOs	Mean Rank	Sum of Ranks	Mann-Whitney, U	p value (sig.)
Pre-Crash	188	164.32	30893	7553*	0.000
Post-Crash	110	124.16	13658		
Total	298				

* Significant at 1% level of significance

This indicates that there is a change in the underpricing of the IPOs after the stock market crash of 2008. The underpricing of the IPOs issued in the period before the crash is found to be significantly higher than that of the IPOs issued after the crash.

It is necessary to understand whether this decline in the initial returns of the IPOs issued after the crash is a long-term change or just a short-term change. For this purpose the underpricing of the IPOs issued in the one year window prior to the crash and one year post the stock market crash of 2008 has been compared. It can be seen from Table I that 76 IPOs have been issued in the one year period prior to the crash and these IPOs have provided a statistically significant mean initial return of 35.08 percent. On the other hand, only 13 IPOs have been issued in the one year period after the 2008 crash and these IPOs have provided mean initial return of only 11.86 percent, which is not even statistically significant. There is however, no significant difference in the initial return of the IPOs issued one year prior to the crash and the initial return of the IPOs issued one year post the crash at 5 percent level of significance.

As the initial returns of the IPOs issued during the one year prior to crash period are not normally distributed ($W(76) = 0.832$, $p = 0$ and $D(76) = 0.142$, $p = 0.001$) and neither are the initial returns of the IPOs issued during the one year post the crash ($W(13) = 0.681$, $p = 0$ and $D(13) = 0.299$, $p = 0.002$), the Mann-Whitney test has also been applied. The results of the Mann-Whitney test provided in Table III confirm those of the independent t-test that there is no statistically significant difference in the initial returns of IPOs for one year period prior to the crash and one year after the crash at 5 percent level of significance.

Table III: Mann-Whitney Test of Difference in Initial Return of IPOs (One Year Prior to and Post Stock Market Crash)

Period	Number of IPOs	Mean Rank	Sum of Ranks	Mann-Whitney, U	p value (sig.)
One Year Prior to Stock Market Crash 2008	76	46.61	3542	372	0.156
One Year Post The Stock Market Crash 2008	13	35.62	463		
Total	89				

As no statistically significant difference is found in the initial return in the period one year prior to and one year post the crash, the period surrounding the crash has been increased further to two years, that is, 24 months prior to the crash and 24 months post the stock market crash of 2008. The 141 IPOs issued in two years period prior to the crash are observed to provide a significant mean initial return of 29.41 percent while the 71 IPOs issued two years post the crash generated a significant mean initial return of only 12.54 percent. The results of the independent-test given in Table I indicate that the difference between the initial return for these two periods is statistically significant at one percent level of significance.

The initial returns of IPOs issued in the period two year prior to the crash have not been found to be normally distributed according to the results of Shapiro-Wilk and Kolmogorov-Smirnov tests of normality ($W(141) = 0.837$, $p = 0$ and $D(141) = 0.116$, $p = 0$). Similarly, the initial returns of IPOs issued two years post the crash are also not found to be normally distributed ($W(71) = 0.889$, $p = 0$ and $D(71) = 0.180$, $p = 0$). Therefore, Mann-Whitney test has been conducted and its results (shown in Table IV) confirm the results of the independent t-test. Therefore, initial returns of IPOs issued in the two years prior to the crash is statistically significantly different from the initial return of IPOs issued in the two years post the crash.

Table IV: Mann-Whitney Test of Difference in Initial Returns of IPOs (Two Years Prior to and Post Stock Market Crash)

Period	Number of IPOs	Mean Rank	Sum of Ranks	Mann-Whitney, U	p-value (sig.)
Two Years Prior to the Stock Market Crash 2008	141	112.63	15844	4138*	0.040
Two Year Post the Stock Market Crash 2008	71	94.28	6694		
Total	212				

* Significant at 5% level of significance

V. Summary and Conclusion

IPOs issued in both the pre-crash and post-crash periods are observed to have provided statistically significant positive initial returns. This implies that IPOs have been generally underpriced by the issuers irrespective of the market conditions. However, a significant sharp decline in the initial returns (underpricing) of the IPOs has been observed after the stock market crash of 2008. Although the mean initial returns of the IPOs issued in the one year post the crash is observed to be considerably less than the mean initial returns of the IPOs issued in the one year prior to the crash, the difference has not been found to be statistically significant. In contrast, the mean initial return is seen to have declined significantly from 29.41 percent in the two year period prior to the crash to only 12.54 percent in the two year period post the crash. Further, it is found that IPOs issued during the three-year period after the crash (post-crash period) have been underpriced less than the IPOs issued in the three-year period before the crash (post-crash period) as the IPOs in post-crash period have provided significantly lower initial returns.

In summary, the comparison of the underpricing in the pre and post-crash period reveals that the IPOs issued after the crash (post-crash period) have been under-

priced to a lesser extent in comparison to the IPOs issued before the crash (pre-crash period). This is evidenced by the significant lower initial returns of the IPOs issued after the stock market crash of 2008. The findings are similar to the findings of Vithessonthi (2008) of lower initial return for IPOs issued in Thailand after the Asian financial crisis of 1997 and also to the findings of Sundarasan and Rajangam (2009) of a significant drop in underpricing in Malaysia after the Asian financial crisis. However, these findings are contrary to those of Ang and Boyer (2009) who found higher underpricing in the period after 1987 United States stock market crash.

This decline in underpricing could be attributed to two alternative reasons. The first reason is that the stock market has become more efficient after the crash as the IPOs are underpriced less. This is in line with the findings of Sundarasan and Rajangam (2009). In such a case, only established companies, which were bigger in size and had a good track record of profitability and growth, may have come out with IPOs. Such companies would have less ex-ante uncertainty; hence the shares of these companies would be expected to carry less investment risk. Consequently, these companies would need to underprice their IPOs to a lesser extent so as to make their IPOs a success. At the same time, the companies with greater ex-ante uncertainty may have stayed away from the primary market because their IPOs would be perceived to be more risky by investors. This would result in a decline in the average initial returns.

The second reason, which may explain the significant decline in the underpricing after the stock market crash, is based on investor sentiments and investors'

response to the IPOs. The stock market crash of 2008 may have led to an increase in the level of risk aversion by the investors. A large number of the highly risk-averse investors may have even left the IPO market after the crash. The remaining investors may have been selective in their choice of IPOs for investment. Accordingly, there would be a general decrease in demand for the IPOs. This would mean that the slack response of the investors would not push the market price of the shares as high upon listing as it did prior to the crash and consequently translate into lower initial returns after the crash.

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