Rational and Behavioral Decision Making in the Indian IPO Market

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Abstract

The underpricing of IPOs has been an extensively researched topic across countries and time. There have been various approaches in academic research to tackle the issue of underpricing and overpricing of IPOs. The IPO issue process is a long process and it disseminates plenty of information until it gets listed on a stock exchange. The present study classified this information in three categories as information available in the offer documents of the IPO issuing firm, information of the performance of past IPOs, and information of the subscription pattern during subscription period of an IPO. This paper is an empirical study which aimed to use the above mentioned three types of information to find out the determinants of initial returns of IPOs in India.

Keywords: behavioral finance, social comparison, IPO underpricing , subscription, offer documents

JEL Classification: G12, G14, G18

There are several explanations for underpricing of IPOs across the world. These explanations mainly fall into two categories: The traditional finance theories which are based on rational decision making and the behavioral finance theories. To name a few, the explanations based on rational decision making are as follows : Underwriter's monopoly, information asymmetry between investors in the IPO market, signaling of quality of the firm, incentive to acquire information from the investors, prestige of the investment banker, underwriter's price support until the issue is fully sold, oversubscription and rationing in the share allocation process, and implicit insurance against possible damages due to legal actions (Allen & Faulhaber, 1989 ; Baron, 1982 ; Benveniste & Spindt , 1989 ; Brennan & Franks, 1997 ; Carter & Manaster, 1990 ; Rock, 1986; Tinic ,1988). These theories state that the IPO investors make rational decisions and analyze the information available to them rather than simply following the behavior of their peer investors.

On the other hand, the explanations based on behavioral finance are such as : prospect theory, mental accounting theory, the cascade hypothesis, and social comparison theory (Chang, 2011 ; Festinger , 1954 ; Kahneman & Tversky , 1979 ; Loughran & Ritter , 2002 ; Ljungqvist & Wilhelm, 2005 ; Thaler , 2008) . These theories state that the investors in the IPO market do not make rational decisions ; rather, they make decisions in comparison to their peer investors. The present study is an empirical study to test both rational decision making explanations as well as behavioural explanations. To test the rational decision making hypothesis, we considered the information available in the offer documents of the issuing firms. Whereas, to test the behavioural explanations, we considered initial returns of the earlier IPOs, and the subscription information of the IPO. We aim to find out how far these explanations are able to explain initial returns of IPOs or underpricing in the Indian capital market.

Review of Literature

In the literature of IPO underpricing, the traditional explanations are comparatively more emphasized than the

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behavioural explanations. Again, in both the kind of explanations, the approach of research has been varying across countries. Jain (2013) documented an extensive literature review on IPO underpricing. The author compared the approach of research between USA, China, and India, and it was observed that the focus of IPO research in the USA is investment bankers's discretionary power ; in China, it is regulatory framework ; and in India, it is firm characteristics. In India, firm characteristics such as age of the firm, issue size, leverage, rate of subscription, turnover, net worth, book value, total assets, EPS, percentage of dividend, issue mechanism, inverse of offer price, industry, standard deviation of returns, listing delay, ownership, group affiliation, board independence ,and hot and cold market are found to be significant variables of initial returns as reported in different studies across time (Agarwalla, 2008 ; Deb & Marisetty, 2010 ; Jain & Jain, 2013 ; Jain & Padmavathi, 2012 ; Jaitly & Sharma, 2004 ; Khurshed, Pande, & Singh, 2009 ; Nandha & Sawyer, 2002 ; Ranajn & Madhusoodanan, 2004 ; Sahoo & Rajib, 2009 ; Singh, 2012 ; Shah , 1995 ; Pande & Vaidyanathan , 2009 ; Phani, Kunal, & Katti, 2010).

On the other side, for behavioural explanations of subscription pattern in the Indian IPO market, Jain and Singh (2012) found the determinants of subscription rate in different categories of investors. According to the authors, in India, investors are categorized in three categories : qualified institutional investors (QIBs), non- institutional investors (NIIs), and retail investors (RIs). They found index return, index volatility, leverage, and promoter holding as the significant determinants of QIBs subscription. Among these variables, index volatility and leverage were found to have a negative impact on QIBs subscription, while index return and promoter holding induced QIBs to subscribe more. For NIIs subscription determinants, they found promoter holding and subscription of QIBs as the significant determinants. Interestingly, promoter holding had a positive impact on QIBs subscription, while it had a negative impact on NIIs subscription. For RIs subscription, the significant variables are subscription of NIIs, index return, and issue size. Among these, the issue size had a negative impact, which means in larger issues, RIs subscribed less. Thus, they found that less informed investors followed more informed investors as QIBs followed promoter holding, NIIs followed QIBs subscription, and RIs followed NIIs subscription. The study hence provided an evidence of information asymmetry in the Indian IPO market.

To test the behavioral aspect of initial returns of IPOs, Chang (2011) analyzed a sample of 1558 IPOs listed on the Taiwan Stock Exchange. The author considered variables such as price- earnings ratio, price-book value ratio, market capitalization to total assets ratio , market capitalization to operating income ratio , and initial returns of the peer firms who went public earlier. The author found that in Taiwan, for making an IPO decision, the IPO issuing firms and the investors made use of the information of the IPOs that went public earlier. This behavior shows presence of behavior of social comparison in the Taiwanese IPO market.

The present study makes an attempt to consider the above mentioned three aspects, that is, firm characteristics, subscription pattern, and initial returns of peer firms in the same data set. It will provide us with the findings regarding how far investors in the Indian IPO market are using the offer documents' information to make rational decisions and how far they are following the behavior of other investors and returns of earlier IPOs.

Empirical Analysis

The sample consisted of 200 book built IPOs listed on the National Stock Exchange (NSE) from January 2004 to February 2013. The data was collected from NSE's website. To get the normality of the variables, they were transformed into natural logarithm .

IPO returns used in the models are calculated as follows :

(1) $\ln \text{Excess } CR = \ln (CP/IP) - \ln (SL - SO)$

where,
Excess CR = Market adjusted initial returns of IPO,
CP = Closing price of IPO on listing day,
IP = Issue price of IPO,

SL = Closing Sensex on listing of IPO,
SO = Closing Sensex on offer closing day of IPO.

(2) $\ln \text{Excess } OR = \ln (OP / IP) - \ln (SL - SO)$

Excess OR = Market adjusted opening returns of IPO,
OP = Opening price of IPO on listing day,
IP = Issue price of IPO,
SL = Opening Sensex on listing of IPO,
SO = Opening Sensex on offer closing day of IPO.

↬ **Abbreviations Used in the Empirical Models**

↬ **QIBs - Qualified Institutional Buyers :** This category of investors includes financial institutions, banks, FIIs, and mutual funds who are registered with SEBI. The 50% portion of shares of a book built IPO is reserved for them.

↬ **NIIs – Non-Institutional Investors :** This category includes individual investors, NRIs, companies, trusts, and so forth who bid for more than ₹ 1, 00,000 . They need not to register with SEBI. 15% shares of a book built IPO are reserved for NIIs.

↬ **RIs – Retail Investors :** These investors cannot bid for more than ₹ 100,000 in a book built IPO. This category also includes high net worth individuals (HNIs) who can bid upto ₹ 2, 00,000.The portion of shares reserved for this category is 35% of total shares of a book built IPO.

↬ **Issue Size :** No. of shares offer in a book built IPO,

↬ **EPS :** Earnings per share,

↬ **NAV :** Net asset value,

↬ **RONW :** Return on net worth,

↬ **Pre-issue debt to equity :** Debt to equity ratio of IPO firm,

↬ **Promoters Holding :** Portion of shares held by the promoters in an IPO,

↬ **P/E :** Price to earnings ratio,

↬ **P/B :** Price to book value ratio.

Model 1

$\ln (\text{Excess } CR \text{ on BSE})$
$= \beta_0 + \beta_1 \ln (\text{Excess } OR \text{ on BSE}) + \beta_2 \ln (QIBs) + \beta_3 \ln (NIIs) + \beta_4 \ln (RIs) + \beta_5 \ln (Issue\ Size) + \beta_6 (EPS) + \beta_7 \ln (NAV) + \beta_8 (RONW\%) + \beta_9 \ln (Pre-issue\ debt\ to\ equity) + \beta_{10} \ln (Promoter\ Holding) + \beta_{11} \left(\dfrac{P}{E}\right) + \beta_{12} \left(\dfrac{P}{E}\right) + è$

The Table 1 shows the stepwise regression model for determinants of initial returns of IPO. The independent variables used in this model were extracted from the information provided in the offer documents or the information which is publicly available such as subscription rate and opening returns. The results in the Table show that out of 12 independent variables, 5 variables are significant. These 5 variables are: Excess opening returns, NIIs, issue size, RIs , and QIBs. Among these variables, issue size and RIs have inverse relationship with initial returns of IPOs, and the remaining other 3 variables have positive regression coefficients. The predictability of the final model is 43.35%.

Stepwise Regression : Model 1

Table 1. Determinants of Excess *CR* on BSE

Response is ln Excess *CR* on 12 predictors, with *N* = 200

Step	1	2	3	4	5
Constant	-0.03	-0.07	0.37	0.49	0.56
ln Excess *OR*	1.19	0.92	0.89	0.98	0.92
t - value	11.55	6.45	6.24	6.38	5.88
ln NIIs		0.04	0.04	0.05	0.04
t - value		2.69	2.82	3.22	2.61
ln Issue Size			-0.03	-0.03	-0.04
t - value			-1.94	-2.31	-2.60
ln RIs				-0.03	-0.04
t - value				-1.53	-1.72
ln QIBs					0.02
t - value					1.49
R-Sq(adj)	39.96	41.80	42.60	42.99	43.35

Stepwise Regression: Model 2

Table 2. Determinants of Excess *OR* on BSE

Response is ln *OR* on BSE on 11 predictors, with *N* = 200

Step	1	2	3
Constant	-0.01058	-0.02451	-0.03245
ln NIIs	0.0648	0.0375	0.0274
t- value	12.91	5.95	4.01
ln RIs		0.0493	0.0449
t- value		5.94	5.47
ln QIBs			0.0194
t- value			3.33
R - sq(adj)	49.18	56.69	58.8

Model 2

$$\ln(\text{Excess } OR \text{ on BSE})$$
$$= \beta_0 + \beta_1 \ln(QIBs) + \beta_2 \ln(NIIs) + \beta_3 \ln(RIs) + \beta_4 \ln(\text{Issue Size}) + \beta_5 \ln(EPS) + \beta_6(NAV) + \beta_7 \ln((RONW\%)) + \beta_8 \ln(\text{Pre}-\text{issue debt to equity}) + \beta_9 \ln(\text{Promoter Holding}) + \beta_{10}\left(\frac{P}{E}\right) + \beta_{11}\left(\frac{P}{E}\right) + \grave{e}$$

The Table 2 shows the stepwise regression model for determinants of opening returns of IPOs. The independent variables used in this model were extracted from the information provided in the offer documents or the information which is publicly available, such as subscription rate. The results in the table show that out of 11 independent variables, 3 variables are significant. These 3 variables are: QIBs, NIIs, and RIs. All of 3 variables have positive regression coefficients. The predictability of the final model is 58.80%.

The Table 3 shows stepwise regression model for determinants of QIBs subscription rate for IPOs. The independent variables used in this model is the information which is available to QIBs at the time of subscription to an IPO. The results depicted in the Table show that out of 8 independent variables, 4 variables are significant.

Table 3. Determinants of QIBs Subscription Rate

Response is ln QIBs on 8 predictors, with N = 200

Step	1	2	3	4
Constant	1.42	-2.81	-3.36	-3.5
EPS (₹)	0.03	0.03	0.03	0.03
t - value	2.49	3.15	2.55	2.84
Ln issue size		0.25	0.28	0.29
t -value		2.4	2.64	2.74
RONW(%)			0.01	0.01
t - value			1.65	2.47
price/book value				-0.68
t-value				-1.91
R - sq(adj)	2.56	4.85	5.67	6.92

Table 4 : Determinants of NIIs Subscription Rate

Response is ln NIIs on 9 predictors, with N = 200

Step	1	2	3
Constant	0.76	0.63	1.53
ln QIBs	0.68	0.68	0.70
t - value	12.45	12.54	12.87
price/book value		0.48	0.57
t - value		2.27	2.66
promoter holding(%)			-0.02
t - value			-2.28
R - sq(adj)	43.61	44.77	45.93

Model 3

$$\ln(QIBs) = \beta_0 + \beta_1(Issue\ Size) + \beta_2(EPS) + \beta_3\ln(NAV) + \beta_4(RONW\%) + \beta_5\ln(Pre-issue\ debt\ to\ equity) + \beta_6\ln(Promoter\ Holding) + \beta_7\left(\frac{P}{E}\right) + \beta_8\left(\frac{P}{E}\right) + è$$

These 4 variables are : EPS , issue size, RONW , and P/B ratio. Among these significant variables, P/B ratio is inversely related to QIBs subscription, and the other 3 variables have positive regression coefficients. The predictability of the final model is 6.92%, which is significantly low for making any predictions.

Model 4

$$\ln NIIs = \beta_0 + \beta_1\ln(QIBs) + \beta_2\ln(Issue\ Size) + \beta_3\ln(EPS) + \beta_4\ln(NAV) + \beta_5(RONW\%) + \beta_6\ln(Pre-issue\ debt\ to\ equity) + \beta_7(Promoter\ Holding) + \beta_8\left(\frac{P}{E}\right) + \beta_9\left(\frac{P}{E}\right) + è$$

The Table 4 shows stepwise regression model for determinants of NIIs subscription rate for IPOs. The independent variables used in this model are the information which is available to NIIs at the time of subscription to an IPO. We assumed that QIBs are more informed than NIIs, hence NIIs may follow QIBs. This assumption is similar to the assumption of Jain and Singh (2012). The results in the Table show that out of 9 independent variables, 3 variables are significant. These 3 variables are: QIBs, promoter holding, and P/B ratio. All 3 variables have positive regression coefficients. The predictability of the final model is 45.93%.

Model 5

$$\ln RIs = \beta_0 + \beta_1\ln(QIBs) + \beta_2\ln(NIIs) + \beta_3\ln(Issue\ Size) + \beta_4\ln(EPS) + \beta_5(NAV) + \beta_6(RONW\%) + \beta_7\ln(Pre-issue\ debt\ to\ equity) + \beta_8\ln(Promoter\ Holding) + \beta_9\left(\frac{P}{E}\right) + \beta_9\left(\frac{P}{E}\right) + è$$

The Table 5 shows stepwise regression model for determinants of RIs subscription rate for IPOs. The independent variables used in this model are the information which is available to RIs at the time of subscription to an IPO. We assumed that QIBs and NIIs are more informed than RIs, hence RIs may follow QIBs and RIs. This assumption is similar to assumption of Jain and Singh (2012). The results depicted in the Table show that out of 10 independent variables, 5 variables are significant. These 5 variables are : QIBs, NIIs, promoter holding, issue

Stepwise Regression: Model 5

Table 5. Determinants of RIs Subscription Rate

Response is Ln Ris on 10 predictors, with *N* = 200

Step	1	2	3	4	5
Constant	0.2825	4.2801	4.6413	4.9877	5.4985
ln NIIs	0.554	0.55	0.449	0.437	0.441
t - value	15.05	15.71	9.78	9.57	9.68
ln Issue Size		-0.246	-0.272	-0.253	-0.284
t - value		-4.7	-5.27	-4.9	-5.16
ln QIBs			0.155	0.176	0.184
t - value			3.27	3.69	3.86
Promoter Holding(%)				-0.011	-0.0097
t - value				-2.46	-2.14
EPS (₹)					-0.0089
t - value					-1.58
R - sq(adj)	53.11	57.62	59.61	60.62	60.92

Stepwise Regression: Model 6

Table 6. Behavioral Determinants of Adjusted Initial Returns

Response is LN AR4 on 3 predictors, with *N* = 263

Step	1	2
Constant	0.08211	0.07067
ln AR3	0.124	0.115
t - value	3.21	2.97
ln AR1		0.084
t - value		2.21
R - Sq(adj)	3.43	4.85

size, and EPS. The 3 variables - issue size, promoter holding, and EPS have negative regression coefficients. The predictability of the final model is 60.92 %.

Model 6

$$\ln(AR_4) = \beta_0 + \beta_1 \ln(AR_1) + \beta_2 \ln(AR_2) + \beta_3 \ln(AR_3) + \grave{e}$$

The Table 6 shows stepwise regression model for behavioral determinants of initial returns of IPOs. The independent variables used in this model are the initial returns of 3 IPOs that went public earlier. This assumption is similar to the assumption of Chang (2011). The results depicted in the Table show that out of 3 independent variables, 2 variables are significant. These 2 variables are: *AR1* and *AR3*. It means any 4th IPO's returns are significantly influenced by the initial returns of the 1st and 3rd IPOs that went public earlier. The predictability of the final model is 4.85%, which is significantly low and cannot be used for making the predictions.

Conclusion and Implications

The present study empirically tested a few hypotheses in the Indian capital market. The obtained results support the existing literature on these hypotheses. The very first hypothesis we tested is that initial returns of an IPO in the Indian capital market is influenced by the characteristics of the issuing firm. We found out of 12 independent variables, and 5 variables are significant. These 5 variables are: excess opening returns, NIIs, issue size, RIs, and QIBs. These results support the results obtained by Khurshed et al., (2009), Pande and Vaidyanathan (2009), Sahoo and Rajib (2009), Deb and Marisetty (2011), Phani et al. (2010), Jain and Padmavathi (2012), Singh (2012), & Jain and Jain (2013).

The second hypothesis we tested is that the opening returns of an IPO are also determined by the characteristics of the issuing firm. We found that out of 11 independent variables, 3 variables are significant. These 3 variables are: QIBs, NIIs, and RIs. The third hypothesis we tested is that QIBs subscription is influenced by the availability of publicly available information. It was found that QIBs's subscription is significantly influenced by EPS, issue size, RONW, and P/B ratio. The fourth hypothesis we tested is that NIIs follow QIBs's subscription as well as other publicly available information. We found that NIIs's subscription is significantly determined by the subscription of QIBs, promoter holding, and P/B ratio. The fifth hypothesis was that RIs are less informed that QIBs and NIIs, hence they follow both of them and other publicly available information. It was found that their subscription is determined by QIBs, NIIs, promoter holding, issue size, and EPS. The sixth and last hypothesis tested was that how far initial returns of a new IPO follows returns of earlier IPOs. We found that 1st and 3rd IPOs initial returns are significant determinants. It shows that investors are using returns of earlier IPOs for making decisions about investment in a new IPO; similar results were obtained by Chang (2011) as well.

It can be concluded that in the Indian capital market, the IPO investors make rational decisions by using information available in the offer document of the issuing firm ; they also take decisions based on the behavior of more informed investors, and the initial returns of earlier IPOs. These results confirm the existence of explanations of rational decision making and social behavioral comparison. The results of present study can be used by the IPO issuing firms as well as the IPO investors to make their decisions.

Limitations of the Study and Scope for Further Research

The present study has a wide scope for future research in testing both the explanations with some variables such as PE, PB, market capitalization to total assets , and market capitalization to operating income . The study of these variables can provide us with the results that while deciding offer price, how far Indian IPO firms are using this information of the firms that went public earlier. Chang (2011) found evidence for the same. Similarly, predictability of the model used for determinants of QIBs subscription is also low to make the predictions, hence in the future, research with respect to this model can be improved.

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