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Transparency in IPO Mechanism:

Information Production, IPO Pricing and Investors' Participation

Suman Neupane

Cranfield School of Management

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Supervisor: Professor Sunil S. Poshakwale

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Abstract

In this doctoral thesis we bring together some empirical analysis on investors' participation in initial public offering (IPOs) from a market whose characteristics are unique and significantly different from US and other important IPO markets. There are two important features which distinguishes the Indian IPO market. First, the Indian IPO market is characterised by a high level of transparency. Information on the participation of different investor categories is publicly available during the offer period on a real time basis. Second, Indian IPO firms are also required to reserve and allocate pre-determined fraction of total shares on offer to different investor categories participating in the IPO.

Our first empirical study shows that the transparency in the mechanism creates highly inelastic demand curves for a large number of IPOs. Analysis of demand over-time shows that while institutional investors take the lead in subscribing to strong IPOs, non-institutional investors do so in weak IPOs, but perhaps not always with an honest intent. Our analysis of IPO pricing shows that favourable demand by uninformed investors is positively associated with a high IPO price. Further, while reputed underwriters appear to exercise far more caution and restraint in setting prices, we find that in a large number of IPOs, less reputed underwriters ignore information produced during the offer period and set the price at the upper bound of the price range. Our findings suggest that the transparency in allocation mechanism appears to be a double edged sword for the uninformed (retail) investors. We recommend a change in the current regulation to protect investor's welfare.

We also examine the influence of the participation of different investor categories on initial returns. Unsurprisingly, we find that while the participation of both the informed investor categories significantly influences initial returns, the participation of retail investor losses its significance in explaining initial returns for bookbuilding and auction IPOs. We also analyse the participation of informed institutional investors to examine whether the presence of new bank loans at the time of the IPO reduces information asymmetry. Our results show that presence of bank loans do not appear to reduce information asymmetry as institutional investors participate significantly less in IPOs with new bank loans. While this result is contrary to prior studies on bank loan announcements, it is consistent with a recent study which shows that prior studies on bank loan announcements are plagued by sample selection issues.

In our final empirical analysis we examine the participation of employees in IPOs and analyse whether such participation can predict superior financial and operating performance of the firm. We find that IPOs with high employee participation offer significantly higher initial returns than IPOs with low employee participation. We also find that firms with high employee participation in their IPOs exhibit superior post IPO operating performance. Further, we find that the prior participation of other investor categories, in particular the institutional investors, does not appear to influence the participation of employees in IPOs. Our results suggest that employees have valuable private information about the quality of the firm. The evidence presented in the study suggests that in the context of Indian IPOs, where data on investors' participation is available on a real time basis, uninformed investors may use information on employee participation to select well performing IPOs.

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Chapter 1 Introduction

1.1 Background

As Jagannathan et al., (2010) show, bookbuilding mechanism has become the most dominant form of Initial Public Offering (IPO) mechanism throughout the world. Where introduced, it has quickly become the most dominating form of IPO allocation and pricing mechanism by replacing auction and fixed price mechanisms. The most important feature of the bookbuilding mechanism, as it is practiced in the US and most of the other markets, is the discriminatory power provided to the underwriter or the investment banker who manages the IPO. The discretion allows the underwriters to price and allocate IPO shares in a manner which they consider appropriate (Ritter and Welch, 2002). In addition to discretion in pricing and allocation, the other important feature of the mechanism is the complete secrecy that is maintained by the underwriters throughout the process. Not only do investment banks withhold information on the participation of investors during the IPO offer period, they also do not disclose data on the completion of IPO since they consider this as private and confidential.

The complete discretionary powers afforded to investment banks coupled with the guarded nature of the IPO process has led to intense debate on the appropriateness of the bookbuilding mechanism particularly in the floatation of young and unknown entities. While there are compelling arguments in support of the bookbuilding mechanism, recent research which examines conflicts of interest in IPOs exposes a dark side in the use of bookbuilding mechanism. Those who support bookbuilding argue that the mechanism enables underwriters and issuers to extract useful information from investors and thus aids in improving the pricing efficiency (Benveniste and Spindt, 1989, Sherman, 2000, Benveniste and Wilhelm, 1990). Sherman (2005) show that allocation control reduces the risk for both issuers and investors. Others argue that bookbuilding serves right for young and unstandardized firms which suffer from severe information asymmetry. Further, Jagannathan et al., (2010) posit that one of the reasons why bookbuilding is popular is because alternative mechanisms, such as auction and fixed price mechanism, suffer from

problems of free riding and winner's curse which in turn hamper the price discovery process.

Those against bookbuilding criticize the significant discretionary power that the mechanism provides to the investment banks who, in turn, use the discretion to further their own benefits (Loughran and Ritter, 2004, Nimalendran et al., 2007). Reuter (2006), for instance, shows that allocation of hot IPOs is positively associated with the trading commission paid by institutional investors. The IPO literature also provides evidence on spinning (Liu and Ritter, 2010) and laddering (Hao, 2007), which critics of bookbuilding consider as the outcomes of discretion that the mechanism endows to the investment banks. Recently, Degeorge et al., (2010) present auctions as a worthy alternative to bookbuilding mechanism by offering evidence of information production and pricing efficiency in their examination of US auction IPOs.

As discussed in the preceding paragraphs, while the IPO literature discusses the benefits and detriments of underwriter discretion in IPOs, there is very little prior research which discusses the implications for investors' participation and information production in a relatively more transparent IPO mechanism. This is partly because, although auctions are transparent in terms of allocations, IPO mechanisms used in most capital markets around the world operate in a setting where very little information is made public. Although there have been calls for making the IPO process more transparent, particularly in the light of investment banks' unscrupulous deals during the internet bubble[1], the pricing and allocation process still remains largely opaque[2]. In this doctoral study, we use a sample of Indian IPOs to examine a number of issues in a setting which is significantly more transparent than the bookbuilding setting of US and other major IPO markets. While the Indian IPO market has issued IPOs with either fixed priced or bookbuilding/auction mechanisms, the mechanism is highly transparent with respect to information on investors' participation.

[1] Nimalendran et al., (2007) discusses examples of profit sharing allocation by US investment banks during the 1999-2000 period. .

[2] Jagannathan and Sherman (2005) argue that a more transparent and accessible bookbuilding can improve investors' and issuers' welfare in IPOs.

The transparency in the IPO mechanism has several important implications for IPO research. First, it should influence the manner in which investors participate in IPOs, which in turn should impact the level of information produced during the offer period. Not only should the transparency influence the level of investors' participation, but it should also affect their timing of participation as some investors may prefer to participate at the end of the offer period after observing the participation of other investors. All this should have important bearings on the degree of information produced during the offer period. Information production during the offer period on account of investor' participation has been an important area of research in the IPO literature. Hence, evidence of the impact of the transparency in information production should be extremely useful. Further, existing evidence on the participation of institutional (informed) and retail (uninformed) investors suggest that the information conveyed by the transparent allocation mechanism should influence investor categories differently.

Second, since prior research suggests that information produced during the offer period influences IPO offer prices (Cornelli and Goldreich, 2003, Degeorge et al., 2010), the nature of information produced in a transparent mechanism should also have significant impact on offer prices. This in-turn should influence the degree of initial returns (underpricing) and the long term performance of IPOs. It would be interesting to observe how the information produced in a mechanism distinguished by transparency influences offer prices compared to mechanisms which are far less transparent.

Third, prior research informs us that reputational capital is important for financial intermediaries (Mehran and Stulz, 2007). In a transparency mechanism where such behaviour is publicly visible it would be interesting to see how investment banks/underwriters behave[3]. It would be plausible to assume that in a transparent mechanism the use of underwriters' discretion in pricing should be consistent with maintaining or enhancing reputation as offer prices which deviates significantly from the information contained in investors' bids will be detected by the market participants. Finally,

[3] In a large sample of our IPOs, underwriters only possess pricing discretion. Hence, we focus more on the pricing than on the allocation aspect in analysing underwriter's behaviour in the IPO process.

the transparency in the mechanism should also leave less opportunity for the underwriters to engage in a quid-pro-quo relationship which has been documented in less transparent IPO mechanisms, such as those practiced in the US.

In this study, we analyse information available on the participation of various investor categories to examine a number of issues including the impact of investors' participation on information production, on IPO pricing, on the use of discretion in pricing by underwriters, and on IPO initial returns. The opaque setting of bookbuilding mechanism in most part of the world has meant that there are very few studies which have examined these issues in significant detail. Amongst the few studies, using proprietary data, Cornelli and Goldreich (2003), Jenkinson and Jones (2004) and Degeorge et al., (2010) provide some empirical evidence in the context of the opaque bookbuilding/auction mechanism. Our research on the influence of investors' participation not only yields important findings on information production and IPO pricing, it also highlights the strengths and weaknesses associated with a transparent IPO mechanism. The findings should be particularly useful to market participants and regulators in both India as well as other less transparent markets.

1.2 The Context: Indian IPO Market

Since institutional features of the Indian IPO setting represents a core element of our study, we briefly highlight two of the most important features in the followings paragraphs before we present a short summary of our main empirical findings. We present a detailed discussion of the various institutional features of Indian IPO market in Chapter 3.

Transparency of the IPO Mechanism

Although the Indian IPO market has historically used either a fixed price, a variant of the US bookbuilding or auction mechanism as a placement method, the IPO process differs significantly from those observed in the US and most of the other IPO markets. Unlike the US IPO market, the IPO mechanism in India is far more transparent. Information on investors' participation during the offer period is publicly available. The information, which is available on almost a real-time basis on the stock exchanges where the IPO is to be listed, allows market participants to observe not only the overall cumulative demand of

the offer, it also allows them to observe the demand of IPO shares by different investor categories. Further, the stock exchanges also displays information on the aggregate demand of IPO shares at different point of the offer price range.

Different Investor Categories

The Indian IPO firm is required to reserve and allocate separate tranche of shares to different categories of investors participating in the IPOs. There are primarily three investor categories to whom IPO shares are reserved and allocated: institutional investors, non-institutional investors and retail investors. Further, in a large number IPOs employees are also offered a certain fraction of the total IPO shares. Institutional investors are allocated the largest fraction of shares followed by retail investor, non-institutional investors and employees of the firm. The participation of various investor categories as well as the availability of data on their participation provides an interesting setting which allows us to test a number of hypotheses regarding investors' participation in IPOs.

1.3 Main Research Issues and Summary of the Findings

In the following paragraphs we briefly summarize the findings of our four empirical chapters, each one of which analyses participation of one or more investor categories.

1.3.1 Transparency in the IPO mechanism: information production, pricing and investor welfare (Chapter 5)

In chapter 5, we analyse the participation of the three main investor categories, institutional, non-institutional and retail investors, to examine the influence of the transparent IPO process in the participation of these three investor categories. In particular, we examine how the transparency influences information production and IPO pricing. We also examine the use of pricing discretion by underwriters. Using a sample of 306 bookbuilding and auctions IPOs over a ten year period from January 2001 to December 2010, we find that the transparency in the IPO mechanism creates IPO demand curve which is significantly less elastic than those reported by prior studies and hence fails to produce value relevant information. Analysis of evolution of demand over the offer period reveals that the investors taking lead in subscribing to IPO shares differs by IPO type. Large institutional

investors, owing to their superior information, subscribe early in strong and hot IPOs. Non-institutional investors (large net-worth investors) do the same in weak and cold IPOs, but, perhaps, not always with an honest intent. Thus, on one hand, the transparency of the Indian IPO mechanism appears to mitigate the winners' curse problem, on the other hand, it raises serious concerns about the welfare of uninformed retail investors.

Findings from our analysis of IPO offer prices show that that favourable demand by retail investors is one of the most significant contributors to high IPO offer prices. More importantly, the favourable demand of the less informed investors is fully incorporated into the offer prices. Our analysis on the role of underwriter's reputation shows that when compared to less reputed underwriters, reputed underwriters are more likely to set offer prices which incorporates the information produced during the offer period. We find that in presence of favourable demand of retail investors, less reputed underwriters simply ignore the information conveyed by informed investors. We suggest a change in the existing IPO regulation to protect the welfare of the less informed investors.

1.3.2 IPO Initial Returns and choice of placement mechanism (Chapter 6)

In Chapter 6, we continue our analysis on the participation of different investor categories and examine their influence on IPO initial returns (underpricing). Further, since a number of different placement mechanisms (fixed price, bookbuilding and auction) are used during the sample period, we also examine the determinants of the choice of IPO mechanism. Using a sample of 371 IPOs issued during the 2001-2010 period, we find that IPOs issued under the auction mechanism are least underpriced while those issued with fixed price mechanism are most underpriced. Results from our analysis of determinants of IPO allocation mechanism show that fixed price mechanism is mostly used by firms of smaller size who are exposed to higher levels of information asymmetry. The size of the IPO offer alone explains more than 60% of the variation in the choice of IPO mechanism. Further, we find that IPO firms exposed to higher risk are also more likely to use fixed price mechanism instead of auction or bookbuilding mechanism.

Our analysis of bookbuilding and auction IPO initial returns suggests that the demand of informed investors (both QIB and NII) is more influential in determining initial returns (first day and first month) than the demand of retail investors. Since high demand by retail investors is already incorporated in setting high offer prices, particularly in cold IPOs, they appear to lose significance in explaining IPO initial returns. In case of fixed price IPOs, however, demand of retail investors appear to be highly significant. This is because in fixed price mechanism the offer price is set well before soliciting investors' bids and, more importantly, retail investors receive a much larger fraction to total shares on offer than what they receive in auction and bookbuilding IPOs. Our examination of investors' flipping based on bulk deals[4] which occur on the first day of trading suggests that flipping is concentrated more in cold IPOs and IPOs which are managed by less reputed underwriters.

1.3.3 New bank loans at the time of the IPO (Chapter 7)

In Chapter 7, we analyse the participation of institutional investors (QIBs) to examine whether bank loans are a unique form of finance. A large number of prior studies on the uniqueness of bank loans find a significant relationship between bank loan announcements and abnormal stock returns. Since Indian IPO regulation requires firms to demonstrate confirm funding sources for at least 75% of the funds required to purse projects declared in the IPO prospectus, a large number of IPOs firms resort to bank lending at the time of the IPO to supplement the financing needs. Hence, we examine the association between the participation of institutional investors and new bank loans made at the time of the IPO to examine the uniqueness of bank lending. We argue that if bank lending is indeed unique, it should be accompanied by a higher participation of the informed institutional investors.

Using a sample of 294 IPOs issued during the period January 2001 to December 2008 our study find some interesting results. We find that new bank loans at the time of the IPO are only taken by very small issuers who are not able to finance their project entirely from the proceeds of the IPOs. Our results show that firms with higher levels of information asymmetry are more likely to have new bank loans at the time of the IPO. More

[4] Buy or sale deals which accounts for at least 0.5% of outstanding shares.

importantly, we find that firms which resort to bank loans have significantly larger projects compared to firms who do not resort to bank funding at the time of the IPO. Further, consistent with some prior research, we also find that firms which are highly levered are more likely to borrow than firms which are less levered.

Our analysis of investors' participation shows that the participation of institutional investors (QIBs) is negatively associated with the presence of new bank loan at the time of the IPO. Our results hold when we only include IPOs of small firm size which are more likely to borrow new bank loans at the time of the IPO. Further, our analysis of investors' demand over the period of the IPOs shows that the early participation of institutional investors (QIBs) is also significantly less in IPOs with bank loan at the time of the IPO. Our results are robust to a number of different specifications and controls. Further, our results remain qualitatively similar when we use investors bids instead of investors' demand multiple. Hence, while our result is contrary to the established prior evidence on the uniqueness of bank loans, it is consistent with a recent study (Maskara and Mullineaux, 2011a), which shows that bank loans are not unique and that the relationship between bank loans and abnormal stock returns documented in past studies is on account of sample selection issues.

1.3.4 Employee participation in IPOs (Chapter 8)

In our final empirical analysis in Chapter 8, we examine the participation of employees in IPOs. Reservation and allocation of shares to employees at the time of the IPO takes the form of a broad-based share ownership plan for employees and hence we test whether the participation of employees is anyway different from other investor categories. In particular, we examine whether high employee participation in IPOs, on account of their privileged position in the organization, can predict superior financial and operating performance of the firm. The hypothesis rests on the assumption that employees bring strong financial consideration when they participate in employee ownership schemes. We argue that by virtue of being insiders, employees possess privileged information and they are well informed about the firm's short and long term prospects. Hence, high participation of employees should be positively related to the quality of IPOs. We also examine whether

key managerial employees influence important IPO decisions as these employees are most likely to benefit from the firm's decision to reserve and allocate shares to the employee category.

Using a sample of Indian IPOs over the period 2000-2008, we find statistically significant evidence of high employee participation in IPOs which perform well in measures of financial performance. We also find that the operating performance of IPO firms with high employee participation is better compared to those that have low employee participation. Further, we find that the participation of employees is not influenced by the participation of informed institutional investors. Consistent with prior evidence we find that larger firms are more likely to allocate IPO shares to employees than smaller firms. Further, incidence of prior employee ownership is also positively related to IPO share allocation to employees. Our analysis on the influence of key managerial employees on important IPO decisions suggests that such influence is unlikely in the context of Indian IPOs. The support for our hypothesis suggests that information about employee participation can be used by uninformed investors to selectively participate in high quality Indian IPOs.

1.4 Structure of the thesis

The remainder of the thesis is structured as follows. Chapter 2 presents a brief summary of the background literature. Chapter 3 highlights the institutional setting of Indian IPOs. Chapter 4 presents the data and methodology. Chapter 5 presents the analysis on the transparency of the IPO mechanism and its impact on investors' participation, information production and pricing. Chapter 6 reports the results on empirical analysis on the determinants of IPO initial returns and the choice of IPO mechanism. Chapter 7 presents our analysis of new bank loan at the time of IPO. Chapter 8 examines employee participation in IPOs. Chapter 9 concludes the thesis by reporting our contributions, limitations and areas for further research.

Chapter 2 Literature Review

2.1 Introduction

The extant literature on initial public offerings (IPOs) is huge and comprehensive. Prior research, which has spanned several decades, has examined different issues concerning IPOs and has resulted in a sophisticated body of theoretical and empirical literature. In the following sections we provide a brief review of literature on initial (underpricing) and the long run performance of IPOs as well as on the influence of underwriter reputation on IPO performance. Since each of our empirical chapters contributes to a specific part of the finance literature, we provide additional review of the related literature in the empirical chapters separately.

2.1.1 Theories on initial performance (underpricing) of IPOs

Underpricing of IPOs has been focus of numerous academic papers since it was first observed in the early 1970s. Stoll and Curley (1970), Reilly (1973), Logue (1973) and Ibbotson (1975) were the first to document underpricing in financial literature (Ritter and Welch, 2002). It is a ubiquitous phenomenon and has persisted across time and countries. The degree of underpricing, however, has fluctuated over time prompting researchers and academicians to come up with different theories to explain it. Ritter and Welch, (2002), Ritter (2003) and Ljungqvist (2007) provide excellent reviews on underpricing theories. Theories on initial performance of IPOs can be grouped under two categories: those that assume information asymmetry between participants and those that do not (Ritter and Welch, 2002).

Underpricing theories based on Information asymmetry

There are three parties to an initial public offering: issuer, investment bank (underwriter) and the investor. Underpricing theories based on information asymmetry assume one of the parties to have superior information than the other parties. These theories regard underpricing a result of this information asymmetry. The most well-known theory which ***assumes investors to be more informed*** than others is the one propounded by Rock (1986).

The theory assumes that there are two groups of investors: informed and uninformed and that the continued participation of the uninformed group is essential for the successful completion of IPOs. Rock (1986) argues that underpricing is essential for the continued participation of uninformed investors. In absence of (expected) underpricing uninformed investor will not participate because of winner's curse problem as informed investors will crowd out the uninformed investors in case of underpriced IPOs while they will receive 100% allocation in case of overpriced issues. Koh and Walter (1989) provide a direct test of the Rock's model using IPO data from Singapore and find that uninformed investors, after adjusting for allocation, were able to make returns which was not significantly different from zero. Using IPO data from UK and Finland respectively, Levis (1990) and Keloharju (1993) also find support for Rock's theoretical argument. Michaely and Shaw (1994) argue and provide empirical evidence that with the reduction of investors' heterogeneity the need to underprice goes away.

Presented first by Beatty and Ritter (1986) and empirically observed both through time and across countries is the link between ex ante uncertainty and degree of underpricing. It has been consistently shown that higher the ex-ante uncertainty higher is the degree of underpricing. Most of the researchers explaining underpricing control for this uncertainty, the proxies of which fall in four groups: company characteristics, offering characteristics, prospectus disclosure and aftermarket variables (Ljungqvist, 2007). Beatty and Ritter's, (1986) claim that investment banks coerce issuers to underprice in order to attract the uninformed investors was empirically tested by Nanda and Yun (1997) and Dunbar (2000). Nanda and Yun (1997) find that investment bank's market share is negatively affected by overpricing and Dunbar (2000) supports the argument by empirically finding evidence of decreasing market share of those investment banks who either underprice or overprice too much.

Theories of underpricing which assume ***issuers to be better informed than others*** are also regarded as signalling theories because of the need of the issuers to signal the quality of their firm. High quality firms need to distinguish themselves from low quality ones and underpricing becomes a very effective tool which the low quality firms cannot replicate.

High quality issuers make sacrifice (underpricing) in the beginning and recoup their losses through better pricing when they come to the market for the second time. The major contributors to signalling theories are Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989). The empirical evidence for signalling theories is relatively weak. Jegadeesh et al., (1993) provide a direct test of the signalling model and find that aftermarket returns are as good predictors as the first day return for seasoned equity offerings (SEOs). Similarly, Michaely and Shaw (1994) find evidence which fails to link underpricing and the probability of SEOs.

Theories of underpricing in which the ***investment banks are assumed to be better informed than others*** are also referred to as the principal agent model. The principal agent model has caught the attention of researchers following the burst of internet bubble (Ljungqvist, 2007). This approach is increasingly used to explain IPO allocation and pricing behaviour exhibited by the investment banks, especially during the internet bubble period (Loughran and Ritter, 2004). Baron and Holmstrom (1980) and Baron (1982) were the first to explore principal agent models in IPO literature. They argue that investment banks underprice IPOs because of their superior information and in doing so spend less effort in marketing and selling the product. Inconsistent with the prediction of the principal agent model, Muscarella and Vetsuypens (1989) find that the underpricing of investment banks when they themselves go public is similar to those of other firms.

Underpricing theories on pricing and allocation of IPOs

The most important theory on IPO pricing and allocation is the one posited by Benveniste and Spindt (1989). Their model is based on the book building mechanism of IPO allocation and extends Rock's (1986) model of underpricing. They argue that underpricing and higher allocation is the reward to induce truthful revelation from its coalition of informed investors. Since the investment bank is a repeat player in the IPO market, it can exclude misleading investors while rewarding truthful investors. The reward for conveying favourable information to the investment bank is the preferential allocation of underpriced stocks. Thus underpricing is the equilibrium in which the true value of the firm is extracted from the informed investors. Since bookbuilding mechanism provides discretion to

underwriters in terms of pricing and allocation, underwriters use it to extract favourable information from the investor which in turn reduces the average underpricing. Benveniste and Wilhelm (1990) and Spatt and Srivastava (1991) also contribute to the bookbuilding theory and posit that bookbuilding can be an effective tool to extract information from the investors. Sherman (2000), Sherman and Titman (2002) and Sherman (2005) strongly support the bookbuilding mechanism and treat underpricing as an equilibrium.

Arguments of the bookbuilding theory seem very plausible and appealing as long as underpricing is reasonable. There also has been some empirical evidence supporting the theory (Cornelli and Goldreich, 2003). However, it becomes less appealing and subject to criticism when underpricing reaches the levels as witnessed during 1999-2000 in US and most other countries. Bookbuilding is seen by many as a mechanism to extract rent by the investment banks. The alternative view builds on the work of Baron (1982). Loughran and Ritter (2002) propose the prospect theory as an alternative explanation for allocation and pricing of IPOs. They argue that entrepreneurs readily accept underpricing and fail to get upset with high underpricing because they tend to offset the wealth loss as a result of underpricing with the wealth gain on their shares as prices increase in the after-market.

Some studies have compared bookbuilding mechanism with other mechanism such as auction. Biais et al., (2002) and Biais and Faugeron-Crouzet (2002) present theoretical models which replicate the benefits of bookbuilding, namely information extractions, without the cost attributable to bookbuilding mechanism. Empirically, Derrien and Womack, (2003) and Kaneko and Pettway (2003) have provided evidences showing underpricing lower for IPOs issued through auctions than those issued through bookbuilding.

Allocation between institutional and retail investors has been one of the issues that papers on allocation have examined. Studies in both the US and UK have shown that institutional investors are preferred over retail investors (Hanley and Wilhelm, 1995; Aggarwal et al., 2002; Cornelli and Goldreich, 2001). While Hanley and Wilhelm, (1995) find underwriters being strategic in allocation of IPOs with higher allocation to institutional investors in both

hot and cold IPOs, Aggarwal et al., (2002) on the other hand find evidence of institutional investor getting a larger share of the allocation in case of hot IPOs and lower allocation in case of weak IPOs. They argue that the allocation to institutional investors is in access of what is explained by the bookbuilding theories. Moreover, Boehmer et al., (2006) find evidence that almost 75% of the allocation in a particular IPO is made by the lead-underwriter.

Some other explanations of IPO underpricing[5]

The IPO underpricing literature is huge and it would be practically impossible to discuss all the theories that have been proposed to explain it. This section will discuss some of the other well received explanations of IPO underpricing. One explanation for underpricing comes from the law suit avoidance theory which posits that underpricing reduces the risk of being sued by investors (Tinic, 1988, Hughes and Thakor, 1992). However, there is not much empirical support for the theory as underpricing is evident even in those countries where the risk of being sued is not economically significant (Lee et al., 1996, Jenkinson, 1990). Ruud (1993) posited that it is the after-market price stabilization activities of the underwriter that lead to underpricing being observed. Ellis et al., (2000) find evidence of the underwriter being the most dominant market maker following the IPO.

Some theories regard underpricing as a tool to retain control. Since underpriced IPOs are heavily subscribed, it allows the issuers/investment banks to allocate to a wide group of investors avoiding control by a large single investor (Brennan and Franks, 1997). Booth and Chua (1996) on the other hand argue that dispersed ownership helps in maintaining a liquid market for the stocks while Zingales (1995) argues that a more dispersed ownership helps the pre-IPO shareholders to easily sell their shares in the aftermarket. Some behavioural explanations are also offered to explain underpricing. Welch's (1992) information cascade, Ljungqvist et al., (2006) investor sentiment theory and Loughran and Ritter's (2002) prospect theory are examples of behavioural explanations to underpricing.

[5] See Ljungqvist (2007) for detailed description.

2.1.2 Theories on long-run performance of IPOs

Like underpricing, long-term performance of IPOs has also been extensively researched.[6] In addition to a number of papers explaining the causes of long term performance, the literature on long-term performance has also discussed on the measurement issues which have plagued almost all discussion that relates to long term performance. Most of the studies have documented long term poor performance of IPOs over the three-five year period subsequent to the IPO (Keloharju, 1993, Ritter, 1991, Aggarwal and Rivoli, 1990, Aggarwal et al., 1993, Levis, 1995). One explanation of the long term poor performance of IPOs comes from those who attribute it to fads (Ritter, 1991 & Aggarwal and Rivoli, 1990). Over optimistic investors buy IPOs expecting high returns, driving the initial price high, but subsequently sell their holding when those expectations are not met. Another explanation of long term underperformance is provided by Schultz (2003) who argues that large number of IPOs follows successful IPOs. This group of IPOs which follows the large group and they do not perform as well as the successful IPOs as they tend to be overvalued by the investors. Since this group of IPOs normally occupies large portion of the sample, the IPOs in general show on average low returns in the long run.

Jain and Kini (1994) argue that the poor long-term performance of IPOs can be partly explained by the decreasing ownership of managers immediately after the flotation. The decrease in managerial shareholdings following the IPO potentially leads to a worsening of managerial incentives. Jain and Kini (1994) find a positive link between operating performance and the proportion of shares retained by managers after the IPO. Mikkelson et al., (1997) record managerial ownership over the ten years following the IPO. Contrary to Jain and Kini (1994), they do not find any consistent relationship between performance and changes or levels of ownership at different points in time. Underwriter reputation has also been used to explain long term underperformance. Mikkelson et al. (1997) find that underwriter reputation can explain the long term performance of IPOs and show that prestigious underwriter were associated with poor long term performance and vice-versa.

[6] See Ritter and Welch (2002) for a detailed discussion.

Brav and Gompers (1997) show that IPOs backed by venture capital funds perform much better than those which are not.

2.1.3 Underwriter reputation

A substantial body of IPO literature explores the reputation of the underwriter in the underwriting process. While a large number of papers have explored the relationship between IPO initial returns (underpricing) and underwriter reputation (see Beatty and Ritter, 1986; (Johnson and Miller, 1988); Carter and Manaster, 1990; Loughran and Ritter, 2004) some others have documented the relationship between underwriter reputation and long term performance (Carter et al., 1998), market and stabilization activities (Logue et al., 2002).

Early studies in the late 1980s and 1990s depicted a negative relationship between underwriters' prestige and initial IPO returns. Carter and Manaster (1990) show a significant negative relationship between underpricing and underwriter reputation. They show that prestigious underwriter bring low risk firms to the market. In order to maintain their reputation, prestigious underwriter only marketed IPOs of low dispersion firms. As a proxy of underwriter reputation, Carter and Manaster (CM) use the relative placement of underwriters in the tombstone advertisements. Those underwriters whose names are prominently listed are assigned higher ranks. Negative relationship between underwriter's reputation and initial returns are also reported by Megginson and Weiss (1991). Megginson and Weiss (MW) rankings are based on the respective market share of the underwriters. CM and MW are the two most widely used proxies of underwriter reputation.

Studies from the late 1990's onward depicted negative relationship between underwriter reputation and initial returns. Attributing changes in underwriters' behaviour to the economic conditions, Beatty and Welch (1996) document a positive relationship between the two variables. Bates and Dunbar (2002) also show a positive relationship arguing that the change in the relationship provides evidence of the structural changes in the IPO process during the IPO boom period. In a very highly cited paper, Loughran and Ritter (2004) argue that the positive relationship between underwriter reputation and initial

returns is explained by the change in the issuers' objective. They attribute the positive relationship to the analyst lust and spinning hypothesis. More than the need for higher proceeds, issuers were more concerned with analyst coverage post listing and the spinning of shares.

Michaely and Shaw (1994) find that IPOs issued by prestigious underwriters perform better over the two years after the IPO. However, they also find that prestigious underwriters do not take smaller firms to the market. Using a number of different measures of underwriter reputation, Carter et al. (1998) find that on average the long-run market adjusted returns for IPOs issued by more prestigious underwriters are less negative. They regard the CM measure as the best proxy to take account of underwriter's prestige. Logue et al. (2002) show that underwriter reputation is a key determinant of pre-market activities. They state that the influence of underwriter reputation on initial returns in not direct, but indirect, through the use of pre-market activities.

Chapter 3 Institutional Settings

In this chapter we present some of the important institutional settings of the Indian IPO market which differentiates it from the US and other IPO markets. The description presented in this chapter highlights the unique institutional setting of the Indian IPO market which provides us with an opportunity to examine several important issues which has been relatively less examined in finance literature.

3.1 Transparency in the IPO Mechanism

One of the unique features of the Indian IPO market is transparency of the offer process. Throughout the offer process information relating to the participation of various investor categories is made public on the webpage of two stock exchanges on which all the listings occur namely, the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). During the offer period two sets of information are available for potential investors. First, the cumulative demand at different price points of the initial price range. Second, the demand multiple (oversubscription) for different investor categories for their respective portion of the offer. To the best of our knowledge, India is the only IPO market where information on investors' participation is publicly available during the offer period. This feature sets the Indian IPO market in a completely different category when compared with the features of US and other major IPO markets. As Jagannathan et al, (2010) report, bookbuilding mechanism dominants the IPO issuance markets in US and most other IPO markets. The bookbuilding mechanism as it is carried out in the US does not provide any information on investors' participation not only during the offer period but even after the completion of the offer.

The transparency in mechanism in the Indian IPO market is made possible as investors are required to bid with one of the syndicate members who in turn input the order in the electronic book. The electronic book is connected to the central bookbuilding software managed by the stock exchange.[7] The number of shares bid and times subscribed for a particular issue for different investor categories is made public by BSE/NSE at the end of

[7] Source: BSE website; www.bseindia.com

each day during the period the issue is open.[8] Bids made by all investor categories are publicly available at the end of the day on the stock exchange website on the bookbuilding live page.

Figure 3-1 shows an example of the information displayed on the bookbuilding live page. The page provides information on offer characteristics including the offer price range, the tick size and names of lead managers. The page also shows information on aggregate demand schedule as well as bids made by various investor categories. Information relating to subscription by various investor categories is also widely reported in all major print and electronic news media throughout the offer period.

<<Insert Figure 3-1 here>>

3.2 IPO Selling Mechanisms in India

Regulations of Indian primary markets have undergone significant changes over the last twenty years. Prior to the establishment of Securities and Exchange Board (SEBI) as the regulatory authority in 1992, security issuance in India was governed by the Capital Issues Act, 1947 and was administered by the office of Controller of Capital Issues (CCI). The security issuance process was highly bureaucratic and controlled the amount, type and price of the issue. With the liberalization of the economy in 1992, significant changes in the regulations were brought about. In order to boost up the primary market, Securities and Exchange Board was set up as the sole regulator with the abolition of the Capital Issues Act, 1947.

As per SEBI guidelines, there are two routes available for unlisted firms to issue shares. Route I requires firms to meet certain requirements on net total assets, profitability and net worth[9]. The other route allows firms, who do not meet these requirements, to issues shares

[8] Available at bookbuilding live at the Mumbai stock exchange and national stock exchange website when there is an offering (www.bseindia.com & www.nseindia.com).

[9] SEBI's Securities and Exchange Board of India (Disclosure and Investor Protection) Guidelines, 2000 Chapter II, 2.2.1 .

by using the bookbuilding mechanism whereby either qualified institutional investors (QIB) or financial institutions receive a significant proportion of the allocated shares[10].

The changes introduced by SEBI led to a number of different ways in which shares could be allocated following an IPO.

3.2.1 Fixed Price Mechanism

Prior to 1999, fixed price was the only mechanism available to IPO issuers. This mechanism, which is still in use, issues IPO on a fixed price basis where the issue price is decided in advance. In case of over-subscription, allocation is done on a pro-rate basis. The basis for the issue price is mandated by SEBI's regulation and there are some specific guidelines[11]. In fixed price mechanism, 50% of the shares are reserved for retail investors and rest for non-retail investors without any distinction between qualified institutional investors and non-institutional investors[12].

3.2.2 Bookbuilding mechanism

US style bookbuilding mechanism was first introduced in India in 1999. In the beginning two forms of bookbuilding were introduced: 75% bookbuilding and 100% bookbuilding. In 75% bookbuilding, 75% of the offer is made through the bookbuilding mechanism while the rest 25% through fixed price offer. While this method was used by firms during the early years following the introduction of bookbuilding, 100% bookbuilding soon became

[10] SEBI's Securities and Exchange Board of India (Disclosure and Investor Protection) Guidelines, 2000 Chapter II, 2.2.2.

[11] SEBI's Securities and Exchange Board of India (Disclosure and Investor Protection) Guidelines, 2000 Chapter VI 6.8.4.11 highlights the factors that needs to considered while fixing the issue price: (i) EPS pre-issue for the last three years; (ii) P/E pre-issue; (iii) Average Return on Net Worth in the last three years; (iv) Minimum Return on Increased Net Worth required to maintain pre-issue EPS; (v) Net Asset Value per share based on last balance sheet; (vi) Net Asset Value per share after issue and comparison thereof with the issue price; (vii) Comparison of all the accounting ratios of the issuer company as mentioned above with the industry average and with the accounting ratios of the peer group.

[12] Retail investors are those who apply to a maximum value of INR 100,000.

the most common way of IPO allocation. In case of 100% bookbuilding, a minimum of 35% and 25% of the shares are allocated to retail and non-institutional investors whereas not more than 50% could be allocated to institutional investors[13]. The bookbuilding mechanism introduced the discretionary allocation of shares to the QIB category[14] while allocation to retail and non-institutional investors continued on a proportionate basis similar to the one followed under the fixed price mechanism. Further, retail investors were also given the option to bid at the cut-off price whereby they did not have to indicate the bid price but instead could bid and buy at the final issue price determined at the end of the bookbuilding period. The bidding period is generally open for 5 days and does not exceed 10 days. In case the price band is revised, the bidding period is extended by further 3 days. All bids made by investors are required to be within the specified price band with a cap of 20 percent of the floor price. All categories of investors are permitted to revise their bids for both price as well as number of shares bid. Generally, retail and non-institutional investors are required to deposit the entire bid amount at the time of biding. However, institutional investors are required to deposit only 10% of the bidding amount[15].

3.2.3 Auction Mechanism

In response to irregularities in the market[16], SEBI introduced a number of changes to the bookbuilding mechanism. One of the key changes was to make allocations to qualified

[13] Before the regulation was amended though vide SEBI/CFD/DIL/DIP/Circular No. 11 dated August 14, 2003, the figures were not less than 25% for retail, not less than 15% for non-institutional investors and not more than 60% for QIB.

[14] SEBI (DIP) guidelines 2000 Chapter XI clause 11.3.2(iv) "The allocation to the Qualified Institutional Buyers) shall be determined by the Book Runner(s) based on prior commitment, investor quality, price aggression, earliness of bids, etc."

[15] Retail investors bidding at the cut-off price are required to deposit in the Escrow Account the Bid Amount based on cap of the Price Band.

[16] In 2004 and 2005 irregularities in IPOs allocations of IPOs surfaced for a number of IPOs including the IPOs of Yes Bank, Priamy Retail and Bombay Rayong Fashion. SEBI unearthed a large scale scale multiple application case in the YES Bank IPO and banned 13 investors from trading in the bank's shares with immediate effect.

institutional investors proportionate to their demand[17]. With this change, though the mechanism retains the name of bookbuilding, in practice, it has become more like a non-discriminatory or uniform type auction mechanism and very similar to the one used by WR Hambrecht in the US[18]. Although, the usual activities associated with bookbuilding such as road shows and presentations to institutional investors are conducted, the offer price set by the underwriter is just below the market clearing price and uniform price is applied to all the investor categories. However, the basis for issue price is also similar to the one mentioned in the bookbuilding section and so is the proportion of total shares allocated to different investor categories.

3.3 Investor categories

A unique feature of Indian IPOs is the separation of the pool of shares available to each investor category in advance. There are primarily three groups of investors investing in Indian IPOs: Retail Individual Investors (RII), Non-Institutional Investors (NII) and Qualified Institutional Buyers (QIB)[19]. QIB are reserved and allocated 50% of the shares on offer, NII about 15% and RII 35% of the shares on offer. As per current guidelines retail individual investors are categorised as those who bid for securities for a value not more than INR 100,000[20]. This limit was initial set at INR 25,000 in 1995 and has been gradually increased over the years. QIB refers to institutional investors such as commercial banks, mutual funds, venture capital fund, etc and are required to be registered with the SEBI. All other investors who bid for more than INR 100,000 and do not fall in the QIB category are referred to as non-institutional investors. Table 3-1 presents a list of QIBs.

<<Insert Table 3-1 here>>

Investors may submit orders at prices which fall within the offer price range in increments of 1 Indian Rupee. The offer price range is required to be within 20 percent of the floor

[17] In addition, issues after November 2005 are also required to allocate 5% of QIB shares to domestic mutual funds.

[18] For a detailed description of the US Auction mechanism refer to Degeorge et al., (2010).

[19] In a number of cases, employees are also allocated a portion of the total shares on offer reserved for them.

[20] Roughly equivalent to US$2,500.

price. RII have the option to submit a strike bid, referred to as the bid at the cut-off price. Both QIB and NII are allowed to submit only price limit bids. However, since the original offer price range of Indian IPOs has historically never been revised upwards; submitting a bid at the upper bound of the demand curve is *effectively placing a strike bid*. Further, all investor categories are permitted to revise their bids for both price as well as number of shares bid during the offer period. The bidding period is in general open for 5 days. In case of a revision in the price band, regulation allows the bidding period to extend by a further 3 days. In general, retail and non-institutional investors are required to deposit the entire bid amount at the time of biding while institutional investors are required to deposit only 10% of the bidding amount[21].

At the end of the offer period the underwriter aggregates all demand and chooses an offer price. All order at or above the offer price is filled on a pro-rate basis while orders below the offer price are left unfilled and refunded. Regulation allows the underwriter/issuer to re-allocate unsubscribed shares from one investor category to other categories which are over-subscribed according to the original share allocation ratio. Thus, if RII portion is undersubscribed, the unsubscribed portion is re-allocated to the QIB and NII. The different investor groups with their own quote of shares serves well for the price discovery process. It is because of this segregation that informed investors can bid on the basis of their own private information without worrying too much about the price discovery process being disrupted by less informed investors.

3.4 A Typical IPO in India

Unlike most other countries, an IPO in India takes the form of a project. Not only does a prospectus outlines the objects of the issue, it also reveals sources of funds to meet the total costs of the project. Table 3-2 shows an example of the objects and sources of funds as mentioned in an IPO prospectus. More often than not there are other sources of funds in addition to the equity issue. Bank or term loans features very regularly as additional source

[21] Retail investors bidding at the cut-off price are required to deposit in the Escrow Account the Bid Amount based on bound of the Price Band.

of funds and in some cases are much larger than the proceeds from IPOs. These bank or term loan from either underwriter related commercial bank or from unrelated commercial banks provide interesting background to investigate the uniqueness of bank loans.

<<Insert Table 3-2 here>>

3.5 IPO initial returns

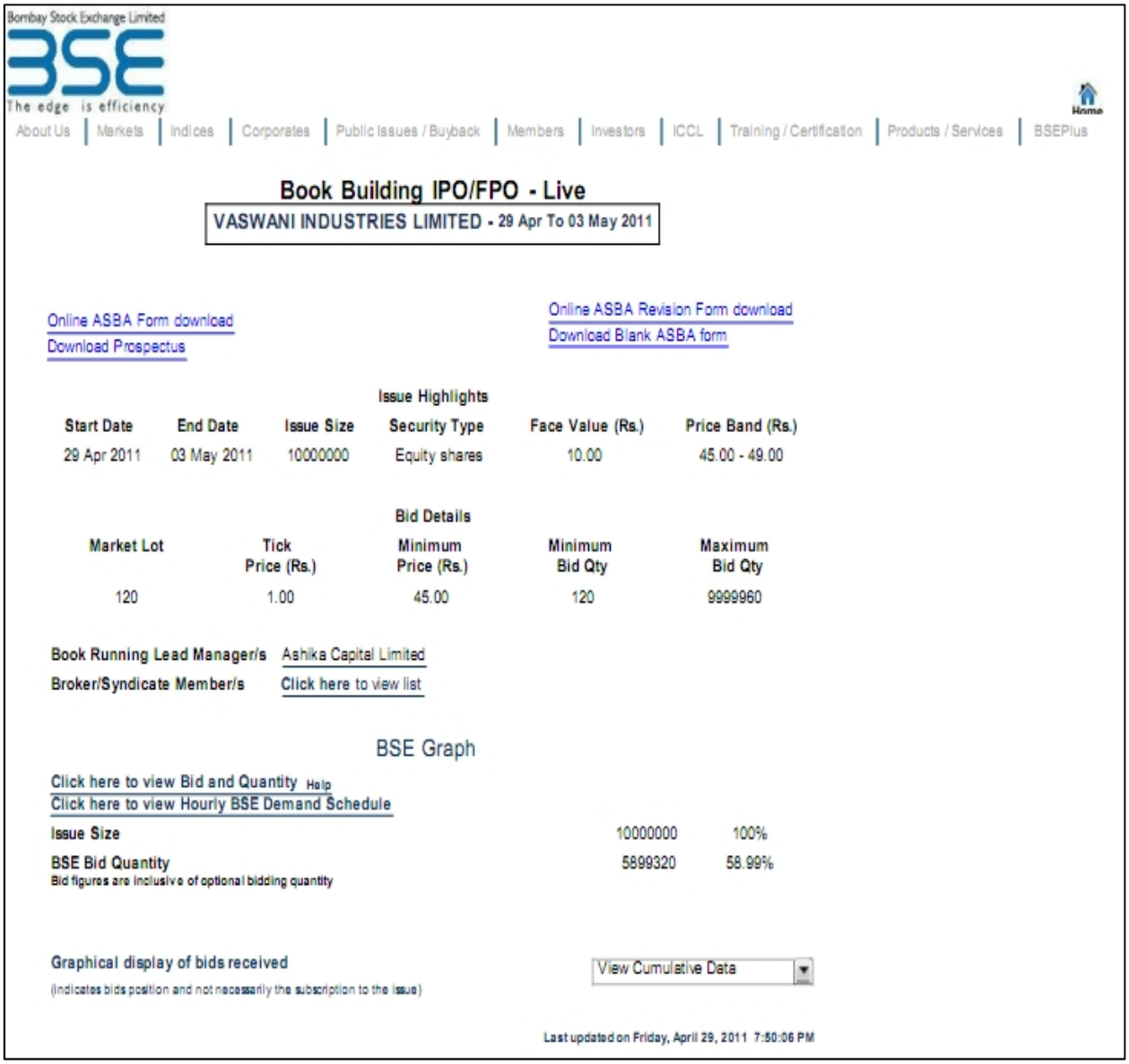
One of the reasons why investigation of IPOs in India is important is because of the persistence of high initial returns. While the initial returns in developed countries have almost dried up post internet bubble, Indian IPOs have registered significant initial returns during the period of our study. Table 3-3 shows the comparative initial returns in US, UK and India over the period 1999-2010 (number in parentheses are the number of IPOs issued).

<<Insert Table 3-3 here>>

3.6 Others

SEBI allows a price band of 120% of the lower end of the band. Although revision is allowed, Indian IPOs, unlike in the US, rarely revise their price band upwards. In some instances when the demand is very weal there is downward revision. While issues in US and UK commence trading immediately after the close of the issue, in India takes about 22 days, on average, for the trading to commence once the issue is closed. This brings about additional complexity when explaining the degree of underpricing observed. While developed countries such as US and UK and emerging economies such as Singapore, Thailand and Malaysia have seen the rise of alternative stock exchanges to support smaller offerings and offerings without much operating history, India has relied only on the two large stock exchanges to support entrepreneurs to raise capital from the financial market.

Figure 3-1: Information on investors' participation available during the IPO offer period



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Book Building IPO/FPO - Live

VASWANI INDUSTRIES LIMITED - 29 Apr To 03 May 2011

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Issue Highlights

Start Date	End Date	Issue Size	Security Type	Face Value (Rs.)	Price Band (Rs.)
29 Apr 2011	03 May 2011	10000000	Equity shares	10.00	45.00 - 49.00

Bid Details

Market Lot	Tick Price (Rs.)	Minimum Price (Rs.)	Minimum Bid Qty	Maximum Bid Qty
120	1.00	45.00	120	9999960

Book Running Lead Manager/s Ashika Capital Limited

Broker/Syndicate Member/s Click here to view list

BSE Graph

Click here to view Bid and Quantity Help
Click here to view Hourly BSE Demand Schedule

Issue Size	10000000	100%
BSE Bid Quantity	5899320	58.99%

Bid figures are inclusive of optional bidding quantity

Graphical display of bids received

(Indicates bids position and not necessarily the subscription to the issue)

View Cumulative Data

Last updated on Friday, April 29, 2011 7:50:06 PM

This figure shows the information available on the live bookbuilding page on the Bombay Stock Exchange website available at www.bseindia.com. This information is also available on the National Stock Exchange website site at www.nseindia.com.

Table 3-1: List of Qualified Institutional Buyers/Investors (QIB)

1	Mutual fund, Venture Capital Fund and Foreign Venture Capital Investor
2	Foreign Institutional Investor and Sub-Account (Other Than a Sub-Account which is a Foreign Corporate or Foreign Individual), registered with the board
3	Public Financial Institution as defined in S 4A of the Companies Act,1956
4	Schedule Commercial Bank
5	Multilateral And Bilateral Development Financial Institution
6	State Industrial Development Corporation
7	Insurance Company registered with the Insurance Regulatory and Development Authority
8	Provident Fund with minimum corpus of two hundred million Indian Rupees
9	Pension Fund with minimum corpus of two hundred and fifty million Indian Rupees
10	National Investment Fund set up by resolution F.No. 2/3/2005- DDII dated November, 23, 2005 of the Government of India published in the Gazette of India
11	Insurance funds set up and managed by army, navy or air force of the Union of India.

Table 3-2: Typical Indian IPO: Project Costs and Sources of Funds (IPO of Mid-Day Multimedia Ltd)

Project Costs	Million INR	Sources of Funds	Million INR
Working Capital	100.50	Public Issue	500.00
Buildings	290.00	Promoter's Contribution	118.2
Loans Repayment	118.20	Term Loan	25.00
Others	104.50	Internal Accruals	14.50
Issue Expenses	40.00		
Total Project Costs	**657.70**	**Total Sources of Funds**	**657.70**

Table 3-3: Comparison of initial returns[22]

Year	US	UK	India
1999	71.04% (476)	78.04% (63)	534.82% (27)
2000	56.13% (382)	57.93% (183)	121.81 % (60)
2001	14.05% (80)	13.74% (67)	26.68% (12)
2002	9.14% (66)	7.30% (48)	66.06% (8)
2003	12.26% (63)	15.52% (50)	38.32% (4)
2004	12.37% (174)	14.12% (173)	53.05% (23)
2005	10.25% (161)	12.74% (225)	41.35% (60)
2006	12.15% (156)	12.11% (212)	26.56% (76)
2007	13.90% (160)	9.85% (151)	33.23% (104)
2008	6.40% (21)		10.05% (36)
2009	9.80% (41)		9.78% (19)
2010	9.10% (94)		13.45% (58)

[22] Data on US initial returns are from Jay Ritter's website (http://bear.cba.ufl.edu/ritter); for UK from Chambers and Dimson, (2008) and for India from Marisetty and Subrahmanyam, (2009) for 1999-2003 and our own workings for 2004-10.

Chapter 4 IPO Data, Sources and Methodology

4.1 IPO Sample

In this chapter we present a description about our data and the methodology that we employ in our empirical chapters. Although different methodologies are employed in different empirical studies we present here the common tools that are used in our analysis.

Our sample period is from January 2000 to December 2010. Our total sample during the 2000-2010 period comprises of 398 IPOs. We exclude large privatization IPOs from our analysis as they are large firms which are not representative of our average IPO firm. However, since the employee participation and new bank loan paper was already completed before we collected data from the 2009-10 period, the papers use data only until December 2008. Our analysis of investors' participation and allocation mechanism uses data until the end of December 2010. Since most of our data is hand-picked from prospectus and websites we use different sample period and data for our empirical studies. Each empirical study will discuss its own sample size and descriptive statistics of the sample chosen.

4.2 Data Sources

Our data comes from a number of different sources. We list below the main sources from which we obtain our data.

4.2.1 Prospectus

The prospectus is our main source of data. We obtain prospectus from Perfect Filings and the Securities and Exchange Board of India (SEBI) website. Most of our data on firm and offer characteristics are hand-picked from the prospectus. Data on offer characteristics include the gross proceeds, total project costs, offer price range, offer price, underwriters managing the issue, the total shares offered including any secondary shares offered by selling shareholders, issue expense, promoters' holding before and after the offer. Data on firm characteristics include total assets, total liabilities, total leverage, long term loan, and age of the firm at the time of the IPO. The prospectus is also the primary source of identifying bank loans at the time of the IPO which is the key variable in our chapter on the

new bank loan (chapter 7). The IPO prospectus is also the primary source of identifying whether employees are reserved shares in the offering. This variable becomes the foundation of our analysis on employee participation in IPOs which we present in chapter 8. Further, some additional variables on employee ownership are also sourced from the prospectus.

4.2.2 Bombay Stock Exchange (BSE)/National Stock Exchange (NSE) Websites

The BSE and NSE website is our primary source of identifying the IPOs that we use in our study. We use the IPO list provided by the exchanges as the basis for our IPO sample. We also use the BSE/NSE website to obtain data on investors' participation in IPOs. This data allows us to observe aggregate demand, demand over time as well as the bids submitted by different investor categories. This data becomes the basis of our analysis in Chapters 5 & 6. We also use data available from the BSE/NSE to compute initial and long term returns of our IPO firms. Data for the bulk analysis that we present in Chapter 6 is also obtained from the NSE/BSE website. We also use data from some leading financial portals (ICICI direct, Money Control and Chittorgarh) to supplement the data available from BSE/NSE websites.

4.2.3 Capital IQ/ DataStream

We source our data on prior years' operating performance from Capital IQ and DataStream. We use this data in your analysis of employee participation in IPOs and in calculating growth rates that we use in the bank loan chapter.

4.3 Important Variables and Research Design

The study primarily uses cross sectional regression analysis. The primary dependent variable is the degree of underpricing or the amount of money left on the table. In the following paragraphs we present some of the important variables used in our study.

4.3.1 Some Important Variables

Underpricing (Initial Returns)

Throughout our study the term underpricing and first day initial return will be used interchangeably. For the purpose of this study the degree of underpricing will be calculated

on two levels: namely the raw underpricing (initial returns) and the market adjusted underpricing (initial returns). The raw underpricing is the return earned on the 1st day of trading and is defined as follows:

$$IR_j = (P_{j,1} - P_{j,0}) / P_{j,0} \quad (1)$$

where IR is the raw underpricing, $P_{j,1}$ is the market price of the stock on the first day of trading and $P_{j,0}$ is the offer price. In emerging markets like India there is usually a time lag between the closing date of the issue and the first trading day. In order to account for the changes in the market during the period, a market adjusted return is calculated. The market adjusted return is calculated by adjusting the market return over the same period to the raw underpricing. The market return is the return earned on the market portfolio over the same period as that of the raw underpricing and is defined as:

$$MR_j = (I_{j,1} - I_{j,0}) / I_{j,0} \quad (2)$$

Where MR_j is the return on the market portfolio (index), $I_{j,1}$ is the Index value on the 1st day of trading and $I_{j,0}$ is the Index value on the closing day of offering.

The market adjusted underpricing is the difference between the raw underpricing and market return and is defined as:

$$MIR_j = IR_j - MR_j \quad (3)$$

where MIR_j is the market adjusted underpricing

Investors' Demand Multiple (Oversubscription)

The second most important variable that we use in all our chapters is the demand multiple. Demand multiple is the ratio of that total demand of shares by investors and the number of shares offered. We not only use the total demand multiple but also the demand multiples of all investor categories: qualified institutional investors, non-institutional investors, retail investors and employees. We use the log of one plus the demand multiple in our analysis.

Underwriter Reputation

One important variable that we use in all the chapters is the reputation of the underwriter managing the IPO offering. The reputation of the underwriter is central to our examination of conflicts of interest as financial intermediaries such as underwriter/investment bank trade-off between the potential of losing reputation and the financial gains when they enter into transactions with other parties. For analysing underwriter reputation we classify underwriters into two categories: reputed and less reputed underwriters. The gross proceeds of the offering managed by underwriters is our basis for the classification. We use a threshold of managing 15,000 million INR during the period of our study to classify underwriters as reputed. Those managing less than 15,000 million INR during the period of our study are classified as less reputed underwriters. This classification leads to two distinct categories of underwriter where we find large and well-known underwriters falling in the reputed underwriter category. Those in reputed category include large universal banks, commercial banks, and multinational investment banks. Those in the less reputed category manage only very small IPO offerings. For robustness purpose we also examine the amount of gross proceeds that underwriter manage every year and rank the underwriters for each of the year in our sample period. Our classification essentially remains the same.

4.3.2 Research Design

To test our hypotheses we use a number of univariate and multivariate analyses.

Univariate Analysis:

For our univariate analysis we use two-independent sample t-test, Wilcoxon rank sum test (Wilcoxon-Mann-Whitney test), one way-ANOVA test and Kruskal Wallis test. Since we analyse between a number of different categories (IPOs with and without new bank loans, IPOs with and without employee participation, IPOs managed by reputed and less reputed underwriters) these tests become very useful for analysing our data and examining our hypotheses.

Multivariate Analysis

We essentially rely on the Ordinary Least Square (OLS) regression for multivariate analysis in determining the impact of our variable of concern on the dependent variable. While doing so we control for other variables as suggested by prior research. Further, we also use probit regression analysis in some of our empirical studies to examine the determinants of a particular decision made by either investors or issuers. For instance, we use probit regression to identify the determinants of employee share reservation and for identifying the determinants of having new bank loans at the time of the IPO. All our OLS and probit regressions report white's heteroskedasticity adjusted standard errors to control for any deviation from the homoscedasticity assumption. In some of our regression analysis we also control for potential sample selection bias and/or endogeneity bias by using some variant of the Heckman sample selection regression and instrumental variable regression (IV) respectively. We discuss these methodologies in detail in the chapters where they are used.

Chapter 5 Transparency in IPO Mechanisms: Information Production, Pricing and Investor Welfare

5.1 Introduction

As Jagannathan et al., (2010) observe, bookbuilding has become the most dominant form of IPO allocation mechanism globally. Where introduced, it has quickly become the most favoured form of IPO allocation and pricing mechanism replacing auction and/or fixed price mechanisms. One of the most controversial features of the bookbuilding mechanism, as it is practiced in the US and in most of the other markets, is the complete lack of transparency in the pricing and allocation process. In general, in these IPO markets, there is little information on how different investors participate and how underwriter sets the IPO offer price. The lack of transparency has not only hindered our understanding of the IPO process, it has also, as critics of bookbuilding argue, encouraged quid pro quo relationship[23,24]. Although there have been calls for making the IPO process more transparent, particularly in the light of investment banks' deals during the internet bubble[25], the pricing and allocation process still remains largely opaque. In this study, we analyse information production, investors' participation and pricing in a setting which is far more transparent than the bookbuilding setting in the US and in most other markets.

The Indian IPO market distinguishes itself from others in one important aspect[26]. Unlike the bookbuilding mechanism in US and most other markets, the IPO mechanism in India is far more transparent. The transparency in the mechanism allows investors to observe two important pieces of information on a real time basis. First, investors can observe the

[23] In addition to the absence of transparency, critics of bookbuilding mechanism argue that the significant discretion that underwriter's enjoy in allocation and pricing encourages quid pro quo relationships in IPOs.

[24] Several studies have implicated underwriters with quid pro quo relationships. These include Reuter (2006), Ritter and Zhang (2007), Hao (2007) and Liu and Ritter (2010).

[25] Nimalendran et al., (2007) discusses examples of profit sharing allocation by US investment banks during the 1999-2000 period. .

[26] We discuss the transparency in the IPO mechanism and other institutional features in detail in Section 3.

cumulative aggregate investors' demand at different points of the offer price range. Second, investors can also observe the demand multiples of different investor categories for their respective portion of the offer. Regulation requires Indian IPO firms to reserve and allocate pre-determined quota of shares to three different investor categories: qualified institutional investors (QIBs), non-institutional investors (NIIs) and retail investors (RIIs)[27].

The transparency in the mechanism, coupled with fact that different investor categories participate for separate quote of IPO shares, may have a number of important implications for the IPO process. First, information available from the transparent mechanism should influence participation of investors across all investor categories, which in turn should shape the extent of information produced during the offer period. The transparency should also influence the timing of investors' participation in the IPO as some investors may prefer to participate early while others may prefer to participate at the end of the offer period. Existing evidence on the participation of institutional (informed) and retail (uninformed) investors suggest that the information conveyed by the transparent allocation mechanism should influence investor categories differently[28].

Second, since prior research suggests that information produced during the offer period significantly influences IPO offer prices (Cornelli and Goldreich, 2003, Degeorge et al., 2010), the nature of information produced in a transparent mechanism could have significant influence on IPO offer prices. Further, since reputational capital is important for financial intermediaries, it would be plausible to assume that in a transparent mechanism the use of underwriters' discretion in pricing should be consistent with maintaining or enhancing reputation as offer prices which deviates significantly from the information contained in investors' bids will be detected by the market participants. More importantly, the transparency in the mechanism should leave less opportunity for the underwriters to

[27] Qualified institutional investors (QIBs) are large institutional investors registered with SEBI, while non-institutional investors (NIIs) are large net-worth investors. We discuss about the various investor categories in detail in Section 3. This feature is similar to the one which Derrien (2005) discusses in the context of French IPOs in which a portion of the offer is reserved for retail investors.

[28] We develop this argument in detail in the hypotheses section.

engage in a quid-pro-quo relationship which has been documented in less transparent IPO mechanisms.

In this study, we use the unique context of Indian IPOs to test a number of hypotheses on investors' participation, IPO pricing, and the role of underwriter reputation. Using a sample of 306 IPOs issued during the 2001-2010 period, we primarily focus on how the transparency in the Indian IPO mechanism affects participation of different categories and how their participation in turn affects information production and pricing[29]. Analysis of aggregate demand schedule shows that demand is concentrated at either one or two points of the offer price range which leads to highly inelastic demand curves. While investor demand is exclusively concentrated at the upper bound of the offer price range for most of the IPOs, it is concentrated at the lower bound for some IPOs with very little investor participation in between the two price points. Further, we find that a large number of investors, both institutional as well as retail, only submit strike bids. Thus, in a sharp contrast with prior research in a less transparent setting (Cornelli and Goldreich, 2003, Kandel et al., 1999, Degeorge et al., 2010), we find that the transparency in IPO mechanism limits information production during the offer period.

Our analysis of the evolution of demand over time shows that most of the bidding occurs on the final day of the offer period. The transparency in the mechanism induces heavy participation from all investor categories, and particularly from retail investors who follow the early participation of either institutional and/or non-institutional investors. Notably, our analysis of demand over time reveals that the investor category taking lead in subscribing to IPO shares differs by IPO type. Consistent with the notion that institutional investors are better informed, we find that institutional investors (QIBs) take the lead in subscribing to strong and hot IPOs. On the other hand, non-institutional investors (NIIs) appear to bid aggressively in the early stages of weak and cold IPOs.

[29] Since we focus on information production and pricing in this study, we have excluded 65 fixed price IPOs which were issued during our sample period.

While an association between well-performing IPOs and strong early institutional demand is consistent with prior research, evidence of a strong participation of non-institutional investors in weak and cold offerings is surprising. One possible explanation of this relationship comes from recent reports in the media which shows a nexus between promoters' of weak IPO offerings and some non-institutional investors wherein the latter submit large fake subscriptions (Sawardekar, 2011). While these fake subscriptions allow the issuers to achieve the required minimum subscription, it also lures uninformed retail investors into participating in weak IPOs who typically participate on the basis of the participation of other investor categories. Thus, on one hand, the transparency of the Indian IPO mechanism appears to mitigate the winners' curse problem (Khurshed et al., 2011), on the other hand, it raises serious concerns about the welfare of uninformed retail investors.

Analysis of IPO offer price shows that price limit bids and investors' demand multiple are significant in determining IPO offer price. However, price limit bids influences offer price in only a small number of IPOs, as a large fraction of the sample only receives strike bids. Further, consistent with Derrien (2005), we find that favourable retail investors' demand contributes significantly to high IPO offer prices. However, we also find that such favourable demand is fully incorporated into the offer prices, which is in sharp contrast to Derrien (2005), who finds that the favourable retail investors' demand is only partially incorporated.

Our analysis on the role of underwriter reputation shows that reputed underwriters are more likely to set offer prices which incorporates the information produced during the offer period. While reputed underwriters appear to set the offer price below the upper bound of the price range when one or more of the investor categories undersubscribe, less reputed underwriters simply ignore such information and set IPO prices at the upper bound of the price range. The participation of less reputed underwriters is strong in a large number of IPOs where informed institutional investors (QIBs) undersubscribe. Majority of these IPOs subsequently perform significantly worse than comparable IPOs in aftermarket trading. The less reputed underwriters are able to price IPOs with any concern for investor welfare as they appear to exploit provisions within the regulations which allow shares of under-

subscribed investor categories to be re-allocated to oversubscribed categories. Hence, to protect the welfare of less informed investors we recommend a change in the regulation to prohibit re-allocation of shares from under-subscribed institutional and non-institutional categories to the retail investor category.

The study makes a number of important contributions. First, to the best of our knowledge this is the first study which examines a number of issues in an IPO mechanism which is far more transparent than mechanisms used in other IPO markets. While some prior studies on Indian IPOs have examined factors determining underpricing (Khurshed et al., 2011) and the effect of regulatory changes on underpricing (Bubna & Prabhala, 2010), our study examines in significant detail the extent of information production and IPO pricing in a transparent IPO mechanism. Our study brings to light the strengths and weaknesses of a transparent IPO mechanism and shows that while transparency appears to reduce winners' curse problem for retail investors (Khurshed et al., 2011), it becomes clear from our analysis that regulators need to put in place adequate measures to protect investors' welfare particularly when large number of uninformed investors participate in the capital market. As our study shows, even a transparent mechanism is prone to abuse if proper regulations and monitoring are not in place. The findings of our analysis will also be useful to both practitioners and regulators operating in other less transparent markets.

Second, our study also enriches the existing evidence on the participation of institutional and retail investors. Consistent with prior evidence we find that institutional investors participate on the basis of the information they possess, while retail investors behave as sentiment or noisy traders. More tellingly, through our analysis of evolution of demand we provide evidence on the timing of the participation of various investor categories. Third, we also complement existing research on the influence of underwriter reputation. As far as we are aware, this is the first study of its kind which provides comprehensive evidence on the role of underwriter's reputation in pricing of IPOs. While prior studies have examined the influence of underwriter reputation by analysing underpricing, we investigate the effect of underwriter reputation by analysing the discretion that underwriters use in setting IPO prices.

The remainder of the chapter is organized as follows. Section 5.2 discusses the related literature. Section 5.3 develops our hypotheses. Section 5.4 explains the sample. Section 5.5 presents descriptive statistics. Section 5.6 presents the empirical evidence and we conclude with Section 5.7.

5.2 Related literature

5.2.1 Investor participation and information production in IPOs

There is a significant body of theoretical literature that discusses information production in the context of IPO mechanisms. Benveniste and Wilhelm (1990), for instance, model the optimal IPO mechanism and argue that the pricing and allocation discretion afforded by the bookbuilding and two-stage marketing mechanism helps underwriters extract valuable information from informed investors. Sherman (2000) models how bookbuilding creates regular groups of investors and shows how bookbuilding helps in both lowering average underpricing and providing returns to investors so that they could engage in information gathering and reporting. Biais and Faugeron-Crouzet (2002) and Biais et al., (2002) show that Offre a Prix Minimal, a modified auction mechanism used in France, exhibits information-extraction properties similar to bookbuilding.

Using proprietary IPO data, Cornelli and Goldreich (2003) and Jenkinson and Jones (2004) provide mixed evidence on information production in bookbuilding IPOs. Cornelli and Goldreich (2003) find that more informative bids (bids which are submitted early and/or price limit bids) not only influence the offer price but also IPO allocations, evidence consistent with the information revelation theories. Jenkinson and Jones (2004), on the other hand, find that bids submitted by investors are not informative for pricing purposes and instead find that the most important determinant of IPO allocation is whether the investor is viewed as a long term holder of the stock. In a survey of large institutional investors participating in bookbuilding IPOs, Jenkinson and Jones (2009) find evidence inconsistent with the information revelation theory. They find that while only one-half of the investors actually develop valuation models, investors primarily consider brokering relationship as most important in receiving favourable IPO allocations.

In the context of auction IPOs, Kandel, Sarig and Wohl (1999) examine demand schedules of Isreali IPOs and find highly informative and elastic demand curves. Lin, Lee and Liu (2007) examine the ability of institutional investors relative to retail investors in Tawainese auction IPOs and find that institutional investors are better informed about IPO value. They find that relative to retail investors, institutional investors bid higher in IPOs with high initial returns. Chiang , Qian and Sherman (2010) also examine Taiwanese IPO auction data and find that a higher number of institutional investors or larger institutional bids are positively associated with higher initial returns and argue that institutional investors participate on the basis of their information about the value of the issue. They find that retail investor's participation, on the other hand, is influenced by the returns on recent IPOs, an evidence of return chasing behaviour.

Degeorge, Derrien and Womack (2010) analyse US auction IPOs and find that issuers and underwriter extract useful pricing information from investors' bids in setting the offer price. They find elastic demand curves for institutional investors, is an indication that institutional investors produce and reveal information even in auction IPOs. Further, they also find that underwriters exercise significant discretion in pricing by setting offer price below the market clearing price in a large number of IPOs.

5.2.2 Pricing of IPOs

The literature discusses setting of IPO offer prices indirectly by analyzing initial returns or underpricing[30]. Rock (1986) argues that firms price (underprice) IPOs in order to attract the participation of uninformed investors. Benveniste and Spindt (1989) posit that underwriter price IPOs to reward investors who reveal valuable information during the offer period. The partial adjustment hypothesis posited by Hanley (1995) suggests that underwriters do not fully incorporate the investors' favorable demand in IPO pricing. Loughran and Ritter (2002) present prospect theory in explaining IPO pricing and suggest that issuers care less

[30] As Derrien (2005) states, the assumption in these analysis is that the short-term equilibrium prices reflect the true value of the stocks.

about large underpricing as they not only consider the shares they sell, but also those they retain which benefits from high underpricing.

Using a large sample of US IPOs, Purnanandam and Swaminathan (2004) find that IPOs are highly overpriced compared to their industry peers. They also find that the high priced IPOs are positively associated with high initial returns but negatively associated with long term risk adjusted returns. Using a sample of French IPOs, Derrien (2005) finds that the favorable demand of retail investors has a significant positive influence on high IPOs prices and that such favorable demand leads to high initial returns but poor long term performance. He further finds that the favorable demand of retail investors is only partially incorporated into IPO offer prices.

5.3 Hypotheses

5.3.1 Investors' Participation

A number of theoretical models including Rock's (1986) winners' curse and Benveniste and Spindt's (1989) information acquisition model assume that some investors are more informed than others. The segregation of informed and uninformed investor categories is at the heart of many of these theoretical models. Rock, for instance, shows that because some investors are more informed, other less informed investors face winners' curse problem. He shows that firm underprice IPOs to avoid winners' curse problem. On the other hand, Benveniste and Spindt (1989) show that underpricing is a reward to informed investors who truthfully reveal valuable information in the IPO process.

These theoretical developments have spurred a large number of studies which examines whether differences exist in how different investor categories participate in IPOs. The present evidence strongly supports the view that some investors are more informed than others. Prior studies have shown that large institutions, a proxy for informed investors, participate highly and hence receive a larger percentage of shares in well performing IPOs issued in both bookbuilding and auction mechanisms (Koh and Walter, 1989, Aggarwal et al., 2002, Degeorge et al., 2010, Hanley and Wilhelm, 1995, Chiang et al., 2010).

As we have discussed earlier, the transparency of the IPO mechanism allows investors to observe prior demand of IPO shares. Since investors can observe the demand of other investors, it is likely that some less informed investors may simply follow those who participated earlier. In fact, prior literature has shown evidence of herding by both institutional and retail investors (Shleifer and Summers, 1990, Lakonishok et al., 1992). Hence, it will be in the interest of the informed investors to participate early in the offer process and reveal the information they have. Further, the separate quota of shares available to different investor categories, with the largest fraction reserved for institutional investors, also encourages informed investors to participate early without being worried about disruption to the price discovery process. We, therefore, posit the two following hypotheses on investors' participation in the Indian IPO context:

H_1: *Informed institutional investors will submit their demand for shares prior to other investor categories in good quality offerings.*

H_2: *Uninformed retail investors will submit their demand for shares late in the offer period only after observing the demand of early bidders.*

5.3.2 Pricing

The information revelation theories argue that an IPO is priced to reward investors who reveal useful information during the IPO process. Benveniste and Spindt (1989) develop an information acquisition model where underwriters underprice the offer as a reward to informed investors who provide valuable information about the intrinsic value of the firm. Cornelli and Goldreich (2003) provide empirical evidence of the information acquisition hypothesis and show that investors submitting early bids as well as those containing information are rewarded by underwriters. They further show that price limit bids have a significant influence on the final IPO price decided by the underwriters. While information revelation theories are essentially based on the US style bookbuilding mechanism, Degeorge et al., (2010) show that information revealed during an auction is equally useful in setting IPO prices. They report highly elastic demand curves and find that the demand of

institutional investors has a significant influence on the offer price. Hence, we posit the following hypothesis:

H_3: *Informative bids (price limit bids) will have a positive and significant influence on the IPO offer price.*

Derrien (2005) models the IPO offer price and shows that the final price depends on the intrinsic value of the firm as revealed by informed investors and on the sentiment of the noise trader (individual investors). Using a sample of French IPOs, in which a fraction of the shares is reserved for retail investors, the study shows that favourable sentiments of the retail investor is positively associated with a higher offer price. The setting of the Indian IPO market bears strong resemblance to Derrien's (2005) model since a certain fraction of total IPO shares is reserved for individual investors. Hence, following Derrien (2005), we formulate the following hypothesis:

H_4: *The IPO price will be positively related to the demand of uninformed retail investors.*

Derrien (2005) shows that in setting the IPO price underwriters only partially incorporate the sentiments of noise traders. He argues that underwriters price IPOs conservatively since they are concerned about providing costly post IPO price support and because they are concerned that bullish noise trader may turn bearish in the post listing period. Further, prior research has also shown that underwriter's reputation is positively correlated with conservative pricing and selection of high quality firms as reputational capital is considered important for financial intermediaries (Carter and Manaster, 1990, Michaely and Shaw, 1994). Some prior research also finds that aggressive pricing results in underwriters losing their market shares (Nanda and Yun, 1997, Dunbar, 2000). Since the transparent Indian IPO mechanism reveals how the IPO is priced in relation to demand, it becomes important, particularly for reputed underwriters, to properly price IPOs. Since reputed underwriters bring significantly larger issues which require the participation of large informed investors, it becomes important to consider the interests of the investors in pricing the offer. On the other hand, it may be plausible to assume that less reputed underwriters may be more inclined to price IPOs which brings them additional deals from prospective issuers. Since

less reputed underwriters manage smaller issuers in a market with the presence of a large investor base, they are more likely to be aggressive in pricing the offer. Hence we formulate the following hypothesis:

***H_5**: Large reputed underwriters will exercise more restraint in pricing IPOs with favourable demand from uninformed retail investors than less reputed underwriters.*

5.4 Sample Data

Our sample comprises 306 bookbuilding and auction IPOs listed on Bombay Stock Exchange (BSE) and/or the National Stock Exchange (NSE) over a ten year period from January 2001 to December 2010. We exclude large privatizations IPOs of utilities and banks as they are not representative of average firms. We collect data on firm and IPO characteristics from the IPO prospectus. We obtain market data primarily from the BSE/NSE website. We use unadjusted prices to calculate initial returns on IPOs and BSE Sensex index as the market index to calculate market adjusted initial returns. Data on IPO demand is obtained from the BSE/NSE and some other finance portals including the website of ICICI Bank (one of the leading commercial and investment banks in India), Money Control (considered as the top finance portal in India[31]) and Chittorgarh (considered India's number one IPO investment portal[32]).

<<Insert Table 5-1 here>>

5.5 Descriptive statistics

In this section we present descriptive statistics of our sample of IPOs. Table 5-1 presents descriptive statistics by year. The mean (median) age of the firm at the time of the IPOs is about 14.19 (12.21) years. The mean (median) total assets and gross proceeds of the overall sample are INR 6,874 (1,945) million and INR 3,535 (1,128) million respectively[33]. The

[31] www.moneycontrol.com

[32] www.chittorgarh.com

[33] 1 US$ is roughly equivalent to INR 45.

mean (median) leverage (total liabilities/total assets) of the IPO firm is 0.56 (0.60). The mean (median) raw first day return (interchangeably used for underpricing) for the period is 22% (13%). This is much higher than those reported by studies using IPO data from US and other developed markets, but is similar to initial returns reported in other emerging markets.

To account for changes in the market conditions from the time of the offer to the listing date, we calculate the market adjusted returns[34]. The mean (median) market adjusted first day return over our sample period is 21% (10%) while the one month market adjusted mean (median) initial return is 18% (8%). Of particular interest is the number of IPOs with negative return on the first day of trading. More than a third of the total IPOs (111 of 306) have negative returns on the first day of trading suggesting that the IPOs are not only overpriced but also underwriters activity in the after-market to support the prices of the IPOs they manage is very limited. The overall demand for IPOs is captured by the total demand multiple. The mean (median) overall total demand multiple is 20.51 (8.08) times which suggests that IPOs are well subscribed.

<<Insert Table 5-2 here>>

In Table 5-2, we compare bookbuilt and auction IPOs as well as IPOs issued by reputed and less reputed underwriters. We define reputed underwriters based on the value of IPOs managed by them during the sample period[35]. Our classification leads to two distinct categories of underwriters. While, the reputed category includes well-known underwriters who undertake large and important IPO issues, the less reputed category includes underwriters who regularly manage only smaller issues. As shown in Table 5-2, both total assets as well as gross proceeds of IPO firms managed by reputed underwriters is significantly higher than those managed by less reputed underwriters. While the difference

[34] On average Indian IPOs are listed 21 days from the day the offer is open for bidding.

[35] We categorize underwriters as reputed who have managed at least 10,000 million INR during the sample period. This results in having 15 reputed and 42 less reputed underwriters. Alternatively, we also look at the top 5 underwriters every year during 2005-2010. Our classification qualitatively remains the same.

in initial returns between the IPOs managed by reputed and less reputed underwriters is not statistically significant at conventional levels, the demand of shares (demand multiple) for IPOs managed by reputed underwriters is significantly higher than for IPOs managed by less reputed ones. Our analyses of investors demand in the following sections will examine these differences in significant detail.

Following Cornelli and Goldreich (2003) (CG hereafter), we calculate the average offer price and the quantity adjusted average limit price both normalized to the offer price range. We find that both average offer price and average limit price of our IPO sample is significantly higher than reported by CG. CG report a mean (median) normalized offer price and average limit price of 0.51 (0.67) and 0.49 (0.49) respectively. The mean (median) normalized office price and average limit price of our sample is 0.80 (1.00) and 0.25 (0.22) respectively. Thus, a larger portion of our IPOs are priced at the upper end of the price range and most of the price limit bids are received at the lower end of the demand schedule. We discuss this in more detail in the following sections.

Since our sample consists of IPOs issued in both bookbuilding and auction mechanisms, we also compare the two IPO categories in Table 5-2. Since auction mechanism essentially replaced bookbuilding, we do not find any significant difference in firm and offer characteristics between the two groups of IPOs. We, however, find that initial returns of bookbuilding IPOs are significantly higher than initial returns of auction IPOs. Our result is different from the one reported by Bubna and Prabhala (2010). Using a narrow time-period and a smaller sample size, Bubna and Prabhala (2010) find that bookbuilt IPOs have lower underpricing than auction IPOs and attribute the difference to the allocation discretion that underwriters have in bookbuilding IPOs. Our results, which are consistent with Khurshed et al., (2011), uses a much longer sample period as well a larger sample size. Finally, we do not find any significant difference in investors' participation and in both the normalised offer and average limit price between bookbuilding and auction IPOs.

5.6 Empirical results

5.6.1 Investor participation and information production

The transparency in the Indian IPO mechanism allows us to observe both aggregate demand schedule as well as the evolution of demand over-time. Hence, to test our hypotheses on investors' participation we run analysis at two levels: aggregate demand and demand over time.

<<Insert Figure 5-1 (a) here>>

5.6.2 Analysis of Aggregate Demand Schedule

In this section we analyse investors' aggregate demand schedule at different points of the offer price range. Since we do not have data on demand of each investor category at different points of the price range separately, we use total aggregate demand. The aggregate demand schedule allows us to examine the total demand of shares at different points of the offer price range.

In order to provide an illustration of the nature of demand for IPO shares in India, we plot in Figure 5-1 (a) the complete demand curves (along with their supply curves) of two IPOs: Allied Digital Service Limited and Indus Fila Limited. We choose Allied and Indus Fila as they represent the demand schedules that we observe in most of our IPO sample. Allied offered 4.5 million shares with an initial price range of INR 170 to 183. Indus Fila offered 4.8 million shares with an initial price range of INR 170 to 176. The demand curves that we plot are strikingly different from those reported in prior studies using both bookbuilding and auction data (Kandel et al., 1999, Cornelli and Goldreich, 2003, Degeorge et al., 2010). The two demand curves demonstrate that most of the demand is concentrated at two points of the demand schedule: the lower and the upper bound of the demand curve. While the total demand for Allied is concentrated at the upper bound, the demand for Indus is concentrated at the lower and upper bound of the demand schedule. In case of Allied, more than 99% of the bids are strike bids (bids submitted at the upper bound or at the cut-off price), a pattern that we observe in a large number of IPOs.

<<Insert Figure 5-1(b) here>>

We plot the aggregate demand curve using demand schedule of 281 IPOs for which we have complete data. To build the demand curve, we use aggregate demand at five different points of the initial offer price range: demand at the lower bound, at the mid-point, below the mid-point, above the mid-point and at the upper bound of the original offer price range. For demand at below and above the mid-point we aggregate all demand between these points. We plot the overall demand curve as well as the demand curve for bookbuilding and auction IPOs separately in Figure 5-1(b). Demand is either at the lower or the upper bound of the initial price range with very little activity in-between. In Figure 5-1 (c), we plot the demand curves of IPOs managed by reputed and less reputed underwriters and find that IPOs managed by reputed underwriters receive relatively more bids at the lower end of the demand schedule compared to less reputed underwriters.

<<Insert Figure 5-1(c) here>>

Table 5-3 presents various statistics on aggregate IPO demand. In Panel A, we present some measures of the slope of the demand curve. First, we calculate three measures of arc elasticity of demand: the elasticity at the average quantity adjusted limit price, the elasticity between the offer price and lower bound of the demand schedule and the elasticity between the lower and upper bound of the demand schedule. Although a strict comparison of our results is not appropriate with those reported in earlier studies because of the unique nature of the IPO mechanism, we still compare to examine the influence of the transparency of the Indian IPO mechanism.

As shown in Panel A of Table 5-3, all our measures of elasticity are much lower than those reported by prior studies. The elasticity at the average limit price is considerably higher than other measures of elasticity with a median of 0.39 but still lower than the elasticity reported by CG. Our median gross elasticity is 0.16 and is significantly lower than 2.46 reported by Kandel, Sarig and Wohl (1999) and 2.13 reported by Degeorge, Derrien and Womack (2010). The median elasticity of demand at the offer price is even lower at 0.07. Both the measures of elasticity are significantly smaller with the elasticity at the offer price

significantly smaller than a value 0.20 (*p*-values of less than 1%) and the gross elasticity significantly smaller than a value of 0.70 (*p*-values of less than 1%).

We also report the elasticity of demand for IPOs managed by reputed and less reputed underwriters and find the difference to be significant at less than 10% significance level. Thus, while the overall demand curve is inelastic, there does appear to be some difference in the way investors participate in IPOs managed by reputed underwriters. In panel A of Table 5-3, we also report another measure of the demand curve: the overall subscription at the lower bound of the demand schedule. This measure of the demand curve is also significantly smaller than the one reported by Kandel, Sarig and Wohl (1999). Our overall mean (median) subscription at the lower bound of the demand schedule is only 0.33 (0.06) while Kandel, Sarig and Wohl (1999) report 53.84 (57.74). The median (mean) oversubscription for all price points below the upper bound of the demand schedule is only 0.20 (0.91).

<<Insert Table 5-3 here>>

As shown in Panel B of Table 5-3, on average about 87% of all investors submit a strike bid. If we consider investors demand for shares at the lower end of the demand curve, the total investors' demand for shares at these two points is about 95% of overall demand for IPO shares. Investors demand for shares at all other point of the offer price range is almost negligible. Further, the demand for IPO shares does not differ significantly by allocation mechanisms. Both bookbuilt and auction IPOs exhibit similar participation by investors. Thus, the change in regulation in late 2005 which prohibited discriminatory allocations to institutional investors does not appear to have made any significant change in the way investors participate in IPO offerings. Our results are not contrary to those reported by Bubna and Prabhala (2010) who analyse a proprietary dataset to examine bids and allocations and find that underwriters exercised significant discretion in allocations. While the allocation pattern may have been different in bookbuilding mechanism, our results suggest that the pattern of investors' participation in bookbuilding does not appear to be different from the pattern seen in auction IPOs.

In Panel C of Table 5-3 we compare aggregate demand schedules for IPOs managed by reputed and less reputed underwriters. We find that the difference in investors' participation in the two IPO categories is significant at all points of the price range. The difference at the upper bound, in particular, is almost 6% lower for IPOs managed by reputed underwriters than those managed by less reputed ones. The difference in the two IPO categories can best be explained by the variance in the participation of institutional investors. As we have shown in the descriptive section, IPOs managed by reputed underwriters are significantly larger than those managed by less reputed ones. Hence, these IPOs attract large institutional investors who have both the resources as well as the ability to be informed about the value of the offer. We find that IPOs managed by reputed underwriters command a much higher demand multiple than IPOs managed by less reputed ones, despite having a significantly larger offer size. As shown in Table 5-2, the mean (median) demand multiple of IPOs managed by reputed underwriters is 33 (18) times compared to 9 (1.8) times for IPOs managed by less reputed underwriters.

The number of investors who submit a strike bid in our sample of IPOs is close to 86% reported by CG for their sample of European IPOs. We investigate this further by examining the proportion of IPOs in which investors submit a strike bid. Panel D of Table 5-3 documents the percentage of investors who submit strike bids. As shown in the Table, we find that strike bids account for more than 99% of all bids in 111 IPOs (40% of the total sample). Hence, the fraction of IPOs that do not have price limit bids in our sample is much higher than the 5% (2 out of 37) reported in the CG sample. Further, we find that strike bids account for more than 90% of all bids submitted in 201 IPOs (71% of the total sample). Results are similar for bookbuilding and auction IPOs. Thus, the overall percentage of price limit bids that we document in our sample is not as a result of having a sizeable portion of price limit bids as in CG. It is on account of having a few IPOs in which investors bid disproportionately at the lower bound of the demand schedule. Further, the low normalized quantity adjusted average limit price of our IPO sample, which is only 0.24 compared to 0.49 that CG report, also suggests that price limit bids are mostly at the lower end of the demand schedule.

Overall, we find that the transparency in the IPO mechanism significantly reduces information production. We find that in a large number of IPOs the demand curve is very inelastic yielding no information. The demand is concentrated either at the upper or the lower bound of the initial price range with minimal demand between these two bounds. It also appears that the transparency of the process completely dominates any potential impact that a change in allocation mechanism (bookbuilding to auction or vice-versa) may have on information production as we do not find any difference in the way information is conveyed by investors in different allocation mechanisms.

5.6.3 Investors' demand over-time

In this section we examine the evolution of investors' demand over-time. The offer is generally open for 5 days unless there is a revision in the price range in which case the offer period is extended for another 3 days[36]. For this part of our analysis we have data for 195 IPOs all from the auction regime. Our analysis in the prior sections suggests that the shift in the regime from bookbuilding to auction appears to have brought little change in the pattern of investors' participation. Hence, we argue that the results that we describe here in this section will also apply to the bookbuilding mechanism. Table 5.4 presents our analysis of investors' demand over-time.

<<Insert Table 5-4 here>>

In panel A of Table 5-4, we show the subscription pattern of different investor categories over-time. We analyse by examining demand multiple over the five day auction period. While day 0 refers to the final day of bidding period, day 1 refers to the penultimate day of bidding and so forth. Prior research informs us that bids submitted earlier are more informative as these are likely to be submitted by informed investors. Results from Panel A suggest that large institutional investors (QIBs) are more likely to bid early than both retail (RIIs) and non-institutional investors (NIIs). We find that in 69 of the 195 IPOs, the QIB category is fully subscribed at the end of the third day of auction period. The corresponding numbers for NII and RII investors are 59 and 20 respectively. The bulk of retail investors'

[36] Only very few IPOs have revised their price range in our IPO sample.

participation appears to occur mostly on the final day of the bidding period. The retail portion of the offer is fully subscribed in only 46 of the 195 IPOs by the end of the penultimate day. Initial analysis of demand over time provides strong support for hypothesis 1 and 2. As hypothesized, informed institutional investors appear to be less interested in demand of other investors and submit their bids early. On the other hand, the less informed retail investors submit their bids only after observing the demand of more informed investors.

Prior research informs us that institutional investors are better informed. To analyse whether other investors follow QIBs or have their own bidding strategies, we classify IPOs into two categories: IPOs with strong and weak institutional demand. We consider IPOs in which the QIBs portion is fully subscribed by the end of the 3rd day (Day 2 in Table 5-4) as IPOs with strong demand (Rocholl, 2009) and the rest as IPOs with weak demand. Accordingly, we have 69 IPOs with strong and 126 with weak institutional demand. Results from panel B of Table 5-4 show that a disproportionately large amount of bidding occurs on the final day which occurs across all investor categories. Even in IPOs where the offer is fully subscribed by the penultimate day, we find heavy participation of all investor categories on the final day of the auction period. It appears that for IPOs with strong demand, both NIIs and RIIs essentially follow QIBs. The median strong IPO is subscribed almost 5 times by QIBs by the penultimate day when the median cumulative demand for NIIs and RIIs is just 0.68 and 0.52 respectively. However, the final day demand is significantly high not only for NIIs and RIIs but for QIBs as well. This suggests that not only NIIs and RIIs follow QIBs, but some less informed QIBs follow other well informed ones. This is consistent with Jenkinson and Jones (2009) who report that only one half of institutional investors develop their own valuation models while investing in IPOs.

Interestingly, in case of IPOs with weak institutional demand, we find that NIIs are more likely to fully subscribe their portion of the shares prior to both QIBs and RIIs. In these weak offerings, NIIs fully subscribe 36 IPOs by the end of the 3rd day (Day 2 in our analysis) when not even a single IPO is fully subscribed by QIBs. By the end of the penultimate day of bidding the median demand multiple of NIIs (1.001) is significantly

higher than the demand multiple of both QIBs (0.64) and RIIs (0.32) with *p-values* at less than 5% significance level. The difference in NIIs subscription compared to other investor categories persists even on the final day of bidding.

To further analyse demand over time, we categorize IPOs according to the first day unadjusted returns and create five different IPO categories: very cold IPOs (returns of less than -10%), cold IPOs (returns between -10% and 0%), warm IPOs (returns between 0% and 10%), hot IPOs (returns between 10% and 50%) and very hot IPOs (returns in excess of 50% on the first day). Result of the analysis which is presented in Panel C of Table 5-4 is consistent with the findings reported in Panel B. We find that while QIBs take the lead in hot IPOs, NIIs appear to be aggressive in cold IPOs. Both the mean and median QIB demand on the penultimate date of the bidding period is significantly higher than other categories for warm, hot and very hot IPOs, while the mean and median NII cumulative demand on the penultimate date is higher for very cold and cold IPOs. Further, while there is a significant difference in bidding pattern of QIBs and RIIs across the different IPOs categories, we do not find such difference in NIIs in days other than the final day. RIIs appear to exhibit a strategy in which they either follow QIBs or NIIs.

To confirm the findings of our univariate results, we perform a multivariate regression analysis to explain both the early participation of QIBs and NIIs and the late surge in the participation of RIIs during the offer period. Our choice of independent variables is guided by prior research (Derrien, 2005, Rocholl, 2009) and we include a number of control variables including size of the issue (*LnGpcds*, log of gross proceeds), recent market return (*Mkt3Mw*), recent market volatility (*MktVol*), one plus log of age of the firm (*LnAge*) and an industry dummy (*HiTech*) which take the value of 1 for IPOs in the hi-tech industry (information technology and bio-technology) and zero otherwise. *Mkt3Mw* is the weighted average of the buy-and-hold returns on the BSE Sensex index in the 3 months before the IPO date where weights are 3 for the recent month, 2 for the next and 1 for the third month before the offering. *MktVol* is standard deviation of the index returns one month prior to the offer issue date.

We also include underwriter reputation (*LbmRep*) dummy variable as it is likely that more reputed underwriters will attract large institutional investors compared to less reputed ones. For explaining RIIs participation, we also include early demand of IPO shares by QIB ($LnQIB_1$) and NII ($LnNII_1$) investors. We define early demand as the log of one plus the cumulative demand multiple at the end of the penultimate day of the offer period. For explaining the early NIIs demand we also include the log of one plus the cumulative demand multiple of QIBs at the end of the third day ($LnQIB_2$). The result of the regression analysis is shown in Table 5-5 where the reported t-statistics are adjusted for heteroskedasticity. The dependent variable in regressions (1) and (2) is the log of one plus the cumulative demand multiple of QIB ($LnQIB_1$) and NII ($LnNII_1$) at the end of the penultimate day while the dependent variable in regressions (3) to (7) is the log of one plus the final demand multiple of RII ($LnRII_0$).

<<Insert Table 5-5 here>>

Results from regression (1) suggest that the early participation of QIBs is significantly higher in larger IPOs. Further, the early participation of QIBs is also likely to be higher in periods following high recent market returns and in IPO managed by reputed underwriters. Regression (2) shows that the early participation of NIIs is higher in IPOs managed by less reputed underwriter confirming our evidence from univariate analysis that NIIs take the lead in subscribing to cold and weak IPOs which are most likely to be managed by less reputed underwriters. Further, results from the regression also show that the prior participation of QIBs have a positive and significant influence on the participation of NIIs. Thus, where QIBs take the lead in subscribing to IPOs, NIIs follow suit. Further, the coefficient of both recent market returns and size of the offer is insignificant which tend to suggest that, unlike QIBs, is it difficult to predict the IPO NIIs' investment pattern.

Regressions (3) to (7) examine the determinants of RIIs participation[37]. In regression (3) we include total sample and find that the coefficients on early QIB ($LnQIB_1$) and NII ($LnNII_1$) participation as well as recent market return (*Mkt30*) is positive and significant. The finding is consistent with our hypothesis on the participation of uninformed investors. The coefficient on *LnGpcds* is negatively related to RII participation. This is most likely a reflection of the size affect as our dependent variable, the demand multiple, is likely to be higher for smaller issues than for larger issues.

In regressions (4) to (7) we segregate the IPOs in two categories: IPOs with strong and weak demand and cold and hot IPOs. As discussed earlier, we consider IPOs with strong demand as those which are fully subscribed by the QIBs two days prior to the close of the offer period. Further, we define IPOs with negative first day (raw) returns as cold IPOs. The two categories are particularly useful in analysing the final demand of RII as univariate analysis show that NII take the lead in subscribing to weak and cold IPOs. In regression (4) where we only consider strong IPOs, the coefficient on early NII participation becomes insignificant while the coefficient on early QIB participation becomes stronger compared to the regression (3).

In regression (5) where we only analyse weak IPOs, we find that the coefficient on the early participation of NIIs not only becomes significant, but its coefficient also increases in comparison to regressions (3) and (4). In regression (6) we only include hot IPOs and find that the coefficients on both $LnQIB_1$ and $LnNII_1$ are positive and significant, although the significance and size of the coefficient on $LnNII_1$ drops compared to regression (5). Finally in regression (6) where we only include cold IPOs both the significance and size of the coefficient on $LnNII_1$ increases suggesting that in colder IPOs the explanatory power of the early participation of NII investors is much higher on the subsequent participation of RII investors. Thus, in both weak and cold IPOs early participation of NIIs significantly influences the subsequent participation of RIIs.

[37] Since RIIs mostly participate on the final day of the bidding period we use the final day demand as the dependent variable. Alternatively, we also use the net demand on the final day as the dependent variable. Our results remain qualitatively similar.

Our analyses provide clear evidence of early participation of well-informed QIBs in hot and strong IPOs and the early participation of NIIs in weak and cold IPOs triggering the participation of RIIs late in the offer period. While it is understandable why QIBs participate early in hot and strong IPOs, the early participation of NIIs in weak and cold IPOs, and particularly in those IPOs in which there is weak QIB demand, raises important questions. So why do NIIs participate early in weak and cold IPOs?

The answer to this may lie in a news story published in Business Standard, a leading Indian business newspaper[38]. According to SEBI's Intelligence Bureau report some dubious NIIs strike pre-IPO deals with promoters and put in large dummy subscriptions perhaps with the intention of attracting RIIs. Since it is necessary to have high retail participation in weak IPOs, it appears that low quality IPO firms strike deals with dubious NIIs to make their offering a success. Once the stock is listed, these NIIs exit the market by selling their shares above the cost price. While this may not be the case in all weak IPOs, it certainly raises concern about the welfare of the unsuspecting retail investors.

Thus, the transparency in Indian IPO mechanism appears to be a double edged sword for the RIIs. On one hand it reduces winners' curse for retail investors by allowing them to participate in IPOs with high QIB participation. On the other hand, it allows some issuers and investors to abuse the mechanism and exploit the uninformed retail investors.

5.6.4 The Pricing of IPOs

Setting of the IPO offer price

Our results from Section 5.6.2 shows that the demand curve for Indian IPOs is highly inelastic yielding very little valuable information for a large number of IPOs. Since IPO regulations in India allow discretion in IPO pricing, in this section we analyse how underwriters use discretion in setting IPO price, particularly in those IPOs where aggregate demand is not concentrated at the upper bound of the price range.

<<Insert Table 5-6 here>>

[38] Source: http://www.business-standard.com/india/news/sebi-wants-ipos-priced-realistically/433739/

To examine the determinants of the offer price we run a multivariate regression analysis with the normalised issue price (*NorPrice*) (to the price range) as in CG as our dependent variable. Results are shown in Table 5-6 where the reported t-statistics are adjusted for heteroskedasticity. In regression (1) we regress the normalized IPO price on the average limit price (*AvLimitPr*). Consistent with CG, we find that the coefficient on the average price limit is positive and statistically significant suggesting that the limit prices contained in the demand schedule does influence the final offer price. However, as we have discussed earlier, the significant average limit price is due to the high demand at the lower bound of the price range in some IPOs. In regression (2) we re-run the analysis with the log of one plus the total demand multiple (*LnDmtl*) and find that it has a positive and statistically significant impact on normalised price. In fact, the total demand multiple explains more of the variation in the normalised price than the average limit price. In regression (3) we include both average price limit and total demand multiple and find that the economic significance of total demand is almost three times that of the average limit price. Although a large number of IPOs do not have price limit bids, IPOs in which such bids occurs it is highly significant in determining the offer price.

In regression (4) we include the elasticity of demand observed at the average price limit. The coefficient on the elasticity of demand is negative and statistically significant suggesting that higher elasticity is associated with more conservative pricing. Since the elasticity of demand at the limit price is mostly concentrated at the lower bound of the demand curve, it is but natural that the higher elasticity leads to a relatively lower normalized offer price. In regression (5) we include a number of control variables including the demand multiple of the three investor categories (QIB, *LnDmtlQIB*, NII, *LnDmtlNII* and RII, *LnDmtlRII*), underwriter reputation (*LbmRep*), log of gross proceeds (*LnGpcds*), a dummy industry variable (*HiTech*) that takes the value of 1 for hi-tech industries and 0 otherwise, recent market return (*Mkt3Mw*), recent market volatility (*MktVol*) and a dummy variable for allocation mechanism (*Mechanism*) which takes the value of 1 for bookbuilding IPOs and zero otherwise.

As shown in regression (5) the coefficient on both QIBs and RIIs demand multiple is positive and highly significant. This is expected as QIB and RII are the two larger investor categories and significant participation of at least one category is essential for the offer to be successful. However, the size of the coefficients suggests that the influence of RII demand is higher than QIB demand in setting high IPO offer price. This is consistent with the findings reported by Derrien (2005) who shows that the demand of the uninformed investor is highly significant in determining a high IPO offer price. Our regression results also appear to suggest that reputed underwriters are more likely to set a more conservative price than less reputed ones. Both recent market recent and market volatility has a very significant and positive influence on the offer price which is consistent with prior research (Derrien, 2005). The mechanism variable is insignificant suggesting that there is not much difference in the way prices are set in the two allocation mechanisms. Similarly, we do not find the coefficient on the size of the issue, age of the firm and hi-tech IPOs to be significant on the IPO offer price. In regression (6), we replicate model (5) by leaving out the average limit price and elasticity variables to run the regression on the entire sample of 306 IPOs. Our results remain essentially the same although the explanatory power of the model drops as a consequence of leaving the two important variables.

One problem with OLS analysis as presented in regressions (5) & (6) is that it assumes the underwriter reputation variable as exogenous. On the basis of our prior discussion, however, it appears that the choice of underwriter is not random and therefore the underwriter reputation variable maybe endogenous in the pricing regression. Prior studies have also argued that the underwriter reputation is endogenous to underpricing (Habib and Ljungvist, 2001, Loughran and Ritter, 2004), a variable which is intrinsically associated with the pricing function. Hence, in order to address endogeneity we use a two stage least square regression for pricing, where we use predicted values of underwriter reputation obtained from using instruments for the underwriter reputation dummy variable. We use probit regression to obtain the predicted values of underwriter reputation and include logarithm of one plus age (*LnAge*) and ratio of age to assets (*AgeTa*) as instruments for the underwriter reputation dummy (Loughran and Ritter, 2004). In addition we use logarithm

of gross proceeds (*LnGpcds*) and a hi-tech dummy (*Hi-Tech*) as other explanatory variables. We consider reputed underwriters as those having a predicted value of 0.6 or more. Our probit regression model has a pseudo-R^2 of 28.84% and correctly classifies underwriter reputation in 76.79% of the IPOs[39].

Regression (7) reports the results of the second stage regression which shows that the coefficient on the underwriter reputation instrument is insignificance and hence loses its significance in explaining the normalized offer price. The finding supports the view that the pricing ability of underwriters has a significant bearing in their choice as agent for managing the issue. One interpretation of the result, is that underwriters who have a history of aggressive pricing (or those who commit to such pricing) will most likely be selected by issuers whose only objective is to obtain maximum proceeds without any concern for investors or post listing stock performance. We also find that the coefficient on the QIB demand multiple also becomes insignificant with the use of an instrument for underwriter reputation. We discuss this finding in the next section in our analysis of discretion exercised by underwriter in pricing IPOs. The coefficients on other variables essentially remain the same.

Discretion in IPO pricing

A large number of Indian IPOs are priced at the upper bound of the initial price range. The proportion of such IPOs far exceeds those reported in prior studies (Cornelli and Goldreich, 2003, Derrien, 2005). In fact, IPO prices simply appear to follow investors' demand with offer prices set at either the upper or lower bound of the price range where most of the demand is concentrated. In this section, we analyse the extent of discretion that underwriters' exercise in pricing IPOs. We use underwriter reputation as our main focus of analysis as prior research informs us that reputed underwriters behave differently from less reputed ones in setting IPO prices.

<<Insert Table 5-7 here>>

[39] Result from the probit regression model is available from the authors on request.

In Table 5-7 we present two analyses to demonstrate how reputed underwriters behave differently from less reputed ones in setting the IPO offer price. In Panel A, we revisit Panel D of Table 3 which shows the percentage of total investors submitting strike bids. We analyse it further by examining whether underwriters set IPO offer price at or below the upper bound of the price range. Results appear to suggest that reputed underwriters exercise far more discretion in pricing when moderate amount of strike bids are submitted. In particular, in the 60-70%, 70-80% and 80-90% categories, we find that a large number of IPOs (21 out of 33) are priced below the upper bound of the price range by reputed underwriters. More importantly, the normalized price of these IPOs suggests that the IPO price appears to be somewhere in the mid-point of the price range, and not just below the upper bound. In the same category of IPOs, almost all the IPOs (12 out of 14) are priced at the upper bound of the price range by less reputed underwriters.

In Panel B, we present another analysis of pricing discretion exercised by underwriters. Here we examine how underwriter price IPOs when particular investor categories undersubscribe their portion of the offering. We find that reputed underwriters attract far more institutional investors that less reputed underwriters do. In fact, QIBs fail to fully subscribe almost one-third of the IPOs (34 out of 110 IPOs) managed by less reputed underwriters. Interestingly, however, in almost all these IPOs, less reputed underwriters set the offer price at the upper bound of the price range. Reputed underwriters, on the other hand, are more likely to set an offer price which is below the upper bound in the event of under-subscription by any investor category. In almost all the IPOs in which either NIIs or RIIs undersubscribe, the offer price is set below the upper bound of the price range. The results from the two analysis on pricing discretion provides support to hypothesis 5 that because of reputational concern and the transparent nature of IPO mechanism reputed underwriter should exercise more restraint and caution in setting IPO offer prices.

Result in Panel B also provides explanation for the insignificant coefficient that we observe on QIB demand multiple in the instrument variable regression (7) in Table 5-6. The evidence is also consistent with our findings on the participation of different investor categories. In IPOs where QIBs make aggressive bids, retail investors simply mirror them.

The influence of QIBs demand on price in the multivariate regression is, hence, indirect through the participation of RII investors. In case of weak IPOs where QIBs do not participate well, it is the participation of RIIs, or the lack of it which ultimately determines the offer price. Thus, in weak IPOs where RIIs simply follow QIBs, perhaps due to weak NII demand, the offer price is most likely to be set below the upper bound of the price range. However, when RIIs become aggressive by following the early NIIs participation, the offer price is most likely to be fixed at the upper bound.

<<Insert Table 5.8 here>>

In order to analyse the impact of IPO pricing on investors' welfare, we examine in detail those IPOs in which QIBs undersubscribe their portion of the offer. We present this analysis in Table 5-8, where IPOs undersubscribed by QIBs are compared against similar other IPOs. We identify comparable firms by following two selection criteria: (1) IPOs with fully subscribed QIB portion and (2) firms with gross proceeds less than twice the mean gross proceeds of undersubscribed firms. Our selection criteria yield 137 and 69 comparable firms for IPOs managed by reputed and less reputed underwriters respectively.

IPOs managed by reputed underwriters in which QIB undersubscribe and which are priced at the upper bound of the price range have smaller returns both on the first day as well as at the end of the first month than comparable firms. However, the difference is not statistically significant. Further, the difference in other variables such as demand multiple of various investor categories and firm characteristics are also not significant. Hence, we turn our attention to the IPOs managed by less reputed underwriters.

IPOs in which QIBs undersubscribe and which are priced at the upper bound appear to perform significantly worse than the firms in the control group. The mean (median) raw as well as market adjusted first day return IPOs in which QIBs undersubscribe is almost 26 (21) percent less than the return of comparable IPOs. In fact, the mean (median) raw first month returns IPOs in which QIBs undersubscribe is -4 (-6) percent which means that the market price of an average IPO falls below the offer price by the end of the first month of trading. While the participation of all investor categories in this group of IPOs is

significantly lower than the control group, we find the participation of both NIIs and RIIs is significantly higher than that of QIBs[40]. Although QIBs are initially given the largest fraction of IPO shares, in several instances underwriters have set the IPO price at the upper bound of the price range in spite of negligible QIB participation[41].

Indian IPO regulation which allows reallocation of shares from undersubscribed category to oversubscribed categories helps underwriters to successfully manage IPOs when there is inadequate demand. This feature becomes particularly useful when NIIs and RIIs are unable to fully subscribe in large IPOs. However, as it appears that the same regulation is exploited by underwriters to completely ignore the information conveyed by large informed institutional investors and load the poor quality offering on the unsuspecting retail investors. This has serious implications for the welfare of small uninformed retail investors. Thus, to maintain equilibrium and to protect the welfare of uninformed investors we propose a change in current Indian IPO regulation. We propose that while reallocation of undersubscribed portion of NII and RII to QIB category be allowed, the reallocation of undersubscribed shares of QIB category to NII and RII categories should be prohibited.

5.7 Conclusions

One of the most controversial features of the bookbuilding mechanism, as it is practiced in the US and most other markets, is its complete lack of transparency. In general, the bookbuilding mechanism is opaque and offers little information on how different investors' participate and how underwriter sets the IPO offer price. The lack of transparency has not only hindered our understanding of the IPO process, it has also, as critics of bookbuilding argue, encouraged quid pro quo relationship between underwriters and institutional investors. The Indian IPO market provides us with a unique setting where the bookbuilding is far more transparent and as a consequence investors are able to observe the demand of

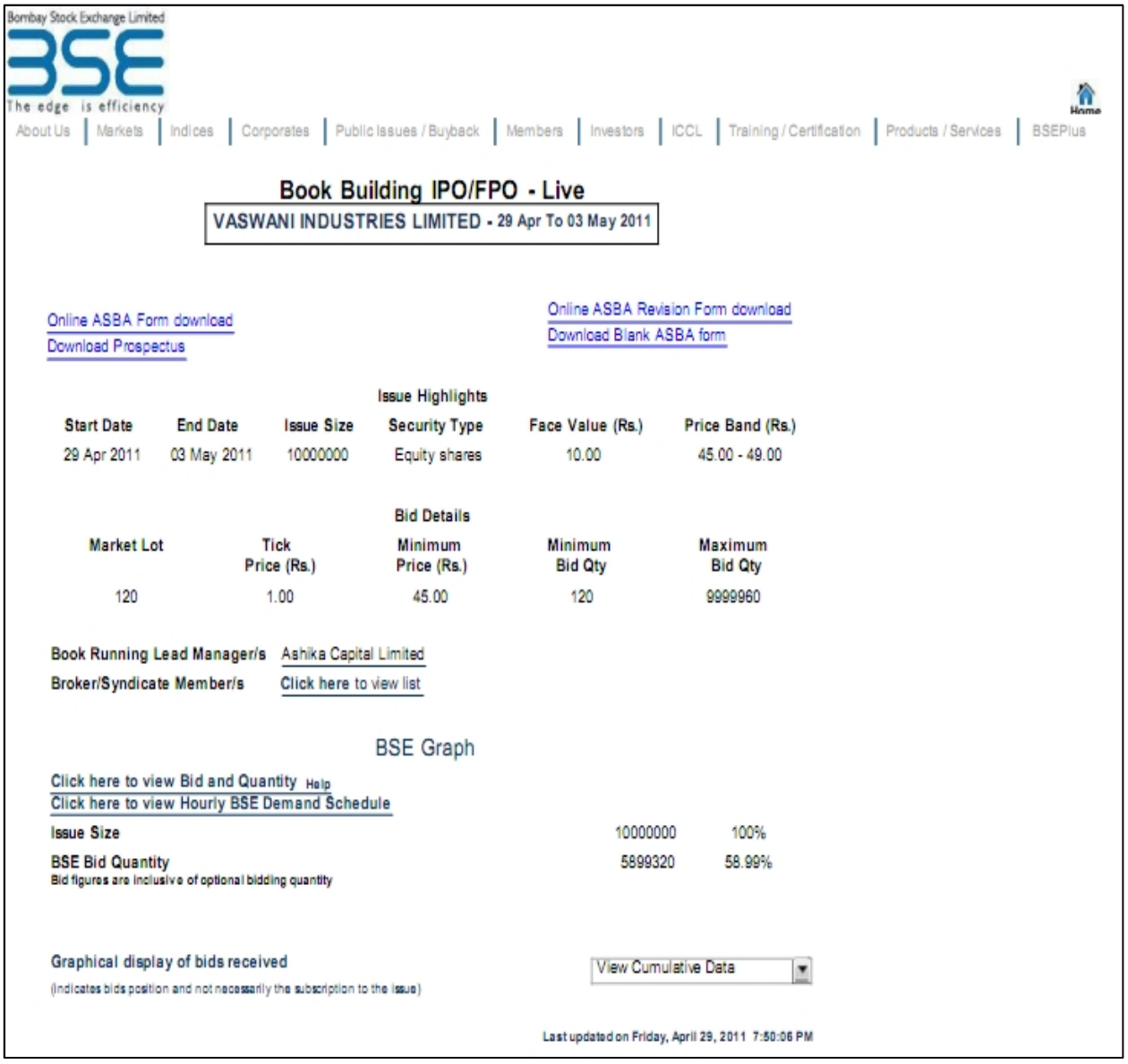
[40] As a robust analysis we also compare QIB undersubscribed IPOs with the rest of the IPOs managed only by less reputed underwriters. Our results essential remain the same.

[41] In case of Tarapur IPO in 2010 the QIB portion was only 3% subscribed but the offer price was set at the upper bound. The offer price of Oriental Trimex offered in 2007 was also fixed at the upper bound in spite of only 30% subscription by QIB.

prior investors. The transparency in the Indian IPO mechanism enables us to examine the complete demand schedule, demand over-time as well as the demand of different investor categories in both auction and a modified version of bookbuilding mechanism. We use the Indian setting to examine how transparency in the bookbuilding influences investors' participation and impacts the information production and IPO pricing.

Using a sample of 306 IPOs over a ten year period from January 2001 to December 2010, we find that the transparency in the IPO mechanism creates IPO demand curve which is significantly less elastic than those reported by prior studies and hence fails to produce value relevant information. Analysis of evolution of demand over the offer period reveals that the investors taking lead in subscribing to IPO shares differs by IPO type. Large institutional investors, owing to their superior information, subscribe early in strong and hot IPOs. Non-institutional investors (large net-worth investors) do the same in weak and cold IPOs, but, perhaps, not always with an honest intent. Thus, on one hand, the transparency of the Indian IPO mechanism appears to mitigate the winners' curse problem, on the other hand, it raises serious concerns about the welfare of uninformed retail investors. Our findings of IPO offer prices show that that favourable demand by retail investors is one of the most significant contributors to high IPO offer prices. More importantly, the favourable demand of the less informed investors is fully incorporated into the offer prices. Our analysis on the role of underwriter reputation shows that when compared to less reputed underwriters, reputed underwriters are more likely to set offer prices which incorporates the information produced during the offer period. We find that in presence of favourable demand of retail investors, less reputed underwriters simply ignore the information conveyed by informed investors. We suggest a change in the existing IPO regulation to protect the welfare of the less informed investors.

Appendix A: Live Bookbuilding on the Bombay Stock Exchange (BSE) Website



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Book Building IPO/FPO - Live

VASWANI INDUSTRIES LIMITED - 29 Apr To 03 May 2011

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Issue Highlights

Start Date	End Date	Issue Size	Security Type	Face Value (Rs.)	Price Band (Rs.)
29 Apr 2011	03 May 2011	10000000	Equity shares	10.00	45.00 - 49.00

Bid Details

Market Lot	Tick Price (Rs.)	Minimum Price (Rs.)	Minimum Bid Qty	Maximum Bid Qty
120	1.00	45.00	120	9999960

Book Running Lead Manager/s Ashika Capital Limited
Broker/Syndicate Member/s Click here to view list

BSE Graph

Click here to view Bid and Quantity Help
Click here to view Hourly BSE Demand Schedule

Issue Size	10000000	100%
BSE Bid Quantity	5899320	58.99%

Bid figures are inclusive of optional bidding quantity

Graphical display of bids received
(Indicates bids position and not necessarily the subscription to the issue)

View Cumulative Data

Last updated on Friday, April 29, 2011 7:50:06 PM

This figure shows the information available on the live bookbuilding page on the Bombay Stock Exchange website available at www.bseindia.com. This information is also available on the National Stock Exchange website site at www.nseindia.com.

Appendix B: List of Qualified Institutional Buyers (QIB)

1	**Mutual fund, Venture Capital Fund and Foreign Venture Capital Investor**
2	Foreign Institutional Investor and Sub-Account (Other Than a Sub-Account which is a Foreign Corporate or Foreign Individual), registered with the board
3	Public Financial Institution as defined in S 4A of the Companies Act,1956
4	Schedule Commercial Bank
5	Multilateral And Bilateral Development Financial Institution
6	State Industrial Development Corporation
7	Insurance Company registered with the Insurance Regulatory and Development Authority
8	Provident Fund with minimum corpus of two hundred million Indian Rupees
9	Pension Fund with minimum corpus of two hundred and fifty million Indian Rupees
10	National Investment Fund set up by resolution F.No. 2/3/2005- DDII dated November, 23, 2005 of the Government of India published in the Gazette of India
11	Insurance funds set up and managed by army, navy or air force of the Union of India.

This table shows the list of institutions and funds when registered with the Securities and Exchange Board of India (SEBI) are considered as Qualified Institutional Buyers (QIB).
Source: Securities and Exchange Board of India (SEBI).

Table 5-1: Descriptive Statistics by Year

Particulars	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total	Median
Number of IPOs	2	2	3	12	39	56	84	32	19	57	306	
Bookbuilding Issues	2	2	3	12	32	1					52	
Auction Issues					7	55	84	32	19	57	254	
Average Age at IPO	13.55	9.63	11.50	17.76	12.55	13.22	14.31	13.40	14.65	15.94	14.19	12.21
Average Total Assets (M INR)	625	25,727	19,029	5,079	6,483	5,738	5,998	3,534	13,509	8,508	6,874	1,945
Average Gross Proceeds (M INR)	479	5,220	3,560	5,441	2,552	2,974	3,311	4,790	5,521	3,366	3,535	1,128
Leverage	0.41	0.08	0.42	0.48	0.50	0.60	0.60	0.54	0.53	0.59	0.56	0.60
Raw First Day Returns (IR)	-0.41	-0.04	0.45	0.50	0.35	0.20	0.28	0.11	0.10	0.13	0.22	0.13
Market Adjusted First Day Returns (MIR_1)	-0.20	-0.08	0.37	0.50	0.32	0.17	0.27	0.16	0.08	0.12	0.21	0.10
Market Adjusted One Month Return (MIR_{30})	-0.10	-0.15	0.30	0.49	0.40	0.23	0.25	-0.01	-0.03	0.01	0.18	0.08
Average Total Demand Multiple	1.18	2.53	15.39	28.85	24.20	19.00	30.59	9.31	6.18	15.53	20.51	8.08
IPOs with +ve First Day Return	0	0	3	12	32	31	51	19	11	36	195	
IPOs with -ve First Day Returns	2	2	0	0	7	25	33	13	8	21	111	

This table reports the descriptive statistics of Indian IPO by year. The sample includes IPOs listed on the BSE and NSE from January 2001 to December 2010. Age is the difference between a firm's IPO year and the founding year. *Total assets* is the total assets of the firm for the quarter prior to the IPO as reported in the offer document. *Gross proceed* is the gross proceeds of the offer calculated by multiplying the offer price with the number of shares offered. *Leverage* is the ratio of total liabilities to total assets for the last quarter prior to the IPO. *Raw first day return (IR)* is the simple return calculated between IPO offer price and the closing price at the end of the first day of trading. *Market adjusted first day return (MIR_1)* is the difference between raw first day return (IR) and the market returns (MR) over the same period of time. Market return is the simple return calculated between the index value on the offer date and the date of listing. We use the BSE Sensex as our measure of the market return. *Market adjusted one month return* is the difference between the simple one month IPO return and the market return over the same period of time. *Total demand multiple* is the ratio of the investors' demand for shares (at and above the offer price) and the total number of shares offered. (1 US$ approximately equal to INR 45).

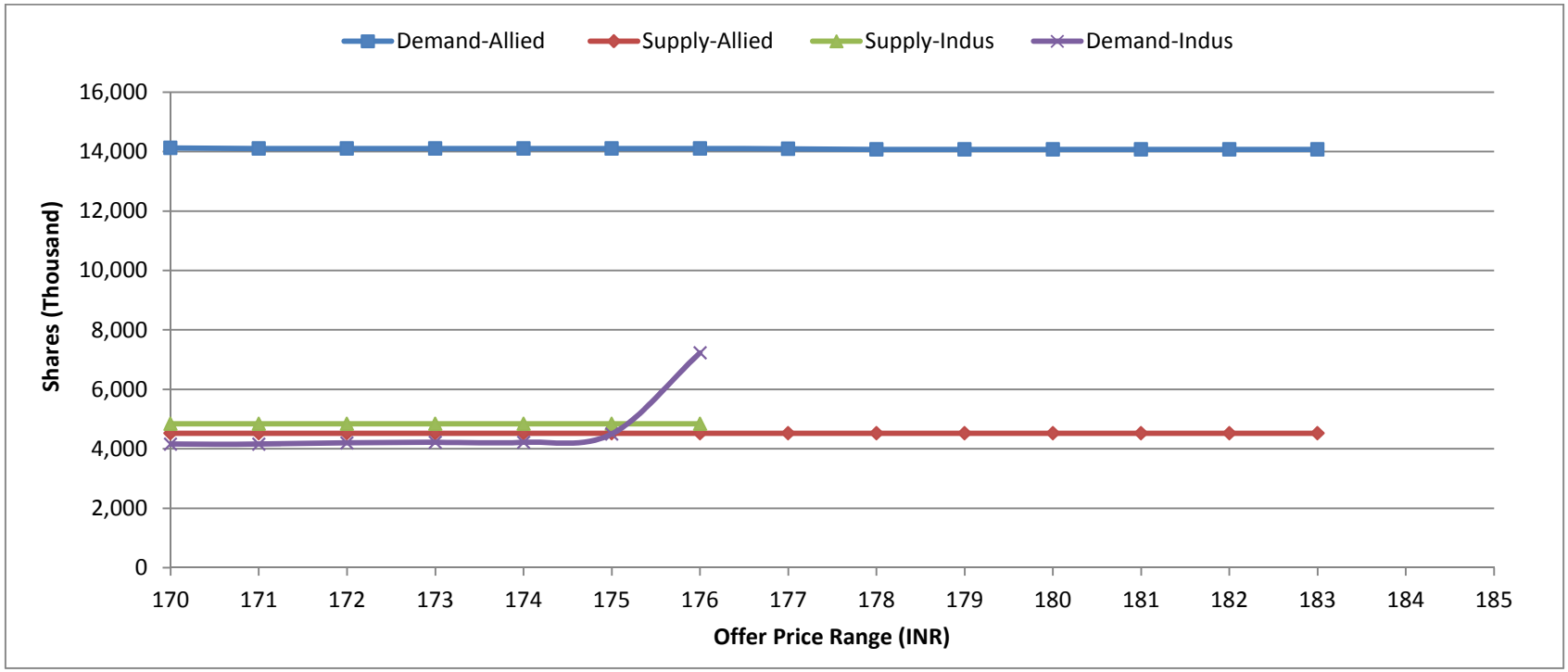
Table 5-2: Mechanism and Underwriter Reputation

Particulars	Reputed	Less Reputed	t-statistic	Bookbuilding	Auction	t-statistic
Number of IPOs	196	110		52	254	
Average Age at IPO	14 (12)	15(13)	0.471	14 (10)	14 (12)	0.415
Average Total Assets (M INR)	9,867 (3,386)	1,542 (921)	-4.991***	7,753 (2,024)	6,694 (1,799)	-0.478
Average Gross Proceeds (M INR)	5,067 (1,694)	804 (642)	-3.884***	3,382 (1,112)	3,566 (1,128)	0.127
Leverage	0.57 (0.62)	0.55 (0.58)	-0.775	0.48 (0.51)	0.58 (0.63)	-2.960***
Raw First Day Returns	0.23 (0.12)	0.21 (0.14)	-0.275	0.31 (0.26)	0.20 (0.10)	-1.794**
Market Adjusted First Day Returns (MIR_1)	0.21 (0.10)	0.22 (0.12)	0.150	0.30 (0.23)	0.19 (0.08)	-1.794**
Market Adjusted One Month Return (MIR_{30})	0.22 (0.11)	0.12 (0.00)	-1.575	0.33(0.29)	0.15 (0.04)	-2.179**
Average Total Demand Multiple	26.16 (14.47)	10.46 (3.31)	-4.995***	23.00 (18.67)	20.01 (6.61)	-0.718
Average QIB Demand Multiple	32.53 (17.43)	8.89 (1.84)	-5.957***	20.26 (14.58)	24.77 (6.60)	0.831
Average NII Demand Multiple	39.64 (14.69)	21.25 (4.12)	-3.035***	46.38 (31.53)	30.38 (5.73)	-2.052**
Average RII Demand Multiple	12.58 (6.24)	9.72 (3.35)	1.845*	17.16 (11.91)	12.88 (4.02)	-0.687
Average IPO Offer Price (Normalised)	0.75 (1.00)	0.90 (1.00)	3.741***	0.85 (1.00)	0.79 (1.00)	-1.014
Average Limit Price (Normalized)	0.25 (0.23)	0.24 (0.21)	0.656	0.28 (0.29)	0.24 (0.22)	0.137

This table reports the descriptive statistics of Indian IPOs by underwriter reputation allocation mechanisms with figures in the bracket representing median values. We define reputed underwriters based on the value of IPOs managed by them during the sample period. *QIB demand multiple* is the ratio of the Qualified Institutional Buyers' (QIBs) demand for shares (at and above the offer price) and the total number of shares offered to the QIB category. *NII demand multiple* is the ratio of the Non-Institutional Investors' (NIIs) demand for shares (at and above the offer price) and the total number of shares offered to the NII category. *RII demand multiple* is the ratio of the Retail Individual Investors' (RIIs) demand for shares (at and above the offer price) and the total number of shares offered to the RII category. *IPO offer price (normalised)* is the normalised issue offer price by the initial price range. *Limit price (normalised)* is the quantity weighted average of all limit prices normalised by the initial offer price range. All other variables are defined in Table 1. We use t-test for difference in means between the two groups of IPOs. ***, **, and * denote the difference is significant at less than 1, 5 and 10 percent level respectively.

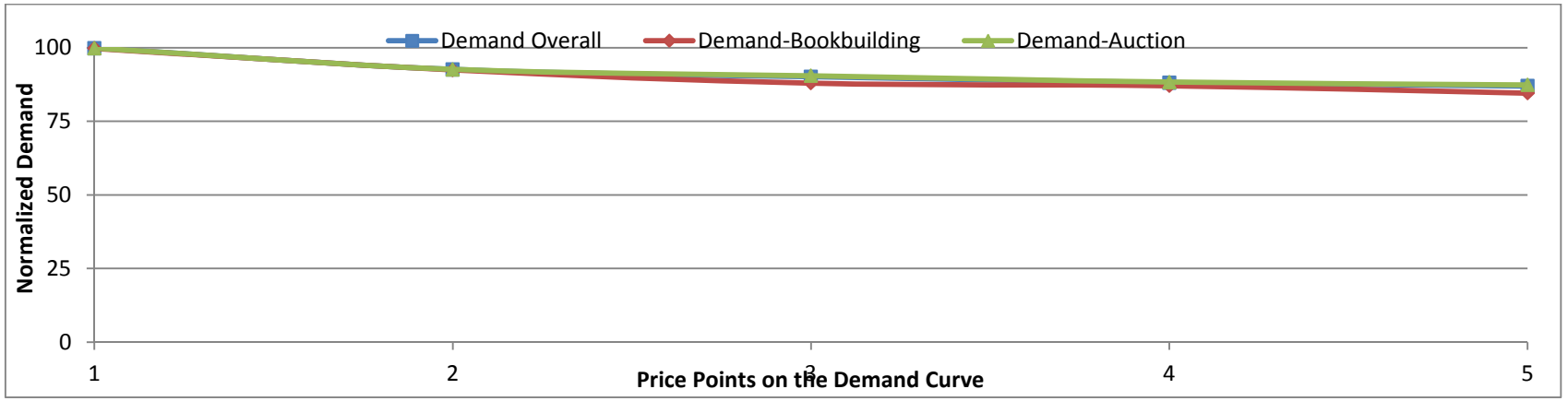
Figure 5-1: IPO Demand Curves

(a) Demand curve of two IPOs (Allied Digital Service Ltd & Indus Fila Limited)



This figure presents the demand and supply curves of two IPOs: Allied Digital Service Limited and Indus Fila Limited. Allied offered 4.5 million shares with an initial price range of INR 170 to 183. Indus Fila offered 4.8 million shares with an initial price range of INR 170 to 176.

(b) Aggregate Demand Curve



This figure presents the overall demand curve of a sample of 281 Indian IPOs issued during the January 2001- December 2010 period. The bookbuilding and the auction demand curves present the demand curve of 41 bookbuilding and 240 auction IPOs respectively. The points of the x-axis refer to lower bound (1), below the mid-point (2), mid-point (3), above the mid-point (4) and upper bound (5). The y-axis shows normalized demand based on the total demand for shares.

(c) Aggregate demand curve by underwriter reputation

This figure presents the demand curves IPO by underwriter reputation. The less reputed and reputed demand curves present the demand curve of 117 and 104 IPOs respectively.The points of the x-axis refer to lower bound (1), below the mid-point (2), mid-point (3), above the mid-point (4) and upper bound (5). The y-axis shows normalized demand based on the total demand for shares.

Table 5-3: Aggregate Demand Schedule

Panel A

	Mean	Median	SD	Min	Max
Elasticity at Average Limit Price	5.3688	0.39	18.0822	0	219
Elasticity at Offer Price	0.4024	0.07	0.8818	0	6.56
Gross Elasticity (Upper-Lower)	1.2719	0.16	2.8873	0	20.7
Elasticity at Average Limit Price- Reputed	6.7885	0.48	21.4677	0	219.73
Elasticity at Average Limit Price -Less Reputed	2.9525	0.30	9.5912	0	73.91
Oversubscription at Minimum	0.3329	0.06	0.7976	0	8.28
Oversubscription below the upper bound	0.9137	0.20	3.2784	0	49.61

This table presents some measures of the slope of the demand curve. *Elasticity at the average limit price* is the measure of arc elasticity between the quantity weighted average limit price and the lower bound of the offer price. *Elasticity at the offer price* is the measure of arc elasticity between the offer price and the lower bound of the offer price. *Gross Elasticity (Upper- Lower)* is the measure of arc elasticity between the upper and lower bound of the offer price. *Oversubscription at Minimum* is the ratio of the shares demanded at the lower bound of the initial price range and the number of share offered. *Oversubscription below the upper bound* is the ratio of the shares demanded at all price points below the upper bound of the initial price range and the number of share offered.

Panel B

	Lower Bound	Below Mid-Point	Mid-Point	Above Mid-Point	Upper Bound	No of Obs.
Overall	7.24	2.50	1.97	1.17	86.97	281
Bookbuilding	16.16	5.59	2.10	3.06	73.01	240
Auction	5.71	1.97	1.95	0.84	89.35	41
Wilcoxon Z statistics Bookbuilding -Auction						
(z)	0.341	1.456	1.541	1.575	-0.432	
Prob > |z|	(0.7330)	(0.1453)	(0.1232)	(0.1153)	(0.6661)	

This table shows investors' demand at different points of the price range for the overall sample and separately for bookbuilding and auction IPOs. For demand at below and above the mid-point we aggregate all demand between those points. We use Wilcoxon rank sum test for difference in medians between IPO allocation mechanisms.

Panel C

	Lower Bound	Below Mid-Point	Mid-Point	Above Mid-Point	Upper Bound	No of Obs.
Reputed	8.90	3.09	2.35	1.26	84.25	177
Less Reputed	4.40	1.49	1.32	1.01	91.59	104
Wilcoxon Z statistics						
Less Reputed-Reputed (z)	-2.014	-2.379	-1.977	-1.903	1.9910	
Prob > |z|	0.0242	0.0173	0.0480	0.0571	0.0465	

This table shows investors' demand at different points of the price range for the overall sample and separately for bookbuilding and auction IPOs. We use Wilcoxon rank sum test for difference in medians between groups.

Panel D

% Strike Bids by Investors	Bookbuilding	Auction	Total
Less than 30%	5	14	19
30-60%	0	14	14
60-70%	2	5	7
70-80%	0	13	13
80-90%	4	23	27
90-95%	5	23	28
95-99%	9	53	62
More than 99%	16	95	111
Total	41	240	281

This table shows the number of IPOs by allocation mechanism the percentage of strike bids submitted by total investors. The *Less than 30%* category shows the number of IPOs in which strike bids accounted for less than 30 per cent of the total demand for shares. Similarly, *More than 99%* category shows the number of IPOs in which more than 99 per cent of the total demand for shares is in the form of strike bids. *Strike bids* are the sum of all the price cut-off bids submitted by retail individual investors (RII) and the bids submitted at the upper bound by all investor categories. Since the Indian IPO price range has never been revised upward, submitting a bid at the upper bound of the price range is effectively submitting a strike bid.

Table 5-4: Investors' Demand Over-Time

Panel A: Number of fully subscribed IPOs by the end of each bidding day

Cumulative Demand	Day 0	Day 1	Day 2	Day 3	Day 4
Institutional Investors (QIB)	156	109	69	35	7
Non-Institutional Investors (NII)	171	95	59	22	7
Retail Investors (RII)	153	46	20	6	2
Total	193	89	56	21	5

This table shows the number of IPOs in which the shares reserved for various investor categories gets fully subscribed over the offer period. Day 0 is the final bidding day of the offer period while Day 4 is the first day of offer for most of the sample IPOs. The sample consists of 195 auction IPOs for which we have data on investors' participation over time. There are two IPOs in which the total demand multiple is just below 1.

Panel B : Cumulative Demand over the bidding period by strength of QIB demand

Cumulative Demand	Day 0	Day 1	Day 2	Day 3	Day 4
Strong Demand (N=69)					
Institutional Investors (QIB)					
Mean	48.2549	9.453	3.5355	1.7468	0.3614
Median	33.8607	4.9975	2.3056	0.9531	0
SD	50.1222	11.5572	3.6303	2.7849	1.0994
Non-Institutional Investors (NII)					
Mean	57.7188	2.5369	1.3359	0.6297	0.1193
Median	31.4805	0.6882	0.1811	0.0058	0
SD	68.936	4.7335	2.309	1.6242	0.8328
Retail Investors (RII)					
Mean	16.9954	1.8301	0.707	0.1482	0.0145
Median	9.4057	0.525	0.1952	0.03	0
SD	22.7582	3.1549	1.3242	0.2999	0.0539
Weak Demand (N=126)					
Institutional Investors (QIB)					
Mean	10.7327	1.649	0.2707	0.0962	0.0279
Median	1.9787	0.6394	0.2	0	0
SD	21.9296	3.6925	0.2903	0.2149	0.1141
Non-Institutional Investors (NII)					
Mean	18.1568	1.5494	0.9973	0.2999	0.1066
Median	4.5951	1.0019	0.3978	0	0
SD	35.5539	1.9305	1.5817	0.6448	0.3947
Retail Investors (RII)					
Mean	5.7419	0.5062	0.2607	0.1123	0.0433

Median	2.8865	0.3241	0.1084	0.0062	0
SD	7.8337	0.5435	0.3949	0.2612	0.1838
Wilcoxon z-statistics					
QIB = Weak - Strong	-6.687***	-9.159***	-11.635***	-7.251***	-3.076***
NII= Weak - Strong	-3.603***	-0.294	-0.682	-1.246	0.024
RII= Weak - Strong	-3.845***	-3.088***	-2.809***	-2.607***	-0.568

This table shows the number of IPOs in which the shares reserved for various investor categories gets fully subscribed over the offer period by IPOs with strong and weak QIB (institutional investors) demand. IPOs are considered to be strong if QIB fully subscribe to their portion of the offer by the end of the third day of bidding period (Day 2 in this table). We use Wilcoxon rank sum test for the difference in median in investor participation between the two IPO categories. ***, **, and * denote the difference is significant at less than 1, 5 and 10 percent level respectively.

Panel C : Cumulative Demand over the bidding period by unadjusted first day IPO returns

	Day 0			Day 1			Day 2			Day 3			Day 4		
Cumulative Demand	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Very Cold (N=41)															
QIB	5.632	1.382	14.503	1.961	0.635	5.278	1.238	0.308	3.565	0.646	0.000	2.556	0.126	0.000	0.463
NII	8.719	2.358	29.538	2.065	0.898	5.082	0.908	0.182	1.459	0.317	0.000	1.124	0.053	0.000	0.207
RII	2.808	1.540	3.732	0.514	0.188	1.401	0.274	0.060	0.793	0.101	0.004	0.186	0.017	0.000	0.086
Cold (N=34)															
QIB	5.451	2.707	10.567	1.158	0.478	1.547	0.665	0.376	0.996	0.330	0.000	0.704	0.058	0.000	0.157
NII	7.319	3.101	11.716	1.571	0.761	2.478	1.278	0.197	2.341	0.303	0.004	0.614	0.076	0.000	0.338
RII	3.687	1.979	4.470	0.525	0.279	0.563	0.312	0.126	0.393	0.117	0.007	0.223	0.043	0.000	0.209
Warm(N=27)															
QIB	16.306	6.827	24.685	2.826	1.542	3.904	1.273	0.634	1.882	0.543	0.000	1.486	0.122	0.000	0.435
NII	16.355	5.113	21.056	1.524	1.002	1.746	1.179	0.610	1.506	0.284	0.000	0.675	0.099	0.000	0.298
RII	5.045	3.358	4.713	0.460	0.235	0.505	0.231	0.092	0.344	0.077	0.000	0.197	0.045	0.000	0.152
Hot (N=57)															
QIB	36.873	19.434	42.820	6.835	2.522	10.045	1.619	0.620	2.221	0.698	0.070	1.244	0.076	0.000	0.296
NII	45.039	26.173	52.426	2.033	0.949	2.934	1.089	0.398	1.987	0.337	0.000	0.720	0.094	0.000	0.426
RII	11.080	8.433	12.169	1.226	0.534	2.467	0.555	0.180	1.220	0.129	0.020	0.318	0.037	0.000	0.175
Very Hot (N=36)															
QIB	48.919	36.522	55.193	7.835	3.100	11.921	2.256	1.019	3.546	1.171	0.000	2.553	0.390	0.000	1.395
NII	74.865	57.045	80.120	2.116	1.202	2.640	1.212	0.211	1.956	0.873	0.028	1.894	0.248	0.000	1.176
RII	24.983	14.947	27.602	1.955	0.740	2.952	0.627	0.229	0.976	0.196	0.025	0.342	0.033	0.000	0.101
Kruskal-Wallis χ^2															
QIB	38.852***			31.222***			11.108**			3.204			0.198		
NII	60.097***			2.443			1.859			4.838			0.833		
RII	51.436***			25.194***			11.165**			9.125*			1.9		

This table shows the cumulative demand multiple of IPOs for different investor categories over the offer period by unadjusted first day IPO returns. *Very Cold* IPOs are those with less than -10% return on the first day of trading, *Cold* IPOs are those with returns between 0 and -10%, *Warm* IPOs are those with return between 0% and 10%, Hot IPOs are those with returns between 10% and 50% and *Very Hot* IPOs are those with returns in excess of 50% on the first day of trading. We use the Kruskal-Wallis for differences in medians among the different IPO categories. ***,**, and * denote the difference is significant at less than 1, 5, and 10 percent level, respectively.

Table 5-5: Determinants of investors' participation overtime: OLS Regression

	QIB_1 (1)	NII_1 (2)	RII_0 (3)	RII_0 (Strong=1) (4)	RII_0 (Strong=0) (5)	RII_0 (Hot=1) (6)	RII_0 (Hot=0) (7)
$LnQIB_2$		0.325***					
		(3.27)					
$LnQIB_1$			0.757***	0.884***	0.674***	0.568***	0.480***
			(11.07)	(5.40)	(7.54)	(4.97)	(2.69)
$LnNII_1$			0.220***	0.0466	0.301***	0.246**	0.307***
			(2.93)	(0.34)	(3.27)	(2.32)	(3.20)
LnGpcds	0.258***	0.0420	-0.506***	-0.468***	-0.522***	-0.515***	-0.237***
	(3.91)	(0.70)	(-9.24)	(-6.61)	(-6.19)	(-7.19)	(-2.87)
LbmRep	0.455***	-0.462***	0.0077	-0.0859	0.163	0.325	-0.0998
	(2.98)	(-3.80)	(0.05)	(-0.30)	(0.92)	(1.50)	(-0.45)
Mkt3Mw	2.237**	1.016	3.572***	3.148**	3.739***	3.712***	3.445***
	(2.06)	(1.21)	(5.69)	(2.58)	(5.20)	(3.50)	(4.87)
MktVol	7.892	-2.147	-14.542**	-17.191	-11.951	-40.373***	11.162
	(0.76)	(-0.27)	(-2.15)	(-1.46)	(-1.40)	(-4.37)	(1.34)
HiTech	0.335	-0.294**	0.126	-0.115	0.230	-0.0392	0.0424
	(1.59)	(-2.23)	(0.82)	(-0.45)	(1.09)	(-0.23)	(0.18)
Constant	-1.254***	0.542	4.446***	4.319***	4.449***	5.065***	2.118***
	(-2.76)	(1.25)	(10.80)	(7.18)	(6.93)	(10.06)	(3.67)
Observations	195	195	195	69	126	120	75
Adjusted R^2	0.272	0.121	0.550	0.653	0.323	0.558	0.275

This table reports the OLS regression on the participation of different investor categories overtime on a sample of 195 auction IPOs. The dependent variable in regressions (1) and (2) are the logarithm plus 1 of demand multiple at the end of the penultimate day of the offer period for Qualified Institutional Buyers *($LnQIB_1$)* and Non-Institutional Investors ($LnNII_1$) respectively. The dependent variable in regression (3)-(7) is the demand multiple at the end of the bidding period for Retail Individual Investors (RII_0). $LnQIB_2$ is the logarithm of one plus the demand multiple of QIB two days prior to the end of the bidding period. *LbmRep* is a binary variable which equals one for reputed underwriters and 0 otherwise. *LnGpcds* is the logarithm of gross proceeds. *Mkt3Mw* is the weighted average of the buy-and-hold returns on the BSE Sensex index in the 3 months before the IPO date where weights are 3 for the recent month, 2 for the next and 1 for the third month before the offering. *MktVol* is standard deviation of the index returns one month prior to the offer issue date. *HiTech* is a dummy variable with value of 1 for IPOs in the information technology and biotechnology industries and 0 otherwise. White heteroskedasticity-consistent *t*- statistics are in parentheses. ***,**, and * denote the difference is significant at less than 1, 5, and 10 percent level, respectively.

Table 5-6: Determinants of the offer price

	(OLS 1)	(OLS 2)	(OLS 3)	(OLS 4)	(OLS 5)	(OLS 6)	(IV 7)
AvLimitPr	0.773***		0.509***	0.353***	0.258**		0.259**
	(5.37)		(4.30)	(3.06)	(2.36)		(2.41)
LnDmtl		0.135***	0.126***	0.111***			
		(8.72)	(8.10)	(7.27)			
LnDmtlQIB					0.048**	0.056**	0.037
					(2.06)	(2.39)	(0.36)
LnDmtlNII					0.027	0.026	0.034
					(1.24)	(1.15)	(0.52)
LnDmtlRII					0.074**	0.085***	0.074**
					(2.43)	(2.82)	(2.46)
Elasticity				-0.006***	-0.005***		-0.005**
				(-2.97)	(-2.88)		(-2.54)
LbmRep					-0.229***	-0.237***	-0.177
					(-4.81)	(-5.09)	(-0.38)
LnGpcds					-0.018	-0.039**	-0.025
					(-0.88)	(-1.97)	(-0.38)
Hi-Tech					-0.002	-0.009	-0.001
					(-0.04)	(-0.19)	(-0.01)
Mkt3Mw					0.806***	0.826***	0.784**
					(2.87)	(2.96)	(2.23)
MktVol					4.185*	1.231	4.533
					(1.67)	(0.45)	(1.05)
Mechanism					0.053	0.026	0.048
					(1.15)	(0.61)	(0.66)
Constant	0.608***	0.489***	0.379***	0.588***	0.623***	0.839***	0.654**
	(13.15)	(9.46)	(6.56)	(13.13)	(3.85)	(5.25)	(2.26)
Observations	281	306	281	281	281	306	281
Adjusted R^2	0.118	0.207	0.279	0.469	0.490	0.395	0.487

This table reports the regression coefficients of the determinants of offer price. The dependent variable is the offer price normalized by the initial offer price range. *Average Limit Price (AvLimitPr)* is the quantity-weighted average of all limit prices and is normalized by the initial offer price range. *LnDmtl, LnDmtlQIB, LnDmtlNII and LnDmtlRII* are the logarithm of 1 + demand multiple (total share bid at or above the offer price divided by the total shares offered) of total offer, qualified institutional buyers (QIB), non-institutional investors (NII) and retail individual investors (RII) respectively. *Elasticity* is the elasticity of demand computed from the lower bound of the

demand schedule to the average quantity adjusted limit price. *LbmRep* is a binary variable which equals one for reputed underwriters and 0 otherwise for regressions. *LnGpcds* is the logarithm of gross proceeds. *Mkt3Mw* is the weighted average of the buy-and-hold returns on the BSE Sensex index in the 3 months before the IPO date where weights are 3 for the recent month, 2 for the next and 1 for the third month before the offering. *MktVol* is standard deviation of the index returns one month prior to the offer issue date. *HiTech* is a dummy variable with value of 1 for IPOs in the information technology and biotechnology industries and 0 otherwise. Regression (6) reports the second stage regression coefficients with predicted dummy values for underwriter reputation. White heteroskedasticity-consistent *t*- statistics are in parentheses. ***,**, and * denote the difference is significant at less than 1, 5, and 10 percent level, respectively.

Table 5-7: Use of Discretion in Pricing

Panel A:

Particulars	Pricing by Reputed Underwriters				Pricing by Less Reputed Underwriters				Total
% of strike bids	Upper-Bound	Below Upper-Bound		Total	Upper-Bound	Below Upper-Bound		Total	
		No.	Normalized Price			No.	Normalized Price		
Less than 30%	1	15	0.07 (0.00)	16	1	2	0.00 (0.00)	3	19
30-60%	2	9	0.08(0.00)	11	0	3	0.00 (0.00)	3	14
60-70%	1	4	0.02 (0.00)	5	1	0	1.00 (1.00)	1	6
70-80%	0	9	0.45 (0.50)	9	5	0	1.00 (1.00)	5	14
80-90%	11	8	0.23(0.11)	19	6	2	0.40 (0.40)	8	27
90-95%	13	5	0.42 (0.50)	18	7	3	0.33 (0.40)	10	28
95-99%	30	5	0.64 (0.68)	35	22	5	0.55 (0.57)	27	62
More than 99%	59	5	0.65 (0.67)	64	47	0	1.00 (1.00)	47	111
Total	117	60		177	89	15		104	281

This table shows the number of IPOs by underwriter reputation showing the percentage of strike bids submitted by all investors and the discretion in pricing exhibited by underwriters. This table uses a sample of 281 IPOs for which we have data on aggregate investors' participation. The *Less than 30%* category shows the number of IPOs in which strike bids accounted for less than 30 per cent of the total demand for shares. Similarly, *More than 99%* category shows the number of IPOs in which more than 99 per cent of the total demand for shares is in the form of strike bids. *Strike bids* are the sum of all the price cut-off bids submitted by retail individual investors (RII) and the bids submitted at the upper bound by all investor categories. Since the Indian IPO price range has never been revised upward, submitting a bid at the upper bound of the price range is effectively submitting a strike bid. *Normalized price* is the mean (median) offer price normalized to the initial offer price range.

Panel B

Particulars	Reputed			Less Reputed		
	QIB	NII	RII	QIB	NII	RII
Undersubscribed	6	33	34	34	6	23
Priced at Upper Cap	4	11	5	31	3	14

This table shows the number of IPOs in which the different investor categories undersubscribed their portion of the offering. Analysis in this table is based on our total sample of 306 IPOs. In addition to the numbers reported in the table, there are 4 IPOs in which both QIB and NII undersubscribe, 12 IPOs in which both QIB and RII undersubscribe and 18 IPOs in which NII and RII undersubscribe.

Table 5-8: Comparison of IPOs with undersubscribed QIB participation

	Reputed			Less Reputed		
Particulars	QIB < 1	Others	t-statistics	QIB < 1	Others	t-statistics
Number of IPOs	4	137		31	69	
Average Total Assets (M INR)	3,939	3,807	0.927	735 (604)	1213 (817)	1.755*
Average Gross Proceeds (M INR)	2,006	1,580	0.858	640 (560)	650 (595)	1.057
Raw First Day Returns	0.15	0.25	0.518	0.05 (0.00)	0.31 (0.21)	2.542**
Market Adjusted First Day Return	0.14	0.23	0.450	0.05 (-0.02)	0.30 (0.20)	2.663***
Raw One Month Return	0.19	0.28	0.675	-0.04 (-0.05)	0.20 (0.05)	1.725*
Market Adjusted One Month Return	0.16	0.25	0.789	-0.06 (-0.15)	0.20 (0.04)	1.759*
Average QIB Demand Multiple	0.62	31.25	1.961*	0.46 (0.44)	10.88 (4.04)	3.132**
Average NII Demand Multiple	2.51	42.49	1.574	4.12 (2.96)	29.04 (10.29)	2.769***
Average RII Demand Multiple	5.45	15.19	0.929	2.65 (2.31)	12.47 (6.77)	2.625**
Average Total Demand Multiple	2.46	26.46	1.876*	1.96 (1.33)	14.16 (7.41)	3.049***

This table compares IPOs in which the QIB investors undersubscribed their portion of the offer with other comparable firms. The figures in parenthesis indicate median values. The comparable firms meet the following criteria: (1) the QIB portion is oversubscribed and (2) the gross proceed of the firm is less than twice the gross proceeds of QIB undersubscribed IPO firm. All the variables are defined in Table (1) and (2). We use t-test for difference in means between the two groups of IPOs. ***, **, and * denote the difference is significant at less than 1, 5 and 10 percent level respectively.

Chapter 6 IPO Initial Returns and Choice of Placement Mechanism

6.1 Introduction

In this chapter we continue the analysis of investors' participation in a transparent IPO mechanism by examining the influence of such participation on after-market returns. While the focus in the previous chapter was on information production and pricing, here we examine how the participation of different investor categories influences IPO initial returns. Moreover, since the Indian IPO market has used three different forms of placement methods during our sample period, we also examine the determinants of choosing a particular mechanism. Hence, unlike in the previous chapter where we focussed only on bookbuilding and auction IPOs, in this Chapter we also include fixed price IPOs. Fixed price mechanism, as we have discussed in the institutional setting, has remained an alternative for IPO firms throughout our sample period. Further, since auction essentially replaced bookbuilding mechanism, our main focus of comparison in this analysis is between fixed price IPOs and IPOs issued with bookbuilding/auction mechanism.

The IPO literature primarily discusses three different placement methods: fixed price, auction and bookbuilding.[42] Bookbuilding mechanism differs from fixed price and auction methods in terms of soliciting investor's demand and interest prior to the fixing of issue price (Busaba and Chang, 2010). In bookbuilding, the offer price is set only after soliciting investors' demand through road shows and meetings with potential investors. In case of fixed price offerings, the offer price is set in advance without soliciting investors' demand and in auctions, a market clearing price is set as the offer price based on bids submitted by the investors[43]. Bookbuilding has gained worldwide popularity in the pricing and allocation

[42] For a detailed description of various allocation mechanisms and their use worldwide see Jagannathan et al., (2010).

[43] Kutsuna and Smith (2004), very interestingly, argue that the critical difference between bookbuilding and auction mechanism is that while bookbuilding allows underwriter to make a credible representation of the value of the offer, auction does not allow such a representation.

of initial public offerings (IPOs). Where introduced, it has become the preferred choice amongst underwriters and issuers (Jagannathan et al., 2010). In the literature, the popularity and widespread use of bookbuilding has been attributed to information extraction (Benveniste and Spindt, 1989) and the analyst lust hypotheses (Loughran and Ritter, 2004, Degeorge et al., 2007). The significant rise in the number of bookbuilt IPOs in a number of countries has led to a growing body of literature which compares the bookbuilding with other alternative pricing and allocation mechanism in terms of their efficiency, information extraction ability, investor participation, and issue costs.

While bookbuilding has become the most popular placement method, there is no unanimity with respect to its appropriateness. There are compelling arguments both for and against the use of bookbuilding mechanism. Those in support of bookbuilding mechanism argue that it enables underwriters to extract information from investors and thus helps in increasing the pricing efficiency (Benveniste and Spindt, 1989, Sherman, 2000, Benveniste and Wilhelm, 1990). Further, Jagannathan et al., (2010) argue that one of the reasons for the demise of auction and fixed price mechanism is that they hamper price discovery due to the free rider and winner's curse problems. Those against bookbuilding criticize the great deal of discretionary power it provides to the investment banks who use the information to further their own benefits (Loughran and Ritter, 2004, Nimalendran et al., 2007). Degeorge et al., (2010) counter the arguments against auctions by providing evidence of information production and the relatively less impact of free riding problem from the examination of US auction IPOs.

The Indian IPO market has gone through a number of important changes in the last decade. Some of these important changes are related to IPO pricing and allocation mechanism which have resulted in the use of different forms of placement mechanisms over time[44]. The Indian market presents a unique setting where all three types of allocation mechanisms, i.e., bookbuilding, auction, and fixed price mechanism have been in use since 1999. The background and developments that have occurred in the Indian IPO market since 1999

[44] The different allocation mechanisms used in India and other institutional settings are extensively discussed in the Chapter 3.

provides a rich context to examine alternative allocation mechanisms and analyse their impact on pricing efficiency.

Our sample of consists of 371 IPOs issued during a ten year period from January 2001 to December 2010. Of these 371 IPOs, 65 of them are issued using the fixed price mechanism, 52 using the bookbuilding mechanism and the rest using auction placement method. Consistent with prior studies, we find that IPOs that use auction mechanism are least underpriced while those which use fixed price mechanism are most underpriced. Our findings also support the view that fixed price mechanism is mostly used by firms of smaller size who are exposed to higher levels of information asymmetry. The size of the issues explains more than 60% of the variation in the choice of allocation mechanisms. Thus, the choice of placement mechanism appears to be primarily a function of the size of the firm. Further, we find that firms exposed to higher levels of risk, as proxied by the degree of firm leverage at the time of the IPO, are also less likely to use bookbuilding or auction mechanisms.

Our analysis of IPO after-market returns provides some interesting results. While our analysis on bookbuilding and auction IPOs in Chapter 5 shows that the demand of the retail investors (RIIs) is highly significant in determining IPO offer price, analysis of initial returns shows that the demand of institutional (QIBs) and non-institutional (NIIs) investors appear to explain IPO initial returns. Since retail investors' (RIIs) demand is already incorporated in setting offer prices, their participation does not appear to be significant in determining post listing prices for bookbuilding and auction IPOs. Moreover, since investors' demand for shares (the demand multiple) absorbs the impact of recent overall market return, we fail to find any significant relationship between recent market returns and IPO initial returns. However, the volatility in recent market returns does appear to explain the variation observed in initial returns of IPO firms. Further, we find that neither the normalized IPO price nor the elasticity of demand appear to have any significant influence on initial returns of IPO firms.

The influence of the retail participation, however, appears to have a strong influence in explaining initial returns of fixed price IPOs in which retail investors are allocated a much larger fraction of total shares than in bookbuilding and auction IPOs. While retail investors are allocated about 35% of the shares on offer in bookbuilding and auction IPOs, they receive about 50% of the total shares in fixed price IPOs. The larger fraction of the shares offered to retail investors coupled with the fact that offer prices are set in advance in fixed price IPOs perhaps explains the strong relationship between initial returns and retail investors' demand in fixed price IPO. We also study flipping of shares by investors in the immediate after-market by examining bulk trades (trades which accounts for 0.5% of outstanding shares). Consistent with prior evidence we find that flipping is concentrated in cold IPOs and is more prevalent in IPOs managed by less reputed underwriters.

The remainder of the chapter is organized as follows. Section 6.2 discusses the relevant literature. Section 6.3 presents sample data. Section 6.4 presents the empirical evidence. Section 6.5 summarizes the chapter.

6.2 Relevant Literature Review

6.2.1 The choice of placement mechanism

Benveniste and Wilhelm (1990) model the optimal IPO mechanism by assuming that large institutional investors are better informed about the value of the firm and that the underwriters work in the interest of the issuing firm. They argue that the pricing and allocation discretion afforded by bookbuilding and two-stage marketing mechanism helps underwriters extract valuable information from informed investors. This in turn helps in maximizing the offer proceeds and reduce the adverse selection problem.

Welch (1992), argues that issuers who are highly risk averse would be better off with a fixed price mechanism as it can help create a cascades due to the presence of investors who have correlated information. Assuming that investors have correlated information and can observe each other's subscription, Benveniste and Busaba (1997) posit that issuers with a higher concern for risk will choose fixed price mechanism because while bookbuilding generates larger expected proceeds, it exposes the issuers to higher degree of uncertainty.

Sherman (2000) models how bookbuilding can lead to creation of regular groups of investors which help in lowering the average underpricing while still providing returns to these investors so that they could engage in information gathering and reporting. Sherman and Titman (2002) examine the bookbuilding mechanism and the need for underpricing in a model where information acquisition process is endogenized. They posit that underwriters' trade-off between accurate pricing and the amount of underpricing. If more investors are invited to the bookbuilding process to improve pricing accuracy it will entail higher underpricing. They further argue that firms that have a lot of stake from greater pricing accuracy[45] will invite more investors and will also result in higher underpricing.

Sherman (2005) models the arguments for why bookbuilding mechanism is gaining universal popularity by comparing it with auction mechanism. She argues that the allocation control which bookbuilding provides has two advantages. First, it lowers risk both for issuers and investors which leads to lower underpricing. Second, it provides more control over information expenditures. The author argues that bookbuilding entails less risk as underwriter is in control of the process. On the other hand, auctions which are open to large investors and in which underwriters do not have control may lead to inaccurate pricing, high aftermarket volatility and wide variation in the number of bidders. She further argues that while underpricing maybe lower in bookbuilding relative to auction, the actual underpricing maybe more or less due to the flexibility afforded by bookbuilding in controlling information expenditures. She argues that higher underpricing is not necessarily a worse outcome for the issuers as a higher level of information collection/production for the purpose of accurate pricing will lead to higher underpricing. Additionally, she argues that IPOs with higher underpricing should lead to less aftermarket volatility. Higher underpricing means more information produced during the IPO and as such there should be less price shifts when the stock starts trading. In other words, IPOs with higher underpricing should have true value revealed at the initial trading price. Since bookbuilding

[45] Such firms might include riskier firms, smaller firms with shares that are likely to be thinly traded and firms that expected to have significant capital investment in the future.

is associated with higher underpricing[46] relative to auction mechanism, bookbuilding should also be associated with lower aftermarket volatility.

Biais et al., (2002) consider the optimal IPO mechanisms for firms in a setting where underwriters and informed institutional investors collude and posses private infromation about the value of the firm and where underwriter posseses private information about the demand for IPO shares. In such circumstances, the authors argue that the optimal IPO mechasnism is one which resembles uniform price auction mechanism where the objective is to maximize the proceeds from the offering[47]. The authors argue that the best pricing function is one which the price decreases with the quantity allocated to retail (uninformed) investors. This will not only help in better information revelation by the intermediary but will also mitigates the winner's curse problem. In a similar study, Biais and Faugeron-Crouzet (2002) compare fixed price auction, uniform price market clearing auction and US style bookuilding mechanisms. They assume that gross proceed maximization is the overriding objective and that large institutional investors have superior information about the value of the firm. Further, they also assume that the underwriters work in the best interest of the seller. The authors argue that uniform price auction may not be an optimal allocation mechanism as it may lead to tactical collusion among bidders leading to a low market clearing price.

Derrien and Womack (2003) show that issuers wishing to limit the impact of market conditions (market return and standard deviation) would be better off by choosing an IPO mechanism which limits the role of underwriters. Using a sample of French IPOs, the authors show that auctions are much better in tempering the effect of market conditions on the offer price. They find that auction procedure is better than others in controlling underpricing in general as well as the variance in underpricing in hot versus cold markets.

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[46] Due to control over information production and allocations to informed investors

[47] The major departure of this study from those of Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990) is the assumption concerning the role of underwriter. While these two papers assume that the underwriters work in the best interest of the seller, Biais et al., (2002) assume that underwriters work in the best interest of institutional investors.

Kutsuna and Smith (2004) discuss the reasons for the popularity of bookbuilding mechanisms since its introduction in the Japanese IPO market. The paper discusses issues on information production, underwriter's role and underinvestment problem. They argue that the critical difference between bookbuilding and auction mechanism is that while bookbuilding mechanism allows the underwriter to credibly represent true value of the firm such a representation is not available in auction mechanism. They argue that since auction mechanism discourages information production (both by underwriter and investors) and does not provide any mechanism to credibly inform the value to the market, some high quality firms may choose not to go for public issue and thus face the underinvestment problem[48]. Importantly, while they find that the total issue cost under auction mechanism is much higher than bookbuilding, the result is biased in favour of auctions as the cost resulting from underinvestment cannot be factored into. They find that auction mechanism benefits younger and smaller firms. The authors argue that the optimal IPO mechanism depends partly on the mix of potential issuers. They state that bookbuilding mechanism maybe better in those markets which are characterised by large issuers and with small heterogeneous issuers which are hard to value and prone to underinvestment. Auction mechanism, on the other hand, maybe better in those markets where issue sizes are small and where the issues are easy to value accurately.

In their study, Chemmanur and Liu (2006) discuss the objective choices that issuers face[49]. They suggest that issuers may not only be concerned with maximizing proceed during an IPO but may also be looking to improve the secondary market price of the stock especially if they wish to return to the market in the near future. As such issuers face a dynamic choice where they not only want to obtain higher proceeds from IPOs but also care about the secondary market price subsequent to the IPO. Further, investors seeking to invest in IPOs need to spend effort and money to gather information about the value of the firm. Given these two ingredients, Chemmanur and Liu (2006) argue that when faced with a

[48] The problem is analogous to the underinvestment problem referred by Myers and Majluf (1984).

[49] Chemmanur and Liu (2006) assume that the issuers have superior information (than outsiders) about the value of the firm consistent with the signalling literature.

dynamic objective as discussed above, issuers will find it better to choose a fixed price mechanism over auctions. Further, they also argue that fixed price offers are also optimal for young, smaller firms or firms facing high information asymmetry since for these issuers the cost of information production and the secondary market price will be of higher importance. On the other hand, matured and well known issuers who face less information asymmetry may be better off with an auction mechanism as in this case the disadvantage of lower information production is offset by the greater price received by high quality firms. They also argue that for firms selling a larger fraction of the company, auction mechanism maybe more suited as they are less concerned with secondary market prices. Conversely, fixed price offering might be a better option for firms selling a lower fraction of the company.

6.2.2 The efficiency of the IPO mechanism

Using Japanese IPO data over the period 1993-2001 Kaneko and Pettway (2003) find that IPOs issued with the auction procedure are underpriced less than those issued with bookbuilding mechanism. While the underpricing of IPOs issued with auctions was 11.4%, those which were issued with the bookbuilding mechanism was 48.0%. The study further finds that the difference in underpricing between the two regimes becomes larger during hot IPO periods. The difference in underpricing between the two regimes in the hottest quintile was 89.5%. Derrien and Womack's (2003) also find lower underpricing for auctions compared to bookbuilt IPOs. The study using French IPO data over the 1992-1998 period reports 9.68% underpricing for auction IPOs and 16.89% underpricing for bookbuilding IPOs. The underpricing for fixed priced IPOs was 8.88%. Further, the variance in the degree of underpricing was highest for bookbuilt IPOs.

Degeorge et al.,(2007) also find lower underpricing for auction IPOs compared to bookbuilt ones. Using French IPO data over the period 1992-1998, the study finds underpricing of 18.89% for bookbuilt IPOs while 10.68% for auction IPOs. The paper argues that the primary reason for the popularity of the bookbuilding mechanism lies in its ability to provide better analyst coverage. They find that analyst not only affiliated with the underwriter provided better coverage for bookbuilt IPOs, but unaffiliated analysts also were

more likely to promote bookbuilt IPOs if they stood to gain shares in future deals from the bookbuilding underwriter. Apart from positive analyst coverage, bookbuilding mechanism did not appear to provide any substantial benefits over auction mechanism. Neither was the long-term performance of bookbuilt IPOs better than auction nor did the higher liquidity of bookbuilding IPOs translated into higher valuations[50].

Chiang et al., (2010) explore auctions in the context of Taiwanese IPOs. Using a sample of 84 IPOs over the period 1995-2000, they examine a number of issues associated with auctions such as the entry of investors, the degree of underpricing, the relationship between bid premium and underpricing, and the impact of unexpected entry of informed and uninformed investors on underpricing. Consistent with Sherman's (2005) information production hypothesis, they find evidence of partial adjustment. Moreover, in issues where there were higher institutional investors or where larger bids were made, the initial returns were higher, meaning institutional investors participated on the basis on their information about the value of the issue. Retail investor's participation, on the other hand, was influenced by the returns on recent IPOs, an evidence of return chasing behaviour. Further, underpricing is negatively related to the number of retail bidders and their bid premium.

In one of the first studies on auction IPOs in the US, Degeorge et al.,(2010) provide a comprehensive analysis of auction IPOs from the US market. Using detailed bidding data of 19 IPOs auction by WR Hambrecht between 1999 and 2007 the paper reports some interesting findings. Importantly, they find that issuers and underwriter could extract useful pricing information from investors' bids which was eventually helpful in setting the offer price. The offer was invariably below the market clearing price which, however, was not unduly influenced by the participation of retail investors. While there is some evidence of free-riding on the part of retail investors this didn't interfere with the efficiency of the mechanism nor did it discourage the participation of informed investors. Further they find

[50] Bookbuilt IPOs were found to have better liquidity because of the positive analyst stock coverage.

that the demand curve of institutional investors is quite elastic indicating that the institutional investors produce and reveal information during the IPO process[51].

6.3 Sample Data

Our sample comprises of 371 IPOs listed on Bombay Stock Exchange (BSE) and/or the National Stock Exchange (NSE) over a ten year period from January 2001 to December 2010. The choice of the sample period helps to avoid the internet bubble and also lends us the opportunity to examine three different allocation mechanisms. We have also eliminated from our sample large privatizations of utilities and banks as they are not representative of average firms. Data on firm and IPO characteristics have been collected from the prospectus using a number of sources including perfect filings, Thomson Research and the SEBI website. From the prospectus we collected information on the IPO mechanism used, number of shares offer, the lead underwriter and the issue costs among a number of other information. We obtain market data from Datastream and supplement this with data obtained from the BSE/NSE websites. We used unadjusted prices to calculate initial returns on IPOs and BSE Sensex index as the market index to calculate market adjusted initial returns[52]. Data on bulk deals were obtained from the Money Control portal which is considered as the top finance portal in India[53].

6.4 Empirical results

<<Insert Table 6-1 here>>

6.4.1 Descriptive statistics

In this section we present descriptive statistics of our sample. Table 6-1 presents descriptive statistics of our sample by year. As discussed in the institutional settings chapter, bookbuilding gradually became the dominant form of placement mechanism when initially introduced in 1999 until late 2005 when it was replaced by auction mechanism. The proportion of fixed price IPOs remained steady up until 2007 after which its use by issuers

[51] See also, Lowry et al., (2010) paper.

[52] As a measure of robustness we also used the broad BSE100 index. This did not alter our conclusions.

[53] www.moneycontrol.com

has dropped significantly. Only 5 of the total 113 IPOs issued between January 2008 and December 2010 have used fixed price mechanism. Our sample is therefore dominated by a large number of IPOs which are issued by auction mechanism.

The mean (median) age of the firm at the time of the IPO is about 14.06 (11.99) years. The mean (median) total assets and gross proceeds of the overall sample is INR 5,800 (1,305) million and INR 2,960 (903) million respectively. The mean (median) leverage (total liabilities/total assets) of the IPO firm is 0.56 (0.60) and the mean (median) post IPO promoters' holding is 58% (59%). The mean (median) raw underpricing for the period is 26% (14%). To take into account the changes in the market conditions during this period we calculate the market adjusted returns. The mean (median) market adjusted first day underpricing over the sample period is 25% (12%) while the one month market adjusted mean (median) initial return is 21% (17%). Of particular interest is the variation in the underpricing over the sample period. While up until 2007 underpricing was relatively high, the degree of underpricing during the 2008-2010 period in fact mirrors those found in the US[54]. More than a third of total IPOs (127 out of 371) during the sample period were overpriced on the first day of listing. The occurrence of overpriced IPOs coincides with the introduction of auction mechanism. In fact during the period 2006-2010, two thirds of all the IPOs issued (115 out of 171) are overpriced on the first day of trading. The overall demand for IPOs is captured by the demand multiple. The mean (median) overall demand multiple is 19.35 (7.62) times which suggests that IPOs are well subscribed in India. The mean (median) market return and volatility prior to the IPO is 4% (5%) and 1% (1%) respectively. We also find significant variation in the offer price range[55] among the IPOs in our sample data[56]. While the mean (median) offer price range is about 11% (12%), the offer price range declines dramatically during the 2009-2010 period.

<<Insert Table 6-2 here>>

[54] US IPO underpricing in 2008, 2009 and 2010 are 6.4%, 9.8% and 8.9% respectively. Source: Jay Ritter website http://bear.warrington.ufl.edu/ritter/IPOs2010Statistics111.pdf

[55] Offer price range = (upper cap-lower cap)/lower cap

[56] Indian IPOs have a limit on the offer price range and can price it with 120% of the lower base price.

In Table 6-2, we compare IPOs issued in the different placement mechanisms. In terms of assets and gross proceeds, both bookbuilding and auction IPOs are significantly larger than fixed price IPOs. It therefore is apparent that fixed price mechanism is preferred by smaller firms who do not wish to use the more complicated bookbuilding and auction mechanisms. The results are consistent with Benveniste and Busaba (1997) who argue that size maybe one of the reasons for IPO firms to choose fixed price mechanism. Thus, the descriptive statistics provide support to the view that smaller firms having higher levels of information asymmetry are more likely to use fixed price mechanism.

In terms of raw and market adjusted first day underpricing, IPOs issued with fixed price mechanism appears to be the highest followed by bookbuilt and auction IPOs. While the market adjusted initial returns of fixed price IPOs is 42%, initial returns for bookbuilding and auction IPOs are 30% and 19% respectively. In general, our results on underpricing are consistent with other studies that document lower underpricing for IPOs using auction mechanism (Kaneko and Pettway, 2003, Degeorge et al., 2007). Our results are, however, different from those reported by Bubna and Praballa (2010) who use a narrow sample period and find that bookbuilt IPOs have less underpricing than auction IPOs in India. The difference in initial returns in placement mechanism persists over short horizons (one month and one week returns). Thus, the auction regime appears to be the most efficient from the issuers' perspective. The mechanism also appears to be economic in terms of total issue cost. While the issue cost of auction IPOs is higher than the issue cost for bookbuilding, it is three-quarter of a percentage point lower than issue cost for fixed price mechanism, the difference significant at 5% level of significance.

<<Insert Table 6-3 here >>

6.4.2 Determinants of placement mechanisms

In this section we examine the factors that determine the choice of IPO placement mechanism. We follow the allocation mechanism literature and include a number of variables to identify factors that determine the choice of placement method. We essentially use the IPO firm and offer characteristics to examine the determinants of allocation

mechanisms. To identify the determinants of IPO mechanism we construct three different probit regression models. The first model compares between fixed price IPOs and others. In the second model we include only fixed price and bookbuilt IPOs and in the third model we include only fixed price and auction IPOs. Table 6-3 reports the results of the probit regression analysis. The dependent variable is *mechanism,* a dummy variable, which takes the value of 1 for fixed price IPOs and 0 for IPOs issued with other mechanisms.

We include as independent variables the logarithm of the gross proceeds (*LnGpcds)* and logarithm of the firm age (*LnAge)*. These two variables not only proxy for the size of the firm, but also acts as a proxy for the firm's degree of information asymmetry. Larger as well as older firms are more likely to be better known at the time of the IPO compared to smaller and younger firms. This, in turn, should result in less information asymmetry for larger and older firms. As a proxy for the issuers' concern for accurate pricing we include the percentage of shares held by issuers'/promoters' post IPO *(Overhang)*. Firms with larger owner's (promoter) retention at the time of the IPO should be more careful about IPO pricing and hence should choose the placement mechanism which would give them the opportunity to price their IPO as accurately as possible. Further, as a proxy for the risk of the firm we include the total leverage at the time of the IPO (*Lev)* and the standard deviation of the after-market return for 60 daily returns after the listing *(AfMktVol)*.

Results presented in Table 6-3 show that the size of the firm is a very strong determinant of the choice of IPO placement mechanism. *LnGpcds* is both highly significant and positively related to mechanism suggesting that firms using fixed price mechanism are smaller than those using either bookbuilding or auction mechanism. In fact as shown in regression (1), the size of the offer alone explains more than 60% of the variation in the choice of IPO mechanism. Smaller firms have relatively less information than larger firms and are therfore more exposed to information asymmetry. Hence, our result supports the argument that firms with higher levels of information asymmetry are less likely to use bookbuilding/auction mechsnism. Futher, the coeffient on leverage of the firm is positive and significant. Since higher leverage is considered to be a proxy of firm risk, our results

suggest that more risky firms are more likely to use the less complicated fixed price mechanism.

The coefficient on the *Overhang* variable is negative coefficient but is not statistically significant. The negative coefficient implies that firms with relatively higher promoters' stake in the post IPO period are more inclined to use auction and bookbuilding mechanism rather than fixed price IPOs. The insignificant coefficient is perhaps due the size effect as captured by the gross proceeds of the offer. It is plausible that larger firms are more likely to be concerned about accurate pricing than smaller firms and hence the concern for pricing is perhaps taken care by the size of the offer. Further, while the coefficient on after-market volatily is negative, it is also not statistically significant at conventional significance levels. In sum, we find that the most important firm characteristic that detemines the choice of the pricing and allocation mechsniam is the size of the firm. Since bookbuilding/auction mechanism is quite complicated and expensive in terms of issue costs, smaller firms are less likely to use bookbuilding/auction mechanism.

6.4.3 Analysis of After-Market Returns

In this section we examine the initial returns for IPOs once they are listed in the stock exchange. Our analysis is motivated by the findings reported in the prior chapter. The results in the previous chapter revealed that the transparent IPO mechanism leads to very inelastic IPO demand and that the demand of RII investors are important and critical in setting a high offer price. An analysis of initial returns (underpricing) will reveal which investors' category demand determines the initial returns of IPOs once it starts trading in the stock market. It will also reveal the influence of the transparency in the mechanism on the initial IPO returns. The conduct this analysis we use OLS regression analysis after controlling for a number of firm and issue characteristics.

<<Insert Table 6-4 here>>

Table 6-4 reports the OLS regression results. The dependent variable for regression (1) - (3) and (5) is the market adjusted first day initial return (MIR_1), while for regressions (4) and (6) the dependent variable is the market adjusted first month initial return (MIR_{30}). Further,

in regressions (1) – (4) we only include bookbuilding and auction IPOs, while in regressions (5) and (6) we analyse only fixed price IPOs. Market adjusted initial return is the difference between raw initial return (*IR*) and the market returns (*MR*) over the same period[57]. Market adjusted initial return is calculated to take account of the changes in the market condition between the issue closure and the listing date. On average, an IPO commences trading on the stock exchange 22 days after the issue closure date. The OLS regression models include industry controls for unobservable industry fixed affects by classifying the IPOs into ten different industry classifications. The reported t-statistics are adjusted for heteroskedasticity.

In our regressions we include a number of control variables that have been found to influence IPO initial returns. Beatty and Ritter (1986) posit that initial returns increase with ex ante uncertainty and because more information is available for larger firms these firms experience lower underpricing. Thus, we include logarithm of gross proceeds (*LnGpcds*) to control for firm size. Further, matured firms are expected to have more information available than younger firms and therefore matured firms are expected to experience lower underpricing. We use the log of one plus firm's age (*LnAge*) to capture this effect. Age is the difference between the firm's IPO year and the founding year.

Following our analysis in the previous chapter and also as demonstrated by Cornelli and Goldreich (2003) we also include logarithm of demand multiple both of the total demand (*LnDmtl*) as well as of three investors categories *(LnDmtlQIB, LnDmtlNII and LnDmtlRII)*. Prior research has shown that demand multiple (times subscribed) has a positive relationship with underpricing (How et al., 2007, Khurshed et al., 2011). Derrien (2005) argues that markets characterised by sentiment traders are more likely to have higher initial returns. We expect a positive relationship between demand multiple and underpricing. As in Cornelli and Goldreich (2003) we also include the normalized issue price *(NorPrice)* and the elasticity of demand at the average limit price *(Elasticity)*. Finally, following the

[57] Raw underpricing (IR) is calculated as: (First day closing price ─ offer price) ÷ (Offer Price). Market return (MR) is calculated as: (Index value on the date of listing ─ Index value on the offer date) ÷ (Index value on the date of listing)

literature that has shown that initial returns are positively influenced by overall markets returns during the period before the offer price is set (Hanley, 1993, Loughran and Ritter, 2004), we construct and use the 3-month weighted market return following Derrien and Womack (2003) (*Mkt3MW*) on the BSE Sensex index and a market volatility measure (*MktVol)*. *Mkt3MW* is the weighted average of the buy-and-hold returns on the BSE Sensex index in the 3 months before the IPO date where weights are 3 for the recent month, 2 for the next and 1 for the third month before the offering. *MktVol* is standard deviation of the index returns one month prior to the offer issue date.

Regression (1) to (4) builds on our earlier work on information production and pricing and as such these regressions only include IPOs issued with either bookbuilding or auction mechanism. As shown in regression (1) and (2) both the normalized issue price and the measure of elasticity is not significant in determining initial returns. The demand multiple, on the other hand, is both positive and highly significant. The result is consistent with Cornelli and Goldreich (2003). Since the IPO is always priced within the original price range, the underwriter underreacts to the information produced in the offer period by setting the price at most at the upper bound of the price range. In regression (3) we examine the impact of various investor categories on the first day market adjusted return and find that the coefficient of demand for all the investors categories is positively and significant although the significance level for RIIs investors is much lower than both QIBs and NIIs. In regression (4) we examine the impact of various investor categories on the first month market adjusted returns. We find that while the coefficient of QIBs and NIIs remains positive and significant the coefficient on RIIs loses its significance. The result is, however, consistent with the evidence presented in the previous chapter. Analysis of investors demand as presented in Chapter 5 revealed that high RIIs demand is instrumental in setting a high offer price, particularly in case of weak and cold IPOs. Unlike QIBs and NIIs, RIIs participate aggressively is weak and cold IPOs and hence as shown by our results, their high participation is not always associated with high initial returns.

Our regression analysis shows that while the volatility of recent market returns is significant in determining initial IPO returns, recent market return itself is not significant.

This is probably because the information contained in recent market return is already incorporated in the investors' demand multiple. We further find that large firms have less initial returns compared to smaller firms. The coefficient on age of the firm and mechanism is also not significant. Mechanism is a dummy variable which takes the value of 1 for bookbuilding and 0 for auction IPOs.

In regressions (5) and (6) we analyse the initial returns of fixed price IPOs. Since we do not observe the demand for QIBs separately for fixed price IPOs, we only examine the influence of the participation of the two other investor categories: NIIs and RIIs. As explained in the chapter on institutional settings, IPO shares are reserved for two categories in case of fixed price IPOs and hence the NIIs variable also includes the demand of institutional investors. The results of the regression analysis show that unlike in bookbuilding and auction IPOs in fixed price IPOs the demand of RIIs is a significant determinant of both the first day as well as the first month initial returns. We argue that the significant relationship between initial returns and RIIs demand in fixed price IPOs is because of two reasons. First, in fixed price IPOs the offer price is set in advance prior to soliciting demand from potential investors as is the case in bookbuilding and auction IPOs. Second, RIIs accounts for a much larger share in case of fixed price IPOs. While only 35% of the total shares are reserved for RIIs in auction and bookbuilding IPOs, about 50% of the total shares on offer are reserved for retail investors in fixed price IPOs. Thus, a much higher fraction of shares coupled with offer price set in advance perhaps explains the positive and strong association between retail investors' demand and initial returns of fixed price IPOs.

6.4.4 Flipping

One of the services that issuers expect from underwriters is to attract investors who hold stocks for a reasonable amount of time. Since underwriters in India have limited role in terms of allocation it is useful to examine what additional services they provide to issuers during the IPO process. Investors who flip the shares in the immediate aftermarket, referred to as flippers, tend to depress the after-market stock price. Avoiding flippers also helps the underwriters to facilitate their function of after-market price support. Krigman et al., (1999)

were the first to document flipping the context of US IPOs by using a proxy for flipping activity. They find flipping to be most active in IPOs with lowest initial returns and to be mostly done by retail investors as institutional investors are tracked by underwriters following the allocation of IPOs. In contrasting results, Aggarwal (2003) using Public Offering Tracking data finds the occurrence of flipping to be more in case of hot IPOs than cold IPOs. She finds that flipping accounts for about 15% of the shares sold in the offering. In a related study Boehmer et al., (2006) find results consistent with Krigman et al., (1999) and find that the proportion of institutional allocations that is flipped immediately is associated with lower long-term returns. Using Australian electronic share settlement records, Bayley et al., (2006) find that flipping activity accounts for a small proportion of total trading volume. They find that the main determinants of flipping are the degree of underpricing and the characteristics of the market (hot vs. cold) and of the firm. Further, they find less underpriced offers are flipped more than higher underpriced offers.

In this section, we examine the investors' flipping behaviour by analysis data available from bulk deals. In the context of Indian capital markets, bulk deal refers to any share trading which involves more than 0.5% of the total number of equity shares of the company listed in the Indian stock exchanges. In 2004, in order to bring about more transparency, SEBI made it compulsory for the exchanges to publish intraday bulk deals at the end of the trading day. We utilize this data to examine flipping in the context of Indian IPOs. We examine bulk data for IPOs during the first month after they are listed in the stock exchange. A large number of these bulk deals are done by the brokers and small investment companies who deal as day-traders which has identical buy and sell bulk deals on the same day. We eliminate all these intraday deals and are left with only those transactions that represent either flipping (strongest for the first day measure) or buying and selling by investors. In this sense our first day bulk deal data provides the strongest measure of flipping by investors as any large scale selling on the first day will invariably mean flipping of shares received during the IPO allocation. Thus, while our bulk deal data might understate the real flipping activity, it nevertheless provides accurate description of flipping involving large flipping deals in the aftermarket. Importantly, large scale flipping can lead

to significant price depression. Data on bulk deals are available in a number of site including the BSE and NSE stock exchanges. We collect bulk deal data from the money control portal[58] which provides details of the bulk deals carried out in the two exchanges[59]. We analyse investors' filliping on a sample of 278 IPOs for which we have bulk deal data during the first month of trading. We follow Boehmer et al., (2006) in reporting flipping as a percentage of the shares sold in the IPO.

<<Insert Table 6-5 here>>

Table 6-5 presents our analysis of investors' flipping in Indian IPOs. Of the 278 IPOs for which we have data on bulk deal in the first month of trading, 104 IPOs show first day negative net bulk sales. The numbers are similar for the first week and first month net bulk sales. In proportionate terms, fixed-price IPOs account for the largest fraction of IPOs with net negative bulk sales on the first day of trading. Twenty six of the forty eight fixed-price IPOs have negative net bulk sales on the first day of trading. About 27% (6 out of 22) of bookbuilding IPOs and about 35% (72 out of 208) of auction IPOs have negative net bulk deals on the first day of trading. In terms of the proportion of shares which are flipped on the first day of trading, IPOs issued with auction mechanism appears to have a higher fraction of flipping compared to other IPO methods. About 10.13% of the shares offered in the auction IPOs are flipped on the first day of trading. The corresponding figures for fixed-price and bookbuilding IPOs are 5.44% and 6.77% respectively. While we only analyse bulk deals and as Aggarwal (2003) report that a large number of flipping occurs through retail trades, the fraction of shares flipped through bulk sales appears to be relatively high in the context of Indian IPOs. We also examine the number of flipping trades and find that on average there are about 2 negative bulk deals per IPO on the first day of trading. However, the number of negative bulk trades varies significantly with the maximum number of 9 negative flipping trades for fixed-price IPOs, 7 for bookbuilding and 11 for auction IPOs.

[58] www.moneycontrol.com

[59] We cross-checked bulk deals of some of the IPOs on the BSE/NSE website and found them to be consistent.

We further examine the first day negative bulk sales by IPO market, size and underwriter reputation. We divide the total sample into four categories of cold (IPOs with negative initial returns), cool (IPOs with initial return between 0 and 10%), warm (IPOs with initial return between 10% and 60%) and hot (IPOs with initial return in excess of 60%). Our results are consistent with those of Krigman et al., (1999) and Boehmer et al., (2006) as we find that flipping activity is higher in cold IPOs compared to hot IPOs. About 55% of the cold IPOs exhibit flipping activity on the first day of trading compared to 21% for hot IPOs. The number of shares flipped in also higher in case of cold IPOs (8.11%) compared to hot IPOs (5.04%). When we examine flipping by IPO size we find that most of the first day flipping occurs in smaller IPOs. While about 50% of all small-sized IPOs have negative bulk sales on the first day of trading, the corresponding figure for large IPOs is only about 23%. Finally, we examine flipping by underwriter reputation and find that almost 55% of the IPOs issued by less reputed underwriters experience flipping on the first day of trading. On the other hand, only 23% of IPOs issued by reputed underwriters experience large scale flipping on the first day of trading.

6.5 Conclusion

In recent times there has been a great interest in allocation mechanisms in the IPO literature. The debate has focused on, among others, the appropriateness and efficiency of these mechanisms. This chapter examined the implications of different placement mechanisms in the context of Indian IPOs. The Indian IPO market provides a testing ground for measuring the efficiency of different allocation mechanisms since changes in regulations have meant that different types of mechanism have been experimented in the Indian IPO market. While fixed price was the only mechanism available to issuers and underwriters until late 1999, the bookbuilding mechanism which allowed discretionary allocation of shares to qualified institutional investors was amended in late 2005 thereby making its mechanism very similar to an auction mechanism. Using a sample of 371 IPOs issued during the period 2001-2010, we examine the determinants of choosing a particular allocation mechanism and the after-market returns of IPOs.

Consistent with prior studies we find that IPOs issued under the auction mechanism are least underpriced while those issued with fixed price mechanism are most underpriced. Results from our analysis of determinants of IPO allocation mechanism show that fixed price mechanism is mostly used by firms of smaller size who are exposed to higher levels of information asymmetry. The size of the IPO offer alone explains more than 60% of the variation in the choice of IPO mechanism. Further, we find that IPOs exposed to higher risk are also more likely to use fixed price mechanism instead of auction or bookbuilding mechanism. Our analysis of after-market initial returns suggests that in case of bookbuilding and auction IPOs the demand of informed investors (both QIB and NII) is more influential in determining initial returns (first day and first month) than the demand of retail investors. Since high demand by retail investors is already incorporated in setting offer prices, particularly in cold IPOs, retail investors' demand appear to lose significance in explaining IPO initial returns. However, in case of fixed price IPOs where retail investors are allocated a much larger share of the total offer and where the offer price is set in advance, we find that the demand of retail investors in much more significant in explaining initial returns. Our analysis of flipping examined by analysing bulk trading data suggest that flipping is concentrated more in cold IPOs and IPOs which are managed by less reputed underwriters.

Table 6-1: Sample Description

Particulars	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total	Median
Number of IPOs	4	2	5	20	54	73	100	36	19	58	371	
Number of Fixed Price Issues	2	0	2	8	15	17	16	4	0	1	65	
Number of Bookbuilding Issues	2	2	3	12	32	1	0	0	0	0	52	
Number of Auction Issues	0	0	0	0	7	55	84	32	10	33	221	
Average Age at IPO	11	10	11	16	15	13	14	13	15	16	14.06	11.99
Average Total Assets (M INR)	355	25,727	11,732	3,479	4,998	4,515	5,142	3,184	13,509	8,376	5,800	1,305
Mean Gross Proceeds (M INR)	268	5,220	2,193	3,349	1,903	2,352	2,832	4,279	5,521	3,314	2,960	903
Leverage	0.59	0.08	0.45	0.52	0.52	0.58	0.59	0.56	0.53	0.59	0.56	0.60
Raw First Day Returns (IR)	0.05	-0.04	0.34	0.47	0.45	0.19	0.34	0.10	0.10	0.13	0.26	0.14
Market Adjusted First Day Returns (MIR_1)	0.18	-0.08	0.26	0.47	0.42	0.16	0.32	0.15	0.08	0.13	0.25	0.12
Market Adjusted One Month Return (MIR_{30})	0.45	-0.15	0.14	0.49	0.49	0.18	0.29	-0.05	-0.03	0.01	0.21	0.07
IPOs with +ve Initial Returns	2	0	5	17	45	39	62	22	11	37	190	
IPOs with -ve Initial Returns	2	2	0	3	9	34	38	14	8	21	98	
Offer Price Range	-	0.15	0.14	0.15	0.16	0.16	0.14	0.11	0.02	0.02	0.11	0.12
Average Demand Multiple	0.59	2.53	12.81	21.22	24.95	15.86	27.60	9.73	6.18	15.38	22.27	7.62

This table reports the descriptive statistics of Indian IPO by year. The sample includes IPOs listed on the BSE and NSE from January 2001 to December 2010. Age is the difference between a firm's IPO year and the founding year. *Total assets* is the total assets of the firm for the quarter prior to the IPO as reported in the offer document. *Gross proceed* is the gross proceeds of the offer calculated by multiplying the offer price with the number of shares offered. *Leverage* is the ratio of total liabilities to total assets for the last quarter prior to the IPO. *Raw first day return (IR)* is the simple return calculated between IPO offer price and the closing price at the end of the first day of trading. *Market adjusted first day return (MIR_1)* is the difference between raw first day return (IR) and the market returns (MR) over the same period of time. Market return is the simple return calculated between the index value on the offer date and the date of listing. We use the BSE Sensex as our measure of the market return. *Market adjusted one month return* is the difference between the simple one month IPO return and the market return over the same period of time. *Offer Price Range* is range of the offer price difference the upper and lower bound. *Total demand multiple* is the ratio of the investors' demand for shares (at and above the offer price) and the total number of shares offered. (1 US$ approximately equal to INR 45).

Table 6-2 Bookbuilding, Auction and Fixed Price Issues

Particulars	Fixed Price (1)	Bookbuilding (2)	Auction (3)
Number of IPOs	65	52	254
Average Age at IPO	13.47	13.61	14.30
Average Total Assets (M INR)***	744.65	7,753.40	6,694.03
Average Gross Proceeds (M INR)***	256.01	3,382.88	3,565.73
Leverage **†	0.57	0.48	0.58
Raw First Day Returns (IR_1) **,[b]	0.45	0.31	0.20
Mean Issue Costs**‡	0.08	0.06	0.07
Offer Price Range (%)[c]		0.16	0.11
Market Adjusted First Day Returns (MIR_1) **, [b]	0.42	0.30	0.19
Dispersion in Underpricing	0.69	0.39	0.41
Money Left on the Table (M INR) **, [b]	100.56	960.57	348.39
Market Adjusted One Week Underpricing (%)**, [b]	0.42	0.31	0.19
Market Adjusted One Month Underpricing (%)*, [b]	0.36	0.33	0.15
IPOs with +ve Initial Returns	45	41	154

This table presents a comparison of the descriptive statistics of IPOs issued in different allocation mechanisms. *Market adjusted one week return* is the difference between the simple one week IPO return and the market return over the same period of time. *Dispersion in underpricing* is the standard deviation of IPO market adjusted first day returns. *Money left on the table* is the difference between first day closing price and the offer price multiplied by the number of shares offered. ***, **, and * denotes fixed price mechanism is significantly different from both bookbuilding and auction mechanisms, ***†, **†, and *† denotes fixed price mechanism is significantly different from bookbuilding and ***‡, **‡, and *‡ denotes fixed price mechanism is significantly different from auction all at less than 1%, 5% and 10% respectively. a, b, and c denotes the bookbuilding is different from auction at less than 1%, 5% and 10% respectively.

Table 6-3 Determinants of Allocation Mechanism

	Fixed Price vs. Others (1)	Fixed Price vs. Others (2)	Fixed Price vs. Bookbuilding (3)	Fixed Price vs. Auction (4)
LnGpcds	-2.129***	-2.297***	-2.418***	-2.233***
	(-7.70)	(-7.92)	(-6.90)	(-8.23)
LnAge		-0.114	0.363	-0.236
		(-0.57)	(1.55)	(-1.12)
Overhang		-0.305	-0.943	-0.713
		(-0.42)	(-0.65)	(-0.94)
Lev		1.339*	0.667	1.139*
		(1.95)	(0.64)	(1.67)
AfMktVol		-7.740	20.72*	-11.79
		(-0.65)	(1.78)	(-0.97)
Constant	12.18***	12.97***	12.70***	13.22***
	(7.46)	(6.51)	(5.19)	(6.52)
Observations	371	371	116	314
Pseudo R^2	0.601	0.616	0.688	0.606

This table presents the results of probit regression model which analyses the determinants of the choice of an IPO mechanism. In regressions (1) and (2) the dependent variable takes the value of 1 for fixed price IPOs and 0 for others. In regression (3) the dependent variable takes the value of 1 for fixed price IPOs and 0 for bookbuilding IPOs. In regression (4) the dependent variable takes the value of 1 for fixed price IPOs and 0 for auction IPOs. *LnGpcds* is the logarithm of gross proceeds. *LnAge* is the log of one plus the age of the firm at the time of the IPO. *Overhang* is the percentage of shares held by issuers'/promoters' post IPO. *Lev* is the leverage (total liabilities/total assets) of the firm at the time of the IPOs. *AfMktVol is* the standard deviation of the after-market return for 60 daily returns after the listing. *t* statistics in parentheses* p<0.10, ** p<0.05, *** p<0.01.

Table 6-4: Determinants of Initial IPO Returns

Particulars	MIR_1 (1)	MIR_1 (2)	MIR_1 (3)	MIR_{30} (4)	MIR_1 (5)	MIR_{30} (6)
NorPrice	0.0166					
	(0.30)					
Elasticity		0.0011				
		(1.51)				
LnDmtl	0.210***	0.2139***				
	(7.70)	(8.84)				
LnDmtlQIB			0.0646***	0.0830***		
			(3.89)	(3.36)		
LnDmtlNII			0.0621***	0.0811***	0.175**	-0.0310
			(4.08)	(3.98)	(2.52)	(-0.29)
LnDmtlRII			0.0450*	0.0404	0.235***	0.479***
			(1.72)	(1.33)	(2.84)	(3.22)
Mkt3mw	-0.147	-0.135	-0.121	-0.207	-0.793	1.116
	(-0.32)	(-0.30)	(-0.28)	(-0.40)	(-0.51)	(0.36)
MktVol	8.677*	8.657*	10.57**	5.650	2.044	21.30
	(1.67)	(1.68)	(2.17)	(1.09)	(0.10)	(0.51)
LnGpcds	-0.0795***	-0.0787***	-0.0657***	-0.0584**	0.211	-0.365
	(-3.72)	(-3.72)	(-2.75)	(-2.11)	(1.27)	(-1.11)
LnAge	0.0230	0.0045	0.0278	0.0144	-0.00235	-0.344**
	(1.00)	(0.18)	(1.19)	(0.45)	(-0.02)	(-2.10)
Mechanism	-0.0240	-0.0215	-0.0257	-0.0340		
	(-0.48)	(-0.26)	(-0.48)	(-0.47)		
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.166	0.0813	0.205	0.151	-1.305	2.237
	(0.88)	(0.44)	(0.85)	(0.53)	(-1.27)	(1.36)
Observations	304	304	298	298	59	59
Adjusted R^2	0.357	0.399	0.375	0.287	0.377	0.262

This table reports the regression coefficients of the determinants of IPO initial returns. The dependent variable in regression (1) –(3) & (5) is the market adjusted first day return (MIR_1) while in regression (4) and (6) is market adjusted first month return (MIR_{30}). *Average Limit Price (AvLimitPr)* is the quantity-weighted average of all limit prices and is normalized by the initial offer price range. *Elasticity* is the elasticity of demand computed from the lower bound of the demand schedule to the average quantity adjusted limit price. *LnDmtl, LnDmtlQIB, LnDmtlNII and LnDmtlRII* are the logarithm of 1 + demand multiple (total share bid at or above

the offer price divided by the total shares offered) of total offer, qualified institutional buyers (QIB), non-institutional investors (NII) and retail individual investors (RII) respectively. *LnGpcds* is the logarithm of gross proceeds. *Mkt3Mw* is the weighted average of the buy-and-hold returns on the BSE Sensex index in the 3 months before the IPO date where weights are 3 for the recent month, 2 for the next and 1 for the third month before the offering. *MktVol* is standard deviation of the index returns one month prior to the offer issue date. *LnAge* is the log of one plus age of the firm at the time of the IPO. *Mechanism* is a dummy variable which takes the value of 1 for bookbuilding and 0 for auction IPOs White heteroskedasticity-consistent *t*-statistics are in parentheses. ***,**, and * denote the difference is significant at less than 1, 5, and 10 percent level, respectively.

Table 6-5: Flipping of IPO shares in the immediate aftermarket trading

Mechanism	Fixed	Bookbuilding	Auction	Total
Number of observations	48	22	208	278
Average Number of Shares offered	7,973,538	13,160,755	16,304,514	21,236,956
Average number of buy bulk deals-day 1	12.85	6.36	16.75	14.87
Average number of sell bulk deals- day 1	13.22	6.59	16.6	14.87
Average shares traded buy bulk deals-day 1	4,305,490	2,691,622	4,750,665	4,448,281
Average shares traded sell bulk deals- week 1	4,397,531	2,219,765	4,184,258	4,032,683
IPOs with negative First Day net Bulk sales	26	6	72	104
IPOs with negative First Week net Bulk sales	27	6	76	109
IPOs with negative First Month net Bulk sales	25	6	77	108
% of share flipped -1st day	-5.44%	-6.77%	-10.13%	-8.51%
% of share flipped -1st week	-5.96%	-6.97%	-11.30%	-9.84%
% of share flipped -1st month	-7.34%	-6.97%	-12.42%	-10.66%
Average no. of flipping trades: Day 1 (Variance)	1.65 (3.27)	3.16 (4.96)	2.66 (6.56)	2.29 (5.71)
Flipping on the first day (No. of Observations)				
By IPO Market				
Very Cold IPOs (less than 0%)	-7.01% (8/13)	-4.01% (1/3)	-12.23% (39/73)	-11.03% (48/89)
Cold IPOs (0-10%)	-3.09% (5/6)	-5.55% (2/5)	-6.55% (12/24)	-5.31% (19/35)
Hot IPOs (10-60%)	-6.67%(9/17)	-8.47% (3/11)	-7.68% (17/72)	-7.45% (29/109)
Very Hot IPOs (more than 60%)	-1.3% (4/12)	-	-10.86% (4/30)	-4.85% (8/45)
By Size				
Very Small (less than 300 million)	-5.99% (17/30)	-	-13.00% (4/9)	-7.32% (21/39)
Small (300-1000 million)	-4.42% (9/18)	-7.12% (5/12)	-11.29% (42/94)	-10.03% (54/121)
Large (1000-2000 million)	-	-	-6.46% (17/66)	-6.46% (17/66)
Very Large (more than 2000 million)	-	-5.01% (1/4)	-7.95% (9/46)	-7.20% (10/50)
By Underwriter Reputation				
Reputed	-9.85% (2/6)	-6.50% (4/16)	-5.09% (25/114)	-7.62% (31/136)
Less Reputed	-5.07% (24/42)	-7.31% (2/6)	-11.11% (47/94)	-8.89% (73/142)

This Table presents an analysis of flipping by investors in the immediate aftermarket trading. We use data on bulk deals to analysis flipping. Bulk deal refers to any share trading which involves more than 0.5% of the total number of equity shares of the company listed in the Indian stock exchanges.

Chapter 7 New Bank Loans at the time of IPO

7.1 Introduction

There is a large body of prior literature which examines the role of bank loans as a unique form of finance. The literature builds on Fama's (1985) argument that banks are unique institutions as they have access to private information through their lending and deposit relationships. A number of studies report abnormal stock returns on bank loan announcements (James, 1987, Lummer and Mcconnell, 1989). In the context of initial public offerings (IPOs), James and Wier (1990), find that firms with bank loans experience lower IPO underpricing and argue that the presence of bank loans reduce information asymmetry. However, in a recent study, Maskara and Mullineaux (2011a) show that the abnormal returns reported in prior bank loan announcements studies is driven by sample selection issues and argue that bank loans do not constitute a special form of finance.

IPO prospectuses in most countries provide information on the uses of funds. In India, most IPOs are issued with the aim of providing finance for specific projects and it is mandatory for the issuing firm to disclose both the uses and sources of funds. The regulation requires firms to demonstrate confirmed sources of funding through verifiable means towards at least 75% of the required funds for the proposed project[60]. In many cases firms resort to bank loans to meet the financing requirements of the project[61]. The use of bank loans at the time of the IPO raises several interesting questions. Do firms take bank loans at the time of the IPO to maintain its target capital structure? Are the projects pursed by IPO firms significantly large which therefore cannot be entirely financed through IPO proceeds? Do

[60] Securities and Exchange Board of India (Disclosure and Investor Protection) Regulations, 2000 II 2.8 states that "an undertaking shall be given in the offer document by the issuer confirming firm arrangements of finance through verifiable means towards seventy five per cent of the stated means of finance, excluding the amount to be raised through proposed issue and existing identifiable internal accruals, have been made".

[61] Proceeds from IPO and bank loan are the two primary sources of funds. Others include promoter's contribution and internal accruals.

firms use bank loans to provide signal to the market about the quality of the offer? These are interesting questions and are related to specific strands of the finance literature. However, since prior literature considers bank loans as a unique form of finance, in this study we focus on the uniqueness of bank loans and examine whether the new bank loans raised at the time of the IPO has any impact on the information asymmetry of IPO firms.

Examination of new bank loans at the time of the IPO is interesting in several ways. First, IPOs are non-standardized offerings with very little information publicly available and are, therefore, exposed to acute information asymmetries. Hence, if bank loans are indeed unique, the uniqueness of bank loans should be pronounced at the time of the IPO and in turn should reduce information asymmetry. This argument is also consistent with Best and Zhang (1993) who argue that banks will expend resources to evaluate and monitor and hence produce valuable information when external screening indicators are noisy or unreliable. Since IPO firms are relatively unknown it can be argued that banks will expend relatively more resources to evaluate and monitor them.

Second, as discussed by Maskara and Mullineaux (2011a), our sample is more suited to examining the role of bank loans as our selection of IPOs firms are less likely to be influenced by sample selection bias which is the case with most prior studies on loan announcement. Our sample covers the entire population of Indian IPOs issued during the period of our study. Third, while prior studies on the impact of bank loans use a sample of control firms through a manual search of comparable companies, our IPO data provides us with a convenient and effective sample of matching firms. Since only about one half of our total sample of IPOs have bank loans at the time of the IPO, it provides us with an appropriate group of control firms to examine the impact of bank loans on information asymmetry at the time of the IPO.

Most of the prior studies have used stock returns to examine the impact of bank loan announcements. In this study, however, we analyse the participation of informed institutional investors to examine the influence of new bank loans made at the time of an IPO. Prior studies on the participation of informed institutional investors have provided a

robust evidence across time period and in different allocation mechanisms that the participation of institutional investors is positively associated with the quality of the offering (Koh and Walter, 1989, Hanley and Wilhelm, 1995, Aggarwal et al., 2002, Cornelli and Goldreich, 2003, Degeorge et al., 2010, Chiang et al., 2010). Hence, we examine the pattern of institutional investors' participation both in aggregate terms as well as over the offer period to examine the uniqueness of bank loans.

The study utilises a sample of 294 Indian IPOs issued during the period January 2001 to December 2008. We find that new bank loans at the time of the IPO are only taken up by very small issuers who are perhaps unable to finance their project entirely from IPO proceeds. We find support of the view that firms with higher levels of information asymmetry are more likely to have new bank loans at the time of the IPO. More importantly, we find that firms which resort to bank loans have significantly larger projects compared to firms who do not resort to bank funding at the time of the IPO. Further, consistent with the Maskara and Mullineaux (2011b), we also find that firms which are highly levered are more likely to borrow than firms which are less levered. This is also consistent with the argument that firms with established banking relationship find it easier to borrow additional bank financing (Kutsuna et al., 2007).

Our analysis of investors' participation shows that the participation of institutional investors (QIBs) is negatively associated with the presence of new bank loan at the time of the IPO. Our results hold when we only include IPOs of small firm size which are more likely to borrow new bank loans at the time of the IPO. Further, our analysis of investors' demand over the period of the IPOs shows that the early participation of institutional investors (QIBs) is also significantly less in IPOs with bank loan at the time of the IPO. Our results are robust after controlling for the impact of existing bank loans (James and Wier, 1990), and where commercial banks act as underwriters to the IPO (Schenone, 2004). Further, our results remain similar when we use investors bids instead of investors' demand multiple. Hence, while our result is contrary to the established prior evidence on the uniqueness of bank loans, it is consistent with Maskara and Mullineaux (2011a) as we find

that bank loans do not appear to be a special form of finance and that it does not reduce information asymmetry.

Our study offers a number of contributions. To the best of our knowledge, this is the first study which examines the uniqueness of bank loans in the context of an emerging market. Further, while a substantial body of literature has examined the uniqueness of bank loans for already listed companies, our study contributes to the literature by examining the impact of bank loans in the context of IPOs where information asymmetries are much higher. More importantly, we deviate from the existing literature and focus on the participation of informed investors rather than on the stock trading prices which could be influenced by the degree of market efficiency especially in the context of emerging markets where returns of both IPOs and the listed stocks are significantly influenced by the participation of noisy or sentiment investors (Khurshed et al., 2011).

The rest of the chapter is structured as follows. In section 7.2 we review the related literature and discuss the new bank loan feature of the Indian IPO market. Section 7.3 discusses our approach to empirical examination. Section 7.4 presents the data and data sources. Section 7.5 provides the descriptive statistics and Section 7.6 presents the empirical results. Section 7.7 concludes.

7.2 Literature review and the Indian IPO market

7.2.1 Uniqueness of Bank Loans

Our study is related to the literature on bank loan announcements which documents a postive relationship between such announcement and abnormal stock returns. A large number of prior studies have considered bank loans as a unique form of finance. This view stems from Fama (1985) who argues that banks are unique institutions as they have access to valuable firm information through their lending and deposit relationships. Since in examining the rates on certificates of deposit (CD) and other high-grade commerical papers Fama (1985) finds that bank borrowers bear the cost of reserve requirements, he concludes that there must be something special about bank loans. Boot (2000) highlights a number of

benefits of bank loans including exchange of information, flexibility, control of potential conflicts of interest, better monitoring, and mitigation of moral hazard.

In an event study on the stock price responses to publicly announced bank credit agreements, James (1987) finds that while bank loan announcements are associated with postive and statistically significant abnormal stock performance, publicly placed straight debt issues are associated with non-postive abnormal stock returns. Lummer and Mcconnell (1989) extend the analysis of the uniqueness of bank loans by analysing new bank agreements with revised credit arrangements. Interestingly, they find that while favourably revised credit agreements are associated with postive abnormal returns, unfavourably revised credit agreements are associated with negative returns. Further, they find that new credit agreements do not produce any abnormal stock returns. They point to their findings to argue that banks do not gain information advantage when they provide new bank loans. It is only through the continuation of credit agreements, the authors argue, that banks gain access to valuable firm information.

Preece and Mullineaux (1996), Billett et al., (1995) find similar results. Further, Slovin et al.,(1992) and Fields et al., (2006) find that bank loan relationship are particularly valuable for smaller and underperforming firms. Hoshi et al. (1993) show that bank lending exposes borrowers to monitoring which serves as a certification device facilitating simultaneous capital market funding. In the context of IPOs, James and Wier (1990) find that presence of bank loan reduces information asymmetry and the degree of underpricing because bank's involvement acts as a signal to the market conveying the superior quality of the offering.

However, Maskara and Mullineaux (2011a) recently argue that the positive relationship between bank loan announcements and abnormal stock returns documented in prior studies maybe due to sample selection issues. They find that only about one-fourth of the bank loans are announced and the incident of loan announcement are driven by factors such as information asymmetry and perceived materiality. More importantly, they find that when sample selection issues are addressed bank loans do not appear to elicit statistically

significant abnormal returns. In a related study Billett et al., (1995) find that bank loans do not generate abnormal returns when returns are estimated over a long period of time.

Our study is also related to the literature on the participation of commercial banks in IPOs. The involvement of commercial banks in underwriting has been a contentious issue and has attracted a significant interest by both academic researchers and policy makers. For instance, the enactment of the Glass-Steagall act in the US in the 1930s and its subsequent repeal in 1999 was primarily related to the participation of commercial banks in investment banking activities. One of the concerns of US policy makers was that better information production due to the presence of banks gave undue advantage and greater bargaining power to the commercial banks. Saunders (1985) and Benston (1990) argue that commercial banks monopolize underwriting business and drive out investment banks.

A number of studies which have examined the role of universal banking in underwriting bond issues find support for the information production hypothesis. For instance, Kroszner and Rajan (1994) report that both quality of the issue and long term performance of issuing firms are better in cases where IPOs are underwritten by commercial banks compared to those which are underwritten by investment banks. Ang and Richardson (1994) and Puri (1994) find similar evidence for debt underwritten by commercial banks in the pre-Steagall era. Using post Glass-Steagall data, Puri (1996) and Gande et al., (1997) find that debt issues managed by commercial banks exhibit higher prices compared to those managed by investment banks.

Puri (1999) compares IPOs underwritten by commercial banks with those underwritten by investment banks and concludes that commercial banks are better certifiers than investment banks with respect to underpricing. Using US data, Schenone (2004) examines the impact of pre-IPO banking relationship and finds, on average, lower underpricing for those IPOs which had a prior banking relationship with a potential underwriter. She finds that the impact on underpricing is much greater when the prior banking relationship is a lending relationship rather than an underwriting relationship and attributes lower underpricing to

continuous monitoring by commercial banks which leads to greater information production at the time of IPO.

<<Insert Table 7-1 here>>

7.2.2 The Indian IPO Market

New Bank Loan at the Time of IPO

Most of the features of the Indian IPO market, including the transparency in the IPO mechanism and the different investor categories have been discussed in Chapter 3. In this section we present a discussion on the bank loan taken by firms at the time of an IPO.

The Indian IPO market provides an interesting setting to examine the impact of relationship banking on the participation of institutional investors. In India, most IPOs are conducted for raising capital for a particular project. Firms issuing IPOs are required to provide not only the uses of the fund but also the sources of funds to meet the total costs of the project[62]. As a part of the disclosure requirement, Securities and Exchange Board of India (SEBI) requires firms to disclose in the IPO offer document confirmed arrangements of finance through verifiable means towards seventy five per cent of the stated means of finance, excluding the amount to be raised through proposed issue and existing identifiable internal accruals. In addition to proceeds from the equity issuance, the IPO prospectus discloses additional sources of funds which often include bank loans. In some instances the share of project financing through bank loans is greater than equity proceeds raised through IPO. Table 7-1 shows information that issuing firms typically disclose in an IPO prospectus. We present a more detailed description of the nature of new bank loans in the empirical results section.

[62] As far as we are aware, prospectus from most countries only discloses the uses of funds raised from the equity proceeds.

7.3 Approach in examining the uniqueness of bank loans

Prior studies have used the degree of underpricing or initial returns as a proxy for measuring the influence on information asymmetry on account of a particular decision, such as using a commercial bank rather than a pure investment bank, or a firm characteristic, such as existing bank loans. James and Weir (1990), for instance, argue that evidence of lower underpricing for IPO firms with bank loans is consistent with the notion that existing bank loans reduce information asymmetry. Schenone (2004) also points to the smaller underpricing of IPOs with commercial banking relationship to argue that existing commercial banking relationships reduce information asymmetry.

In this chapter we analyse the uniqueness of bank loans and its influence on information asymmetry by examining the participation of institutional investors (QIBs). We use this approach for two reasons. First, as we have documented in Chapter 6 the participation of institutional investors significantly influences initial IPO returns. While the participation of non-institutional investors (NIIs) also impacts initial returns, NIIs participation, as we have documented in Chapter 5, is, however, induced by the early participation of QIB investors. Second, the impact of investors' participation is strong in multiple regression analysis that we do not observe any impact of bank loan on initial IPO returns[63]. Hence, we focus on the participation of institutional investors to examine the uniqueness of new bank loans at the time of the IPO.

There is a significantly large IPO literature that discusses participation of institutional investors in IPOs. Both Rock (1986) and Benveniste and Spindt (1989) implicitly assume that some investors are more informed than others. Koh and Walter (1989) provide empirical support of the winners' curse hypothesis in the context of Singaporean IPOs and show that informed investors participate well in good quality IPOs and less in poor quality offerings. Hanley and Wilhelm (1995) find that institutional investors capture a large fraction of the short-run profits associated with IPOs. Cornelli and Goldreich (2003), using

[63] We conduct a regression analysis similar to the one presented in Chapter 6 to examine the impact of new bank loans on IPO initial returns. Our analysis shows that the coefficient on bank loan dummy variable is not significant in explaining initial IPO returns.

proprietary European IPO data, find informed participation of large institutional investors who are in turn rewarded with preferential allocation of underpriced IPO shares. Aggarwal et al., (2002) also find a significant positive relationship between institutional allocation and the first day IPO returns which they partly attribute to the bookbuilding hypothesis. Using US IPO auction data Degeorge et al., (2010) find evidence of high institutional participation in better performing IPOs providing further support further of the view that the participation of institutional investors is driven by informed investment. In their examination of Taiwanese auction IPOs, Chiang et al., (2010) find that while the participation of retail investors is influenced by sentiments, the participation of institutional investors appear to be more informed as institutional investors participate well in better performing IPOs.

7.4 Sample data

Our sample consists of IPOs listed on BSE and/or the NSE between January 2001 and December 2008. The total number of IPOs offered during the period is 298. We exclude all privatization IPOs since most of these are of large government owned banks and financial institutions and hence are not representative of average IPO issuing firms. Our final sample comprises of 294 firms of which 113 firms disclose bank loans as one of the sources of funds in the offer document. Data on most of the key variables including data on bank loan are collected from the prospectus. We collect IPO prospectus from Perfect Filings, Thomson Research and the SEBI website. We obtain market data from DataStream and supplement this with data obtained from the BSE/NSE websites. Data on the participation of investors is obtained from the NSE/BSE website. We use unadjusted prices to calculate initial returns on IPOs but also calculate market adjusted initial returns using BSE Sensex index as the market index[64].

[64] As a measure of robustness we also used the BSE100 index. This did not alter the conclusions of our results.

7.5 Descriptive Statistics

In this section, we present descriptive statistics of our sample. Table 7-2 shows descriptive statistics for each year starting from 2001 to 2008[65]. We adjust all Indian Rupee denominated variables for inflation using the consumer price index taken from the Global Market Information Database (GMID). We report all values in 2004 Indian Rupee. Data on the number of IPOs show that the yearly level of IPO activity has increased considerably over the period of our study. Following the burst of the internet bubble in 2000 and consistent with global trends, IPO activity in India also experienced a sharp decline. It regained some momentum from 2004 onwards and increased steadily over the period 2005-07. In fact 2006-07 can be considered as a boom period for IPO activity as number of listings increased sharply. The onset of the financial crises trigged by the credit crunch in 2007 brought about a halt to the feverish IPO activity as issuers stayed away from the Indian capital markets.

<<Insert Table 7-2 here >>

We describe briefly the descriptive statistics of our sample IPO. The mean (median) firm age at the time of IPO for our sample IPOs is 13.6 (11.87) years. The mean (median) total assets at the time of the offer is INR 4,794 (1,138) million while the mean (median) gross proceeds is INR 2,725 (821) million. Data suggest that during 2005-07 buoyed by investors' large appetite for IPO shares, many smaller firms actively participated in raising funds from the capital market. The mean (median) times subscribed for IPOs for the entire period is 22.27 (8.17) times. The mean (median) leverage (total liabilities/total assets) of the IPO firm is 0.56 (0.59) and the mean (median) post IPO promoters' holding is 58% (59%). The overall mean (median) raw initial return (first day) for the period is 30% (17%) and the mean (median) market adjusted first day initial return is 28% (15%).

<<Insert Table 7-3 here >>

[65] We limit our sample to 2008 to avoid the effects of financial crises influencing our results. In fact in 2009-10 very few small firms have new bank loans at the time of the IPO. Only few large firms show new bank loans as additional source of finance in their prospectus.

Table 7-3 presents a more comprehensive descriptive statistics for IPOs by segregating the total IPOs into two groups: IPOs with and without new bank loans. Of the 294 IPO firms, 113 have new bank loans at the time of IPO. In Panel A we examine all IPOs based on this classification. As presented in the Table, the two groups of IPOs differ significantly in terms of size. IPOs with new bank loans are significantly smaller than those without new bank loans across a number of measures including total assets, gross proceeds and prior year sales. These firms are also significantly smaller in terms of prior year net income and EBITDA (earnings before interest, tax, depreciation and amortizations). Thus, it appears that firms which resort to bank loans at the time of the IPO are comparatively smaller in size than other IPO firms. Further, the median gross proceeds of IPOs with new bank loans is only 451 million INR which is less than half the median gross proceeds of IPOs without such bank loans. The univariate results suggest that smaller size firms are more likely to have bank loans as one of the funding sources at the time of the IPO to meet the financing requirements of the project. This finding is consistent with Fama (1985) who argues that for smaller firms contracting costs for bank loan are lower than the cost of raising funds from the primary market.

Since smaller firms are more likely to have higher levels of information asymmetry, we also find a significant difference in terms of investors' participation and consequently the initial returns in IPOs with and without new bank loans. Hence, we analyse a restricted sample of IPOs in order to compare IPOs having new bank loans with firms of similar characteristics. In Panel B and C we compare and examine only those IPOs with gross proceeds of less than 2,000 million INR and 1,000 million INR respectively. As presented in Table 7-3, we lose few observations from the category of IPOs with bank loan compared to IPOs without such bank loans. Even with this classification, IPOs with new bank loans appear to be significantly smaller than those without such new bank loans. What is remarkable, however, is the difference in total project costs between the two groups of IPOs. Although IPOs with new bank loans are much smaller than IPOs without bank loans, their project costs are much higher. It, thus, appears that to finance projects which are much larger than those pursued by comparable firms, firms resort to bank financing to

supplement the proceeds from the IPO offering. We also find that IPOs with new bank loans have significantly higher total long-term loan funds compared to IPOs without such bank loans although we do not find any difference in total leverage (total liabilities by total assets).

In both the reduced IPO samples we find that the participation of investors, and importantly, the participation of QIB investors is significantly smaller in IPOs with bank loan than in IPOs without such bank loans. While the evidence may be on account of the size of the offering as large institutional investors are less interested in participating in small offerings, the univariate analysis nevertheless suggests that the presence of bank loan does not attract informed institutional investors. Our multivariate analysis includes a number of control variables, including the size of the offer, examine whether new bank loans are indeed unique.

7.6 Empirical results

7.6.1 The nature of new bank loans

In this section we examine the nature of new bank loans availed to IPOs firms at the time or just prior to the IPO. Here we specifically examine whether the new bank loans made at the time of the IPO is a new banking relationship or whether it is a continuation of existing banking relationship. Details of existing and new banking relationship are provided in the offer document and we make use of this information to further explore the nature of new bank loans. Schenone (2004) finds that banking relationship substantially reduces information asymmetry and more importantly a lending relationship has a more pronounced effect than an investment banking relationship. By controlling for the banking relationship, we will be able to identify the impact of new bank loans on the underpricing.

Table 7-4 shows the data collected from the prospectus of all IPO firms with respect to banking relationship. In the first half of the table we present banking relationship of all firms at the time of the IPO as disclosed in the offer document. The offer document provides a list of all bankers to the company and provides details of the lending

relationships with them. Thus, the data presented in Table 7-4 depicts only lending relationships. We find that in terms of banking relationship prior to the IPO, firms with and without new bank loans do not appear to be very different. While about a fifth of the IPOs firms have banking relationship with a single bank at the time of the IPO, almost one-third of the firms have lending relationships with more than 4 different banks at the time of the IPO. It appears that use of bank loan at the time of the IPO does not depend on the number of banking relationships at the time of the IPO as both the sets of IPO firms have fairly similar number of banking relationships. If we do find an association between new bank loans and reduction in the information asymmetry, then this would suggest that reduced underpricing is caused by new bank loans rather than by existing banking relationships.

<<Insert Table 7-4 here>>

In the second half of Table 7-4 we present the source of new bank loans of IPO firms. In more than half of the IPOs firms (67 out of total 113 IPOs), the new bank loan has been sourced from a single bank. Of these 67 IPOs, only 3 firms have obtained loans from a bank which didn't have prior banking relationship with the firm. All of the remaining 64 firms received bank loan from banks which had prior banking relationship with the firm. In case of IPO firms in which more than a single bank provided the new bank loan, there was just a single case in which a completely new banking relationship was formed. Thus, it is clear from the above analysis that new bank loans at the time of the IPO do not create new banking relationship. This evidence is important for our analysis as Lummer and McConnell (1989) find that banks entering into new credit agreements have no information advantage relative to other investors. They find that abnormal stock returns are only associated with favourable revised credit agreements since banks obtain relative information advantage when they continue the credit relationship with their customers.

7.6.2 Determinants of New Bank Loan at the Time of IPO

In this section we examine the determinants of new bank loan as disclosed by IPO firms in the offer document. Since the decision to raise finance from alternative sources is essential a capital structure decision, we follow the capital structure literature and the evidence from

descriptive statistics to identify factors that determine new bank loan at the time of IPO. Prior research has shown that firm size and firm age have a bearing on leverage. While the trade-off theory predicts larger and more matured firms to have relatively more debt, the pecking order theory suggests an inverse relationship between leverage and firm size and between leverage and firm age (Frank and Goyal, 2009). Thus we use logarithm of total assets (*LnTa*) as a measure of firm size. In addition to *LnTa*, we also use logarithm of prior year's sales *(LnPySales)* and the logarithm of total project costs *(LnPrjCost)* as additional proxies for the size of the firm.

<<Insert Table 7-5 here>>

Following the literature we also include profitability (*Profit*) of firms as a determinant of bank loan. While Jensen (1986) predicts a positive relationship between profitability of firms and leverage, some more recent papers have argued that such a relationship is negative (Kayhan and Titman, 2007). We use operating margin as a proxy for firm profitability. We also include growth (*growth*) since it has been shown that growth and leverage are negatively related (De Jong et al., 2008). We use the average sales growth for three years prior to the IPO year (King and Santor, 2008) as a measure of growth. Since the degree of past leverage will have an impact on additional bank lending we include the total long-term debt and total leverage of the firm as additional control variables. We also include the difference between pre and post IPO promoters' holding (*OwnerDil)* and control for industry fixed effect by including a dummy variable, *HiTech*, which equals to one for IPOs in the hi-tech industry (information technology and bio-technology industry) and 0 otherwise. Table 7-5 shows results from the probit regression model where robust t-statistics are reported.

In regressions (1) – (3) we include the total sample of IPOs. In regression (4) and (5) we only include IPOs with gross proceeds of less than 2000 million INR and less than 1000 million INR respectively. As reported in the descriptive statistics section, our probit regression results from all specifications show that larger firms are less likely to seek additional bank loan at the time of the IPO to finance their projects. This holds true for both

our measure of the size of the firm: total assets and prior year's sales. This provides support to view that firms with higher levels of information asymmetry are more likely to have new bank loans at the time of the IPO. However, once we control for the size of the firm, we find that firms with larger project costs are more likely to use bank loan as additional source of finance. While the finding that IPOs with larger projects seek addition funding through bank loan is not necessarily surprising, it is the combination of the size of the firm and the project cost that appears to be remarkable. Our analysis suggests that by borrowing at the time of the IPO firms are able to pursue larger projects than the projects pursued by similar sized firms without such bank lending.

We also find that IPO firms with new bank loans have significantly higher long term debt than those without new bank loans at the time of the IPO. This is consistent with Maskara and Mullineaux (2011b), who find that firms which are highly levered are more likely to borrow than firms which are less levered. A further possible explanation for higher leverage firms using bank loan at the time of IPO could be that firms with previous banking relationship find it easier to raise further debt to finance their projects. Our results reported in Table 7-5 are, in general, supportive of the pecking order theory explanation since firms with higher project costs, higher total leverage[66], lower total assets and lower profitability are more likely to use new bank loan.

7.6.3 New Bank Loans and the Participation of Institutional Investors

In this section we examine the impact of new bank loan at the time of the IPO on the participation of institutional investors (QIBs). We run a multivariate OLS regression results while controlling a number of factors associated with investors' participation. To examine the influence of bank loan on QIB investors' participation, we use two dependent variables. In regressions (1) – (3) we use the logarithm of one plus the demand multiple of QIB investors (*LnDmtlQIB*) as on the final day of the bidding period. In regressions (4) –(6) we use the logarithm of one plus the demand multiple of QIB investors as on the penultimate day of the bidding period ($LnDmtlQIB_1$) to examine the early participation of QIB

[66] For robustness purposes we also use the debt ratio as a proxy for leverage. Results are conclusively similar.

investors. In regressions (1) and (4) we include the whole sample, in (2) and (5) we only include IPOs with gross proceeds of less than 2,000 million INR and in regressions (3) and (6) we include only IPOs with gross proceeds of less than 1,000 million INR. Our main independent variable is the bank loan dummy variable (*BkLoan)* which takes the value of one for IPOs with new bank loan at the time of the IPO and zero otherwise. The results of the regression models are presented in Table 7-6 where the reported t-statistics are adjusted for heteroskedasticity.

<<Insert Table 7-6 here>>

We include a number of control variables that have been found to influence institutional investors' participation in IPO. Our choice of independent variables is guided by prior research (Derrien, 2005, Rocholl, 2009) and we include as our control variables the size of the issue (*LnGpcds*, log of gross proceeds), recent market return (*Mkt3Mw*), recent market volatility (*MktVol*), log of one plus age of the firm (*LnAge*) and an industry dummy (*HiTech*) which take the value of 1 for IPOs in the hi-tech industry (information technology and bio-technology) and zero otherwise. *Mkt3Mw* is the weighted average of the buy-and-hold returns on the BSE Sensex index in the 3 months before the IPO date where weights are 3 for the recent month, 2 for the next and 1 for the third month before the offering. *MktVol* is the standard deviation of the index returns one month prior to the offer issue date. We also include underwriter reputation (*LbmRep)* dummy variable as it is likely that more reputed underwriters will attract large institutional investors compared to less reputed ones. Further, we also include a dummy variable to distinguish between fixed price IPOs and auction/bookbuilding IPOs (*mechanism)*.

In all our regression models our main independent variable, the bank loan dummy variable, is negative and statistically significant. Not only the coefficient on final QIB demand (*LnDmtlQIB*) but the coefficient on early demand of QIB investors ($LnDmtlQIB_1$) is negative and statistically significant. Thus, the presence of new bank loan at the time of the IPO does not appear to bring in greater participation by informed institutional investors. Further, as shown in regressions (2) & (3), and (5) & (6), we find that the coefficient on the

bank loan variable is negative and significant in the restricted sample where we only use small firm IPOs who are more likely to have bank loan at the time of the IPO. Further, we observe similar results with limited sample size for early QIB participation. While the result is contrary to most of the prior studies on bank loan announcements, it is consistent with the findings reported by Maskara and Mullineaux (2011a). If bank loans are indeed unique we should have observed a much higher participation from the informed institutional investors in IPOs with new bank loans at the time of the IPO. Our analysis provides a strong evidence of the view that bank loans are not unique form of finance.

The coefficient on the recent market return variable is positive and significant in all our regression models suggesting that the participation of QIB investors is positively influenced by recent high market returns. Further, we find that coefficient on the underwriter reputation variable is positive and significant in regressions (1) – (3) while it is not significant in regressions (4) – (6). This suggests that while the total demand submitted by QIB investors is influenced by the reputation of underwriter, early participation does not appear to be influenced by such reputation. Further, we find that the coefficient on the Hi-Tech variable is positive and significant suggesting that hi-tech firms attract more large institutional investors. The coefficients on the age and the allocation mechanism variables are not significant.

<<Insert Table 7-7 here>>

7.6.4 Robustness Tests

Commercial Bank & Prior Borrowing

Schenone (2004) reports evidence which suggests that participation of commercial banks as underwriters to the IPO serves as a certification of IPO quality. Hence, it is likely that institutional investors may place more value for commercial bank as an underwriter rather than new bank loans at the time of the IPO. To control for this effect we create a dummy variable, *CbkLbm,* which equals to 1 if the lead underwriter is a commercial bank or if the underwriter is affiliated to a commercial bank and 0 if the underwriter is an investment

bank. If the underwriting reputation of the commercial bank is influential, we should find a positive relationship between *CbkLbm* and QIB investors' participation.

Further, James and Wier (1990) report that IPOs of firms that have established borrowing relationship experience lower information asymmetry. It may be plausible to assume that pre-IPO borrowing relationship might be more important that new borrowing relationship established at the time of the IPO. To control for this we also include a new variable in our regression analysis to account for the effect of pre-IPO borrowing relationship by using the amount of loan funds (both secured and unsecured) at the time of the IPO, excluding the new bank loan. We capture the strength of this relationship by *LoanRatio*, which is calculated as a ratio of total loan to total assets at the time of IPO. Since almost all IPO firms in our sample have loan funds, we use a continuous variable to capture the effect of pre-IPO borrowing relationship.

Table 7-7 reports the regression presented in Table 7-6 by including *CbLbm* and *LoanRatio* as additional control variables. The coefficients on both the additional variables is insignificant in almost all the regressions while the coefficients for new bank loan and other control variables remain significant and consistent with those reported earlier. Thus, neither the presence of commercial bank as the underwriter nor prior borrowing relationship appears to influence the participation of informed institutional investors.

<<Insert Table 7-8 here>>

Institutional Investors' Participation on the basis of Bids

In this section we re-run our analysis by using the number of bids submitted by QIB investors rather than using the demand multiple variable. As such, we re-run the regression reported in Table 7-8 by using the log of bids submitted by QIB investors as the dependent variable. Since we only have the total bids submitted by QIB investors, we are only able to run the regression on the final bids submitted by QIB investors. As we have done earlier, we use three different regressions: (1) the total sample, (2) IPOs with gross proceeds of less than 2000 million INR and (3) IPOs with gross proceeds of less than 1000 million INR. Result of the regression analysis is presented in Table 7-8 where the reported t-statistics are

adjusted for heteroskedasticity. The results using QIB investors' bids are similar to those reported using the demand multiple variable. Except for the hi-tech variable all other variables retain the same sign on the coefficient and the statistically significance is also very similar. Thus, the use of investors bids also support our earlier findings that bank loans do not appear to be unique and their presence does not lead to an increased participation of informed institutional investors.

7.7 Conclusions

Information asymmetry among IPO participants is considered as a critical element in the IPO issuance process. A large bulk of the IPO literature discusses the importance of reducing information asymmetry to better price and place the offer. Further, there is comprehensive literature which discusses the uniqueness of bank loans as a form of finance. Prior literature has examined and found a strong relationship between bank loan announcements and abnormal stock returns. They attribute this relationship to the unique characteristics of banks and their important monitoring and certification functions. The role of commercial banks in new security issuance and especially their perceived value with regard to certification of the quality of the offer has also been well documented in the literature. In this study we examine the impact of new bank loan raised at the time of an IPO on information asymmetry. We argue that since the offer document is a primary source of valuable information available to investors, the information content of new bank loan should be of great importance. Further, the support as well as monitoring of on-going and future investment activities by a commercial bank should provide certification of the quality of the offer, which in turn should reduce information asymmetry of IPO firms.

The chapter utilises a sample of 294 Indian IPOs issued during the period from January 2001 to December 2008 and reports some interesting results. We find that new bank loans at the time of the IPO are only taken by very small issuers who are not able to finance their project entirely from the proceeds of the IPOs. More importantly, we find that firms that resort to bank loans have significantly larger projects compared to other firms which do not resort to such bank funding at the time of the IPO. The result is perhaps an evidence of

empire building by small business in wake of inefficient bank lending (Manove and Padilla, 1999).

Contrary to most of the prior studies on bank loan announcements, we find that presence of bank loan at the time of the IPO does not appear to reduce information asymmetry for IPO firms. We find that the participation of informed institutional investors does not appear to be high in firms who borrow new bank loans at the time of the IPO compared to those firms which do not borrow. In fact the participation of QIB investors in significantly lower in IPOs with new bank loans than in IPOs without such new bank loans. More importantly, the early participation of QIBs, a strong proxy of the quality of the offer, is also significantly lower in IPOs with new bank loans. Since the initial returns of IPOs is significantly and positively related to the participation of investors, we find that initial returns of IPO firms resorting to bank loan at the time of the IPO is significantly less compared to firms without such bank loans. Thus, while our result is in sharp contrast to the established evidence of the uniqueness of bank loans, it is consistent with the Maskara and Mullineaux (2011a) who show that prior studies on bank loan announcements are plagued by sample selection issues and that bank loans are no different from other forms of finance.

Table 7-1: Typical Indian IPO

Project Costs	Million INR	Sources of Funds	Million INR
Cost of the expansion	1,845.70	Public Issue	839.80
Issue expense	31.50	Term Loan	1,037.90
Total Project Costs	1,877.70	Total Sources of Funds	1,877.70

This table presents the objects and sources of funds as disclosed in the offer document of SEL Manufacturing Company's IPO in 2007.

Table 7-2 Descriptive Statistics

Particulars	2001	2002	2003	2004	2005	2006	2007	2008	Total	Median
Number of IPOs	4	2	5	20	54	73	100	36	294	
IPOs with Bank Loan	2	0	1	6	19	25	45	15	113	
Average Age at IPO	11	10	11	16	15	13	14	13	13.64	11.87
Mean Total Assets (M INR)	355	25,727	11,732	3,479	4,998	4,515	5,142	3,184	4,794	1,138
Mean Gross Proceeds (M INR)	268	5,220	2,193	3,349	1,903	2,352	2,832	4,279	2,725	821
LEV (%)	0.59	0.08	0.45	0.52	0.52	0.58	0.59	0.56	0.56	0.59
Total Loan Funds (%)	0.10	0.08	0.28	0.33	0.30	0.30	0.34	0.27	0.32	0.33
Promoter's Post	0.60	0.53	0.56	0.61	0.57	0.61	0.57	0.57	0.58	0.59
Raw Initial Returns (%)	0.05	-0.04	0.34	0.47	0.45	0.19	0.34	0.10	0.30	0.17
Market Adjusted Initial Returns (%)	0.18	-0.08	0.26	0.47	0.42	0.16	0.32	0.15	0.28	0.15
Market Adjusted One Month Return (%)	0.45	-0.15	0.14	0.49	0.49	0.18	0.29	-0.05	0.27	0.13
IPOs with +ve Initial Returns	2	0	5	17	45	39	62	22	192	
IPOs with -ve Initial Returns	2	2	0	3	9	34	38	14	102	
Mean Demand Multiple	0.59	2.53	12.81	21.22	24.95	15.88	27.60	9.73	22.27	8.17

This table presents the descriptive statistics of Indian IPO by year. The sample includes IPOs listed on the BSE and NSE from January 2001 to December 2008. *Age* is the time in years between the IPO offer date and the founding date. *Total assets* is the total assets of the firm for the quarter prior to the IPO as reported in the offer document. *Gross proceed* is the gross proceeds of the offer calculated by multiplying the offer price with the number of shares offered. *Leverage* is the ratio of total liabilities to total assets for the last quarter prior to the IPO. *Raw first day return (IR)* is the simple return calculated between IPO offer price and the closing price at the end of the first day of trading. *Market adjusted first day return (MIR_1)* is the difference between raw first day return (IR) and the market returns (MR) over the same period of time. Market return is the simple return calculated between the index value on the offer date and the date of listing. We use the BSE Sensex as our measure of the market return. *Market adjusted one month return* is the difference between the simple one month IPO return and the market return over the same period of time. *Total demand multiple* is the ratio of the investors' demand for shares (at and above the offer price) and the total number of shares offered. (1 US$ approximately equal to INR 45).

Table 7-3 : IPOs with and without new bank loan at the time of IPO

Particulars	Total Sample			GPCDS <2000			GPCDS <1000		
	Bank Loan	No Bank Loan	z-stat	Bank Loan	No Bank Loan	z-stat	Bank Loan	No Bank Loan	z-stat
Number of IPOs	113	181		102	132		86	88	
Average Age at IPO	14 (12)	13 (12)	-0.115	14 (12)	13 (12)	-0.592	13 (12)	14 (12)	0.947
Mean Total Assets (M INR)	2,217 (758)	6,402 (1,505)	4.604***	1,157 (615)	1,926 (1,033)	3.1198***	896 (533)	1,055 (759)	1.946*
Mean Gross Proceeds (M INR)	1131 (451)	3720 (1,020)	5.379***	584 (422)	811 (782)	3.969***	427 (381)	535 (546)	2.6459***
Mean Prior Year Sales	1521 (722)	3,717 (1,274)	3.975***	1,161 (679)	2,036 (959)	3.975***	801 (591)	1,279 (800)	2.550**
Mean Prior Year EBITDA	281 (114)	723 (244)	4.732***	167 (99)	249 (190)	4.732***	126 (87)	177 (137)	2.580***
Mean Prior Year NI	114 (49)	330 (125)	4.600***	85 (45)	125 (91)	4.600***	66 (40)	84 (69)	2.541**
Total Project Costs	2971 (1041)	4013 (969)	0.652	1,296 (706)	791 (745)	-1.7537*	923 (627)	561 (562)	-2.515**
Project Cost % of GPCDS	2.32 (1.68)	1.03 (1.00)	-11.278***	2.25 (1.68)	1.04 (1.00)	-10.1653***	2.24 (1.69)	1.10 (1.00)	-8.6602***
Total Loan Funds	0.35	0.28	-3.214***	0.34 (0.36)	0.28 (0.30)	-3.214***	0.35 (0.37)	0.29 (0.33)	-2.126**
Leverage	0.59 (0.60)	0.54 (0.58)	-1.248	0.58 (0.60)	0.53 (0.58)	-1.410	0.57 (0.60)	0.55 (0.59)	-0.345
Promoter's Diff	0.30 (0.27)	0.21 (0.20)	-5.1048***	0.30 (0.27)	0.23 (0.24)	-3.8979***	0.32 (0.29)	0.27 (0.25)	-2.4229**
Raw Initial Returns	0.25 (0.12)	0.32 (0.18)	2.0110**	0.26 (0.14)	0.37 (0.25)	2.1461**	0.28 (0.14)	0.36 (0.15)	1.257
Mean Issue Costs	0.07 (0.08)	0.06 (0.07)	-3.617***	0.08 (0.08)	0.07 (0.07)	-2.2617**	0.08 (0.08)	0.07 (0.08)	-1.2867
Market Adjusted Initial Returns	0.24 (0.06)	0.31 (0.18)	2.008***	0.25 (0.08)	0.35 (0.25)	2.226**	0.26 (0.08)	0.34 (0.13)	1.460
Market Adjusted One Week Return	0.24 (0.07)	0.33 (0.21)	2.1401**	0.24 (0.07)	0.37 (0.25)	2.0497**	0.26 (0.06)	0.37 (0.12)	1.154
Market Adjusted One Month Return	0.19 (0.01)	0.31 (0.18)	2.4842**	0.19 (0.00)	0.36 (0.22)	2.559**	0.20 (0.00)	0.36 (0.07)	1.7067**
Mean Demand Multiple- QIB	12.51 (4.76)	31.61 (14.14)	5.047***	10.54 (4.10)	24.10 (10.09)	5.047***	9.25 (3.92)	18.05 (3.63)	2.101**
Mean Demand Multiple- NII	16.10 (2.91)	42.70 (18.84)	4.371***	15.21 (3.44)	43.43 (15.33)	4.371***	13.49 (3.02)	32.2 (7.75)	1.548
Mean Demand Multiple-RII	8.74 (3.57)	15.47 (6.80)	2.679***	9.08 (3.63)	18.04 (8.15)	2.679***	9.39 (3.50)	18.04 (6.25)	2.085**
Mean Demand Multiple	11.38 (4.07)	26.68 (12.42)	4.765***	10.56 (4.04)	23.55 (9.43)	4.765***	9.81 (3.75)	18.56 (6.88)	1.942*
IPOs with -ve Initial Returns	47	55		40	35		32	27	

The sample includes IPOs listed on the BSE and NSE from January 2001 to December 2008. All values are reported in Indian Rupees (INR) and adjusted for inflation using consumer price index. All values are reported in 2004 INR. Total Loan refers to loans outstanding (both secured and unsecured) at the time of the IPO excluding the new bank loan. (1 US$ approximately equal to INR 40).

Table 7-4: Nature of Bank Loans

Particulars	*Banking relationships with number of Banks at the time of IPO*					
	1	2	3	4	> 4	Total
IPOs with new bank loans	22	21	16	18	36	113
IPOs without new bank loans	24	30	30	31	51	166
	Number of Banks providing new bank loans					
IPOs with New bank loans	1	2	3	4	> 4	Total
Number of IPO firms	67	14	17	8	7	113
Average new bank loan at the time of IPO (million INR)	144	131	119	245	454	
New Banking relationship	3	1	0	0	0	4
Partial new banking relationship	0	5	5	5	7	22
Proportion of new bank loans provided by existing banking relationship (%)	95.52	92.86	100.00	100.00	100.00	96.46

This table presents the nature of banking relationship of IPO firms during in our sample. This table also shows the nature of new bank loans with respect to banking relationships.

Table 7-5: Determinants of Bank Loan at the Time of IPO

	All (1)	All (2)	All (3)	Gpcds<2000 (4)	Gpcds<1000 (5)
LnTa	-0.866***		-0.800***	-0.991***	-0.938***
	(-4.46)		(-5.13)	(-5.34)	(-4.59)
LnPySales		-0.290***			
		(-3.38)			
LnPyNi	-0.155	-0.178	-0.190**	-0.317**	-0.433**
	(-1.52)	(-1.60)	(-2.01)	(-2.49)	(-2.47)
LnPrjCost	0.779***	0.214**	0.713***	1.153***	1.146***
	(4.38)	(2.38)	(4.76)	(6.19)	(5.66)
LtDebt	2.007***	1.267***		2.525***	2.896***
	(3.09)	(2.88)		(4.13)	(3.75)
Lev			1.500***		
			(2.94)		
OwnerDil	2.144**	2.850***	1.848**	1.623*	1.005
	(2.46)	(3.98)	(2.39)	(1.73)	(0.99)
LnAge	0.117	0.114	0.157	0.223	-0.0852
	(0.86)	(0.97)	(1.15)	(1.62)	(-0.49)
Growth	0.1131	0.1012	0.0923	0.0765	0.0676
	(0.84)	(0.71)	(0.97)	(0.82)	(0.56)
HiTech	-0.119	-0.0617	-0.0901	0.139	0.232
	(-0.51)	(-0.26)	(-0.39)	(0.49)	(0.65)
Constant	-0.975	-1.176	-1.070	-2.397**	-1.965
	(-1.25)	(-1.52)	(-1.38)	(-2.11)	(-1.46)
Observations	294	294	294	234	174
Pseudo R^2	0.284	0.202	0.253	0.271	0.240

Determinants of new bank loan at the time of the IPO. This table presents the results of the probit regression examining the determinants of new bank loan at the time of the IPO. The dependent dummy variable is bank loan with takes the value of 1 for IPOs with new bank loan at the time of IPO and 0 otherwise. *LnTa* is the logarithm of total assets. *LnPySales* is the logarithm of prior year sales. *LnPyNi* is the log of prior year's net income. *LnProjectCost* is the log of total cost of the project as mentioned in the prospectus. *LtDebt* is the ratio of total long-term debt and the total assets of the firm at the time of IPO. *OwnerDil* is the difference in percentage of promoters' pre and post IPO holdings. *LnAge* is the log of age at the time of IPO. *Growth* is the three year average sales growth at the time of the IPO. *HiTech* is a dummy variable which takes the value of 1 for IPOs in the information technology and biotechnology industry and 0 otherwise. Heteroskedasticity adjusted t statistics are in parentheses.

Table 7-6: Bank Loan and QIB Participation

	All	Gpcds<2000	Gpcds<1000	All	Gpcds<2000	Gpcds<1000
	(1)	(2)	(3)	(4)	(5)	(6)
BkLoan	-0.475***	-0.408***	-0.267**	-0.462***	-0.502***	-0.441**
	(-3.38)	(-2.73)	(-2.05)	(-3.36)	(-3.23)	(-2.42)
LbmRep	0.761***	0.765***	0.635***	0.276	0.274	0.234
	(4.82)	(4.68)	(3.30)	(1.61)	(1.52)	(0.89)
LnGpcds	0.185**	0.247*	-0.0722	0.281***	0.155	-0.0674
	(2.37)	(1.81)	(-0.37)	(3.30)	(1.13)	(-0.30)
Mkt3mw	5.579***	4.239***	4.004***	4.366***	4.085***	2.357*
	(5.34)	(3.62)	(3.00)	(4.22)	(3.25)	(1.88)
MktVol	-7.440	-18.91	-16.69	13.21	5.842	-2.771
	(-0.61)	(-1.40)	(-1.05)	(1.17)	(0.48)	(-0.21)
LnAge	0.00624	0.0865	0.177*	-0.0773	0.109	-0.0847
	(0.07)	(0.88)	(1.66)	(-0.57)	(0.89)	(-0.60)
HiTech	0.550***	0.794***	0.810***	0.386*	0.449*	0.591*
	(2.70)	(3.55)	(2.80)	(1.85)	(1.71)	(1.77)
Mechanism	0.0752	0.130	-0.0861	-0.164	-0.211	0.0341
	(0.39)	(0.62)	(-0.38)	(-0.31)	(-0.35)	(0.06)
Constant	0.607	0.136	1.779	-0.980	-0.508	1.485
	(0.98)	(0.14)	(1.26)	(-1.47)	(-0.51)	(0.93)
Observations	288	229	170	118	90	60
Adjusted R^2	0.352	0.326	0.216	0.436	0.305	0.149

This table presents the OLS regression on the determinants of QIB participation. The dependent variable in regressions (1)- (3) is the log of one plus the demand multiple of QIBs on the final day of bidding period while in regression (4)-(6) is the log of one plus the demand multiple of QIBs on the penultimate day of bidding. In regressions (1) & (4) we include the total sample, in (2) & (5) only IPOs with gross proceeds of less than 2000 million INR, and in regressions (3) & (6) only IPOs with gross proceeds of less than 1000 million INR. *BkLoan* is a dummy variable which takes the value of 1 for IPOs with new bank loan at time of IPO and 0 otherwise. *LbmRep* is a dummy variable which takes the value of one for IPOs managed by reputed underwriters and 0 otherwise. *LnGpcds* is the log of the gross IPO proceeds. *Mkt3Mw* is the weighted average of the buy-and-hold returns on the BSE Sensex index in the 3 months before the IPO date where weights are 3 for the recent month, 2 for the next and 1 for the third month before the offering. *MktVol* is standard deviation of the index returns one month prior to the offer issue date. *LnAge* is the log of one plus the age of the firm at the time of IPOs. *HiTech* is a dummy variable with value of 1 for IPOs in the information technology and biotechnology industries and 0 otherwise. Mechanism is a dummy variable with a value of one for IPOs issued by fixed price mechanism and 0 otherwise. White heteroskedasticity-consistent *t*- statistics are in parentheses. ***,**, and * denote the difference is significant at less than 1, 5, and 10 percent level, respectively.

Table 7-7: Robustness Tests: Existing Long-term Debt and Commercial Bank Lead Underwriter

Dep var: LnDmtlQIB	All	Gpcds<2000	Gpcds<1000	All	Gpcds<2000	Gpcds<1000
	(1)	(2)	(3)	(4)	(5)	(6)
BkLoan	-0.402***	-0.322**	-0.118	-0.471***	-0.511***	-0.328*
	(-2.83)	(-2.13)	(-0.67)	(-3.23)	(-3.11)	(-1.81)
LoanRatio	-0.605*	-0.406	-0.423	0.0253	0.308	-0.0152
	(-1.80)	(-0.97)	(-0.82)	(0.06)	(0.57)	(-0.02)
CbLbm	0.124	0.00165	0.0698	0.0376	0.0323	-0.0534
	(0.79)	(0.01)	(0.29)	(0.21)	(0.14)	(-0.16)
LbmRep	0.801***	0.801***	0.690***	0.283	0.301	0.300
	(4.99)	(4.86)	(3.60)	(1.62)	(1.64)	(1.14)
LnGpcds	0.200**	0.308**	-0.00532	0.279***	0.152	-0.0430
	(2.48)	(2.16)	(-0.03)	(2.91)	(1.08)	(-0.19)
Mkt3mw	5.494***	4.343***	4.153***	4.437***	4.123***	1.826
	(5.05)	(3.47)	(2.87)	(4.16)	(3.30)	(1.34)
MktVol	-2.747	-14.78	-8.158	14.80	9.424	-0.381
	(-0.21)	(-1.04)	(-0.48)	(1.24)	(0.75)	(-0.03)
LnAge	0.0346	0.116	0.261**	-0.0923	0.109	-0.0151
	(0.37)	(1.15)	(2.47)	(-0.66)	(0.83)	(-0.11)
HiTech	0.453**	0.714***	0.764**	0.393*	0.522*	0.601
	(2.17)	(3.09)	(2.58)	(1.80)	(1.75)	(1.56)
Mechanism	0.0791	0.158	-0.0408	-0.128	-0.146	-0.000274
	(0.41)	(0.76)	(-0.19)	(-0.23)	(-0.22)	(-0.00)
Constant	0.484	-0.327	1.045	-0.984	-0.683	1.052
	(0.78)	(-0.31)	(0.73)	(-1.43)	(-0.67)	(0.65)
Observations	275	218	161	110	82	54
Adjusted R^2	0.367	0.335	0.221	0.431	0.297	0.075

This table presents the OLS regression on the determinants of QIB participation. The dependent variable in regressions (1)- (3) is the log of one plus the demand multiple of QIBs on the final day of bidding period while in regression (4)-(6) is the log of one plus the demand multiple of QIBs on the penultimate day of bidding. In regressions (1) & (4) we include the total sample, in (2) & (5) only IPOs with gross proceeds of less than 2000 million INR, and in regressions (3) & (6) only IPOs with gross proceeds of less than 1000 million INR. *LoanRatio* is the ratio of the total loan and the total assets of the firm at the time of the IPO. *CbLbm* is a dummy variable which takes the value of 1 for IPOs managed by commercial bank underwriters and 0 otherwise. All other variables are defined in Table 7-6. White heteroskedasticity-consistent *t*- statistics are in parentheses. ***,**, and * denote the difference is significant at less than 1, 5, and 10 percent level, respectively.

Table 7-8 Robustness Tests: On the Basis of QIB Bids

Dep Var: Log of QIB Bids	All (1)	Gpcds<2000 (2)	Gpcds<1000 (3)
BkLoan	-0.548*** (-4.13)	-0.522*** (-3.38)	-0.367* (-1.88)
LbmRep	0.750*** (4.69)	0.706*** (4.08)	0.593*** (2.79)
LnGpcds	0.495*** (8.73)	0.609*** (4.65)	0.405* (1.92)
Mkt3mw	5.921*** (6.14)	5.337*** (4.51)	6.456*** (4.78)
MktVol	-17.37 (-1.54)	-27.56** (-1.98)	-12.61 (-0.79)
LnAge	0.141 (1.37)	0.164 (1.33)	0.347** (2.28)
HiTech	0.328* (1.75)	0.283 (1.16)	0.110 (0.28)
Mechanism	0.182 (0.62)	0.268 (0.88)	0.153 (0.51)
Constant	-0.402 (-0.79)	-1.038 (-1.09)	-0.526 (-0.36)
Observations	242	183	126
Adjusted R^2	0.588	0.472	0.355

This table presents the OLS regression on the determinants of QIB participation. The dependent variable in regressions (1) - (3) is the log of one plus the number of bids submitted by QIB investors. In regression (1) we include the total sample, in (2) only IPOs with gross proceeds of less than 2000 million INR, and in regression (3) only IPOs with gross proceeds of less than 1000 million INR. All other variables are defined in Table 7-6. White heteroskedasticity-consistent *t*- statistics are in parentheses. ***,**, and * denote the difference is significant at less than 1, 5, and 10 percent level, respectively.

Chapter 8 : Employee participation in IPOs

8.1 Introduction

The last couple of decades has seen a rapid growth in the number of employees owning stocks of firms in which they work (Guedri and Hollandts, 2008). The growth is largely because of employee participation in broad-based share ownership schemes such as the Employee Stock Purchase Plan (ESPP) and 401 (k) plans in the US and Save-As-You-Earn (SAYE) plan in the UK. Unlike the Employee Stock Ownership Plan (ESOPs), where generally the top executives of the firm are given stock options, broad-based ownership schemes are open to all the employees of the firm and, more importantly, participation in such schemes is voluntary. Although there is extensive research on the effects of employee stock ownership on employee attitude, commitment, and impact on firm performance, most of the research is based on ESOPs (Kaarsemaker et al., 2009). Comparatively, much less is known about the nature and motivation of employee participation in broad-based ownership schemes where such participation is voluntary (Pendleton, 2010). In this chapter, we attempt to augment the literature by examining employee participation in broad-based ownership schemes by using data from Initial Public Offerings (IPOs).

The motivation for the study arises from the intersection of two strands of literature. The first strand deals with orientation of employees when they participate in firm ownership schemes. Prior studies, for instance, have examined whether employees have a financial or control orientation when they purchase stocks of firms in which they work. The available evidence suggests that financial orientation plays a significant role in employee participation. For instance, both Degeorge et al. (2004), who examine employee participation in the privatization of France Telecom and Pendleton (2010) who examines employee participation in SAYE scheme in the UK, show that financial expectations figure more prominently than expectations about control in the determination of participation by employees. The implication of these findings is that since employees are mainly concerned with financial gains, the firm's expected return and risk will be the key determinants of their participation in such schemes (French, 1987).

The second strand of literature related to our study examines whether employees possess valuable private information when they buy stocks of the firms in which they work. Studies on the timing of option exercises (Carpenter and Remmers, 2001, Huddart and Lang, 2003, Aboody et al., 2008) and purchase of shares by employees (Babenko and Sen, 2010) examine whether employees' decision to invest predicts superior firm performance. The evidence so far is mixed. While Huddart and Lang (2003) and Aboody et al., (2009) find that executives possess timing ability in their exercise of stock options, Carpenter and Remmers (2001) do not find abnormal stock returns following stock option exercises. In a recent study, Babenko and Sen (2010), using data on shares purchased voluntarily by non-executives of the firm in the ESPP plan, find that aggregate purchases of company stock predict positive abnormal stock returns.

In this study we examine whether high employee participation in IPOs predicts superior financial and operating performance of the firm under the assumption that financial consideration influences employees' decision to participate in firm ownership schemes. The privileged position that employees have in getting access to private information should mean that they are more likely to be informed about future prospects of the firm. Employees are also more likely to be better informed about the quality of the top management, their aspirations and vision, as well as the general working environment of the firm, all of which have important implications for the financial success of the firm. Given that employees who participate in IPOs have access to inside information; the extent of their participation should be positively related to firm performance.

Reservation and allocation of shares to employees of the firm during an IPO constitutes a form of broad-based employee ownership scheme and is practiced in a number of countries[67]. In this study, we use data from Indian IPOs to examine employee participation in such a broad-based ownership scheme. Our choice of Indian IPOs as the context for examining employee participation is motivated by a number of important considerations. First, IPO firms are relatively young and there is much less analyst coverage at the time of the IPO. Hence, they provide us with a good testing ground for

[67]The section on related literature discusses countries where employees receive IPO shares.

predicting the significance of employee participation for superior firm performance because such participation is less likely to be influenced by external information.

Second, whilst most of the employee ownership schemes discussed in the literature i.e., SAYE, ESOPs and EPPS require little or no immediate cash outlay, direct purchase of shares in IPOs requires a cash investment[68]. While immediate cash investment may perhaps hinder wider employee participation due to liquidity constraints (Degeorge et al., 2004), it will however, induce them to invest carefully. Third, unlike stock options, employee participation in Indian IPOs, as in most other broad-based schemes, is voluntary. This is important as Babenko and Sen (2010) argue that voluntary participation with immediate investment will mean that only those who have valuable private information will participate in the offering. Fourth, the transparency in the Indian IPO mechanism allows investors to observe prior demand for IPO shares by various investor categories during the offer period. Thus, the predictive power of employee participation can be tested and its utility for less informed market investors be gleaned.

Our main empirical results show that IPOs with high employee participation exhibit superior financial and operating performance. We find that initial returns of IPOs with high employee participation are 20 to 35% higher than IPOs in which employee participation is low. The allocation weighted initial returns of IPOs in which employees participate heavily, is also significantly higher than IPOs with low employee participation. Our results are robust even after controlling for a large number of variables that previous research has found to be associated with IPO initial returns. In terms of operating performance, IPOs with high employee participation exhibit superior post-IPO performance on a number of measures including growth rate in sales, EBITDA profit margin and net income profit margin. The transparency in the Indian IPO mechanism allows investors to observe the participation of prior investors during the IPO offer period. Our analysis on the influence of prior investors' participation on the participation of subsequent investors shows that prior participation of other investor

[68] While IPO firms in some countries provide some discount on the offer price to employees, in the context of Indian IPO no such discount is available and the employees pay the same offer price as paid by other investors. We discuss in detail the employee share offering in Indian IPOs in the Section 8.2.2.

categories, including institutional investors, does not appear to influence the participation of employees. Overall, our results show strong evidence of employees possessing value relevant information.

Our analysis of the nature of employee participation in IPOs provides some interesting insights. First, we find that only a small fraction of the total employees of the firm actually participate in the offering. The median (mean) proportion of employees participating in IPOs is only about 14% (27%) of the total employees. Our result is consistent with the evidence from prior research which attributes low employee participation to various constraints (liquidity, income and awareness) that employees face when participating in ownership schemes (Degeorge et al., 2004, Pendleton, 2010, Engelhardt and Madrian, 2004). Second, consistent with prior research, our analysis on the determinants of the employers' decision to reserve shares for employees at the time of the IPO show that larger firms are more likely to offer IPO shares to employees than smaller firms. Further, incidence of prior employee ownership, either through direct ownership or via the stock option scheme, is also positively related to the likelihood of employee share offering in IPOs.

Our analysis of key managerial employees yields two important results[69]. First, key managerial employees (KMEs), who are likely to benefit the most from the offering, do not appear to influence the firm's decision to offer IPO shares to employees. Second, employees participating in IPOs do not appear to come from the KME category alone as KMEs' account for only about one-third of the total employee applicants. One interpretation of the result, which is consistent with Banenko and Sen (2010), is that even junior employees possess valuable private information about the firm in which they work.

The study makes important contributions to the literature. To the best of our knowledge, this is one of the first study which presents evidence of employee participation in a broad-based ownership scheme using market-based data. While prior studies have primarily used survey data to examine employees participation in ownership schemes

[69] Key managerial employees (KMEs) are the top executives of the firm as reported in the offering document.

(Pendleton, 2010), we present evidence by analysing financial and operating performance data. The evidence presented in the study also contributes to the growing literature on voluntary employee participation plans and provides strong evidence that employees are motivated by financial considerations when participating in firm ownership plans.

Further, by examining the participation of employees, we highlight a new and potentially valuable class of IPO investor that provides useful signals to the market. The study builds on the work of Khurshed et al. (2011) in the context of Indian IPOs, who find that the unmet demand of non-institutional investors is a significant determinant of initial returns. While Khurshed et al. (2011) examine the participation of institutional, non-institutional and retail investors in detail, our study extends the literature by examining the participation of employees and its information content. The findings of the study should be of interest to the issuers, investment bankers and general investors since where available, the extent of employee participation could signal the quality of the IPO. This is particularly useful in the context of Indian IPOs where the transparency in IPO mechanism allows investors to observe the participation of prior investors on a real time basis.

The rest of the chapter is structured as follows. Section 8.2 presents the related literature and develops the main hypothesis. Section 8.3 presents prior literature on employee participation in IPOs and the nature of employee offering in Indian IPOs. Section 8.4 presents the data and methodology. Section 8.5 provides descriptive statistics. Section 8.6 presents the empirical evidence and section 8.7 concludes.

8.2 Related Literature & Hypothesis

Our study is motivated by two strands of the finance and business literature. The first is related to the literature on orientation of employees when they participate in employee ownership schemes. In particular, a number of prior studies have examined whether employee share ownership in firms is motivated by financial considerations. The extrinsic model, one of the three models proposed by Klien (1987) to explain the conditions necessary for employee ownership to have a positive effect on employee attitudes, posits that employees will participate in ownership plans only if they believe their wealth will be maximized.

Prior empirical studies that have focused on the extrinsic model find strong support in its favour. In a survey of a large group of employees from a prosperous firm, French and Rosenstien (1984) find that employees viewed participation in firms as more of a financial investment rather than as a means to achieve control over the firm. By referring to the findings from earlier studies, French (1987) argues that employees may simply have a financial rather than control orientation towards share ownership and limit their expectations to a satisfactory rate of return on their investment. Buchko (1992) finds that the financial value of ownership is positively related to employee satisfaction and organization commitment. More recently, using a large data source of more than 2,500 employees from three large UK firms with established SAYE scheme, Pendelton (2010) finds that while control orientation has a small effect on employees' decision to participate in ownership schemes, financial consideration has a positive and large effect.

The other strand of the literature that is relevant to our study is the one which examines whether employees possess value relevant private information when they acquire ownership in the firm in which they work. Some studies on insider trading, option exercises and purchase and sales of company stocks by employees examine whether such investment by firm employees is driven by private information and hence can predict superior performance of the firm. Current evidence on employees' predictive ability can at best be considered as mixed. Using data on insider trading, Carpenter and Remmers (2001) examine whether exercise of options by insiders is driven by private information and find that stock options exercised during 1992-1995 period do not predict abnormal stock returns. Conversely, Huddart and Lang (2003), using a large set of proprietary data from seven large firms, find that option exercises by both top and junior employees predict future market adjusted stock returns.

Using data from employee contribution in 401 (k) plans, Benartzi (2001) and Cohen (2009) do not find evidence of employees possessing valuable private information. On the other hand, Babenko and Sen (2010), report that purchases of firm's stocks by non-executive employees through the employee stock purchase plan (ESPP) predicts abnormal stock returns and hence conclude that non-executive employees possess private information about the firm. Babenko and Sen (2010) argue that employee

participation in a voluntary employee stock purchase plan such as the ESSP is different from exercise of stock options as stock options are generally granted rather than purchased and are provided mostly to top executives. They further discuss that ESPP is also different from the 401 (k) plan as the later provides substantial discount in purchasing firm's shares and hence encourages the participation of employees who do not possess valuable private information.

In the context of IPO literature, investors have been categorised as either informed or uninformed. Owing to the lack of resources to gather and process information, retail (individual) investors are considered as uninformed investors. Large institutional investors, on the other hand, are considered as informed investors who possess information that is useful to the issuers and the underwriters (Hanley and Wilhelm, 1995, Benveniste and Spindt, 1989). Previous research suggests that retail investors do not have superior information about the quality of the offer. Koh and Walter (1989), Keloharju (1993), Amihud et al., (2003) have shown that retail investors, on average, make profit which is not significantly different from the risk-free rate of return as they tend to invest in overpriced IPOs. These sentiment traders also contribute to large initial returns and poor long term performance of IPOs (Derrien, 2005).

Institutional investors, on the other hand, are considered as well informed since they conduct extensive research before making investments. There is empirical evidence which suggests that institutional investors not only bid highly in better performing IPOs (Lee et al., 1999) but they also are favoured in allocation of IPOs that offer higher initial returns (Aggarwal et al., 2002). Recent studies in the context of auction IPOs also suggest that large institutional investors possess useful private information as their active participation in IPOs is associated with superior firm performance (Degeorge et al, 2010, Chiang et al., 2010).

Since employees enjoy privileged position in the organization with respect to receiving useful information coupled with the fact that employees bring strong financial orientation in their participation in ownership schemes motivate us to examine whether there is a positive relationship between active participation of employees and the quality of the IPO. Further, unlike institutional investors, employees are neither required to invest significant resources for acquiring information nor do they have to invest in cold

IPOs to be favoured with allocation in hot IPOs. Thus, active employee participation could provide an unbiased measure of the quality of the offer. We argue that employees being insiders are better informed about the quality of the offer and therefore their participation will be higher in IPOs with higher initial and long term returns.

H_1: Employees will participate actively (high participation) in well performing IPOs i.e. high employee participation at the time of the IPO predicts superior firm performance.

8.3 Employee Participation in IPOs and Nature of Employee offering in Indian IPOs

8.3.1 Prior Discussion of Employee Participation in IPOs

Although IPO firms in a number of countries allocate shares to its employees, very few studies have examined employee participation in the context of IPOs. How et al., (2007) report that under a preferential allocation scheme, Malaysian authorities allow IPO firms to allocate up to 5% of the issued and paid-up capital to directors and employees of the firm. In the context of Swedish IPOs, Rydqvist (1997) shows that employees are sometimes the most favoured investor category during IPO allocations. Boreikoa and Lombardo (2010) report that Italian IPO firms reserve a certain fraction of the public offering to employees, customers, and selling agents of the firm. Chen et al., (2009) show that about 10-15% of the IPO shares in Taiwan is reserved for employee subscription. A number of prior studies on Chinese IPOs also discusses IPO share allocation to employees (Su and Fleisher, 1999, Chan et al., 2004).

However, most of these prior studies only acknowledge the existence of an employee quota and do not provide detailed analytical insights regarding employee participation. To the best of our knowledge only Rydqvist (1997) and Degeorge et al., (2004) discuss employee participation in some detail. Degeorge et al. (2004) analyse the participation of employees in the France Telecom privatization IPO[70]. The study analyses data using the standard portfolio selection model and finds that employees' wealth and income have a significant bearing on their participation. Despite a number of measures adopted

[70] There are some important differences between the France telecom offering and the sample of our IPOs. We discuss these differences in detail in the section on institutional features of Indian IPOs (Section 3.1.1).

by the firm to address liquidity, the study finds that only about 60% of the firm's eligible current and former employees participated in the offer.

Using a sample of Swedish firms, Rydqvist (1997) examines employee participation in IPOs in a setting where issuers exercise significant discretion in share allocation. The paper finds that while issuers excessively underprice IPO shares and allocate a significant portion of it to employees as a tax efficient form of compensation when underpricing gains are taxed at favourable rates, the excessive underpricing disappears when tax rates become unfavourable. The Indian IPO market differs from the Swedish setting in two important ways. First, neither the underwriters nor issuers have allocation discretion in a large number of our sample. Second, unlike the fraction of shares allocated to employees in Rydqvist (1997), employees in our sample receive only a small fraction of the total offer.

Some previous studies have examined managerial self-dealing by studying the relationship between outstanding employee stock options and IPO underpricing. Taranto (2003), for instance, examines the impact of underpricing on the tax benefit of executives holding stock options and find that insiders with stock options, granted stock or restricted stock benefit from IPO underpricing. On the other hand, Lowry and Murphy (2007) examine whether executives influence the IPO offer price or the terms of options granted at the time of the IPO and find no support for the managerial self-dealing hypothesis. In the context of firm performance, Pukthuanthong et al., (2007) find that IPO firms with a balanced managerial compensation comprising of stock options and equity ownership perform better over the long run than firms with unbalanced managerial compensation.

8.3.2 Nature of Employee Offering in Indian IPOs

In a large number of Indian IPOs, a fraction of the total shares on offer is reserved for the permanent employees of the firm. The proportion of the shares reserved for the employees is on average 4-5% of the total offering. Apart from the promoters (founding owners) and directors of the firm, all other permanent employees are eligible for participation. Allocation is on a pro rata basis for oversubscribed IPOs. For undersubscribed IPOs, applications are given full allocation and the unsubscribed portion is re-allocated to other investor categories. Since there is no legal requirement to

reserve IPO shares for employees, the decision to reserve and allocate shares to employees is essentially a firm decision. Thus, our analysis of employee participation in IPOs requires two conditions: First, shares are offered to employees in the IPO (employer decision). Second, employees volunteer to participate in the shares offered by the IPO firm (employee decision).

While shares offered to employees in an IPO represents a form of broad-based ownership scheme, some of the features of employee offering in Indian IPOs are different from other broad-based employee ownership schemes that the prior literature has examined. First, where such an offer is made, employees pay the same offer price that other investors participating in the IPO do. In a large number of broad-based employee ownership schemes, such as the SAYE in UK and ESPP and 401 (k) in the US, employees receive significant discounts when they purchase employer stocks.

Second, some of the features of the offering in the privatization of France Telecom (Degeorge et al, 2004) do not apply to our sample of Indian IPOs. In case of France Telecom IPO, the government was keen to make the share offering a success for political reasons. Hence, the company adopted a number of measures to address liquidity, such as allowing employees to finance their purchase through regular salary withdrawals, and increase awareness by communicating to employees the benefits of participation in employee ownership scheme. Further, unlike in the case of Indian IPOs, former employees were also allowed to participate and a number of restrictions were imposed on the subsequent sale of shares.

8.4 Data and Methodology

8.4.1 Data

Our sample consists of IPOs listed either on the BSE and/or the NSE stock exchange between January 2000 and December 2008. The total number of IPOs issued during the period is 476. We exclude all privatization IPOs of large government owned banks and financial institutions, as they are not representative of the average sample firm. The filtering results in a total of 321 IPOs[71] of which 146 IPOs offer shares to its employees.

[71]Data on stock prices are not available on either DataStream or BSE and NSE websites for the regionally listed IPOs and, therefore, these are not included in our sample.

Table 8-1 shows the total number of IPOs issued during the sample period and a summary of IPOs which we exclude in our study.

<< Insert Table 8-1 here>>

Data on most key variables are collected from the IPO prospectus available from Perfect Filings, Thomson Research and the SEBI website. We obtain market data from DataStream and supplement these with data from the BSE/NSE websites. We use unadjusted prices to calculate IPO initial returns and use the BSE Sensex index to calculate market adjusted initial returns[72]. Data on bids and allocation are obtained from ICICI Bank's website which is one of the leading commercial and investment banks in India[73]. Data on day-by-day bidding are collected from one of India's leading IPO investment portals[74]. Data on the operating performance of IPO firms are collected from Capital IQ database.

8.4.2 Methodology

Employee participation

We use two dummy variables in our analysis of employee participation in IPOs. The first variable is EMPPAR, which is equal to 1 for IPO firms which reserve shares for its employees and 0 otherwise. The measure captures the issuing firm's decision to reserve IPO shares for its employees. The second measure is EMPHIGH, which we use to capture the difference in the degree of employee participation in IPOs. It takes the value of 1 and is referred as EmpHigh if employee subscription is at least 95% of the total employee shares on offer. It takes the value of 0 and is referred as EmpLow when employee subscription falls below the 95% threshold[75].

[72]As a measure of robustness we also use the broad BSE100 index. This did not alter the conclusions of our results.

[73]Bids and allocation data are also publicly available on the websites of some other financial and research institutions. We randomly checked these with ICICI data and found no inconsistencies.

[74]Chittorgarh. http://www.chittorgarh.com/

[75] We check the robustness of our results by repeating the analysis using alternative cut-off points at 99% and 90%. Our results remain unchanged and statistically significant. We use dummy variable to measure

Returns

To examine whether high employee participation can predict superior IPO firm performance, we calculate the initial returns of the IPO for the first day, first week and first month after the listing. We use the market adjusted initial returns (*MIR*), which is the difference between raw initial returns (*IR*) and the market returns (*MR*). We calculate *MIR* to account for any changes in the market condition between the issue closing date and the date of listing.

$$IR_j = \frac{P_{j,1} - P_{j,0}}{P_{J,0}} \quad (1)$$

where IR_j is the raw initial returns, $P_{j,1}$ is the market price of the stock on the first day of listing and $P_{j,0}$ is the offer price.

The market return is the return earned on the market portfolio, the BSE Index in our case, over the same period and is defined as:

$$MR_j = (I_{j,1} - I_{j,0}) / I_{j,0} \quad (2)$$

where MR_j is the return on the market portfolio (index), $I_{j,1}$ is the index value on the 1st day of trading and $I_{j,0}$ is the Index value on the offer closing date.

The MIR is the difference between the raw initial return and the market return and is defined as:

$$MIR_j = IR_j - MR_j \quad (3)$$

Sample selection Bias

In our analysis, the relationship between IPO returns and employee participation is examined by estimating the following treatment effect model:

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the degree of participation because a very high proportion of active (high) employee participation is concentrated over a small range of values.

$$Y_i = \alpha + \beta.X_i + \gamma.EMPHIGH_i + \varepsilon_i \quad (4)$$

where Y_i is the IPO initial returns, X_i is the set of exogenous explanatory variables, and β is a vector of parameters to be estimated. $EMPHIGH_i$ is a dummy variable which equals 1 if the IPO has high employee participation and 0 otherwise. γ is the parameter of interest and measures the relationship between initial returns and employee participation. ε_i is the error term. Since our sample of IPOs which offer shares to employees is a sub-set of the overall sample, there could be potential self-selection bias as employee participation in IPOs could be non-random and may be affected by the IPO characteristics and market conditions which in turn may also affect the degree of initial returns. We address this limitation by employing the Heckman self-selection regression model.

In the first stage of the Heckman effect model, we estimate employee participation using a probit regression:

$$EMPPAR_i = \omega.Z_i + \varepsilon_i \quad (5)$$

where $EMPPAR_i$ is a dummy variable which equals 1 for IPOs with employee participation. Z_i is a set of observable variables influencing a firm's choice of offering employee reservation in IPOs. ω is a set of coefficients, and ε_i is the error term. In the second stage, the self-selection correction term, inverse Mills ratio or $\hat{\lambda}$, is added in our main regression (5) to consistently estimate the parameters using the Ordinary Least Squares (OLS).

8.5 Descriptive Statistics

8.5.1 Full Sample

In this section, we present descriptive statistics for our total sample of 321 firms[76]. We adjust all Indian rupee denominated variables for inflation using the consumer price index which we obtain from the Global Market Information Database (GMID). We present all values in 2004 Indian rupees. As shown in Table 8-2, the mean (median)

[76] Since a very small number of firms were listed during the period 2001-03, we have grouped them together.

firm age at the time of the IPO is 13.30 (11.74) years. The mean (median) total assets of IPO firms are INR 4,555 (1,098) million while the mean (median) gross proceeds are INR 2,580 (732) million. The mean (median) leverage (total liabilities/total assets) of the IPO firm is 0.55 (0.58) and the mean (median) post IPO promoters' holding is 58% (59%). The mean (median) raw initial return (first day) for the period is 31% (16%) while the market adjusted mean (median) initial return is 30% (16%). Similarly the market adjusted one week and one month mean (median) returns are 26% (15%) and 27% (12%) respectively. The mean (median) overall demand multiple is 22.27 (8.05) times which suggests that on average the demand for IPO shares far exceeds its supply.

<<Insert Table 8-2 here>>

A notable feature of the Indian IPO market during our sample period is the high number of overpriced IPOs. In particular, during the 2006-2007 period, we find that almost one-half of the IPOs are overpriced on the first day of trading. We also calculate recent market return to examine market conditions at the time of the issue. We find that while recent market return is positive during the 2001-2003 and 2008 periods, it is negative during other periods. The result is not surprising as it is plausible to assume that issuers were more concerned about timing their issues properly during the 2001-2003 and 2008 periods as these are periods that follow the burst of internet bubble and the onset of financial crisis respectively.

<< Insert Table 8-3 here>>

Table 8-3 compares IPOs with employee share reservation with those without such reservation. Employees are reserved IPO shares in nearly one-half of our total sample of IPOs. We do not find any significant difference in firm characteristics such as assets, age, leverage, and promoter's holding between IPOs with and without employee share reservation. Further, the raw and market adjusted initial returns also do not differ significantly. The findings suggest that our analysis of IPOs only with employee share reservation is unlikely to cause sample selection issues. Nevertheless, we control for sample selection bias in our multivariate regression analysis.

<< Insert Table 8-4 here>>

8.5.2 IPOs with and without Employee Participation

In this section, we present a comparison of IPOs with high (EmpHigh) and low (EmpLow) employee participation. Table 8-4 shows the descriptive statistics for the two IPO categories. Firms with high employee participation in the IPO are larger and raise more funds than firms with low employee participation, though the difference is not significant at conventional significance levels. The difference in initial returns between the two IPO groups is, however, significantly different. While the mean market adjusted first day return for IPOs with low employee participation is only 13%, it is 36% for IPOs with high employee participation with the difference statistically significant at less than 1% significance level. The difference in IPO returns persists in the subsequent period. IPOs with high employee participation have significantly higher one week and one month returns than IPOs with low employee participation. While the market adjusted one month returns for IPOs with high employee participation is 39%, it is only 4% for IPOs with low employee participation. The univariate statistics lends strong support to the view that employees have valuable private information and their high IPO participation predicts superior financial performance.

As shown in Table 8-4, the overall demand multiple for IPOs with low employee participation is significantly smaller than for IPOs with high employee participation. Since investors can observe the demand of other investors, the significant difference in subscription that we observe in the two IPO categories could perhaps suggest that employees actively participate in only those IPOs with a high investors' demand. To control for this externality and to examine whether employees possess private information about the value of the firm, we include the demand multiple (subscription) of all investor categories in the multiple regression analysis presented in Section 8.6.2. Further we also examine whether participation of other investor categories influence employee participation in IPOs.

<< Insert Table 8-5 here>>

8.5.3 Nature of Employee Participation in IPOs

In this section, we present some descriptive statistics on employee participation in IPOs. We analyse the characteristics of the offer, firm and bids made by employees in some detail to examine whether these factors causes the difference in employee demand that we observe between IPOs with high and low employee participation.

Panel A of Table 8-5 presents some statistics on employee subscription (demand multiple), which forms the basis of our regression analysis in the following section, both for the overall sample as well as for IPOs with high (EmpHigh) and low (EmpLow) employee participation. Employee subscription, which is the ratio of shares bid to shares reserved for employees, shows how well employees participate in the IPO offering. The overall mean (median) employee subscription is 1.652 (1.00) times while it is 2.405 (1.085) and 0.457 (0.450) times for EmpHigh and EmpLow respectively. If we exclude three large observations[77], the mean (variance) for the overall sample and for EmpHigh falls to 1.024 (0.708) and 1.393 (0.756) respectively. Further, we find employee subscription in excess of two times in only a tenth of the total IPOs with employee share reservation. Thus, while we find high demand multiples for other investor categories, demand multiple for the employee category is relatively low. We later show in this section whether low employee demand multiple is due to firm and/or offer characteristics or whether it is a reflection of the nature of employee participation in broad-based employee ownership schemes.

Panel B of Table 8-5 reports the allocation weighted initial returns for EmpHigh and EmpLow IPOs. Since allocation is proportionate, employees receive full allocation in undersubscribed IPOs and receive less than what they apply for in oversubscribed IPOs (inverse of demand multiple). As shown in Table 8-5, employees participating in oversubscribed IPOs (EmpHigh) have an allocation weighted first day return (AWIR_1) of 36.18%, significantly higher than the 13.76% earned by employees who participate in undersubscribed IPOs. The difference in allocation weighted returns becomes larger subsequently with the average first month returns for employees participating in

[77] The employee subscription for Edelweiss Capital Ltd, Aurionpro Solutions Ltd and UTV Software Communications Ltd are 10.02, 25.84 and 58.32 times respectively.

oversubscribed IPOs almost 23% higher than the returns for employees participating in undersubscribed IPOs.

In Table 8-6 we analyse firm, offer and employee bidding characteristics in detail to examine the low employee demand multiple that we document in Table 8-5. Panel A of Table 8-6 shows that on average about 4-5% of the shares are reserved for the permanent employees of the firm. The difference in the proportion of shares offered to employees in EmpHigh and EmpLow firms is not significant and hence the difference does not explain the variance that we observe in employee demand multiple in the two IPO categories. We find that the total number of permanent employees across IPO firms vary significantly with a median size of about 600 employees. While the number of permanent employees is higher for EmpHigh in comparison to EmpLow, the difference is not statistically significant. We also calculate the monetary value of IPO shares on a per employee basis at the offer price. The median value of IPO shares per employee is to about eighty two thousand Indian Rupees (about US$ 2,000) for the overall sample, while it is about eighty thousand and ninety thousand for EmpHigh and EmpLow respectively.

The Indian IPO offer document contains a section on key managerial employees (KMEs) of the firm. The KMEs are senior executives who either head the functional departments of the firm and/or hold important managerial positions within the firm[78]. They are also most likely to participate in the offering as Degeorge et al., (2004) argue that income is one of the most important determinants of employee participation in ownership schemes. Further, if there is any group of employees who are most likely to influence and benefit from the decision to reserve shares for the employee category, it is most likely to be KMEs. The average number of KMEs reported is 12 and it accounts for about 4% of the total employees of the firm. The difference in the number of KMEs between EmpHigh and EmpLow is not significant and hence, at least the size of KMEs does not explain the difference that we observe in employee demand in the two IPO categories.

[78] While some offer documents include company directors as KMEs, we exclude them from our analysis as directors are not entitled to bid for shares reserved in the employee category.

<< Insert Table 8-6 here>>

In Panel B of Table 8.6, we present our analysis on employees who participate in the offering. The total number of employees applying for IPO shares varies significantly across firms with a median (mean) size of about 62 (221) applicants[79]. Further, the number of applicants in EmpHigh is significantly higher than the number of applicants in EmpLow. While the median (mean) applicant size is 78 (275) for EmpHigh, the corresponding figure for EmpLow is 50 (119). More importantly, the median (mean) fraction of employees who participate in IPOs is only about 14 % (26%). Thus, only small fraction of the total employees actually participates in the share offering. The low participation is most likely a reflection of the liquidity constraint that employees face while participating in ownership schemes (Degeorge et al., 2004; Pendleton, 2010). The average monetary value of IPO shares offered per employee, which is about eighty two thousand Indian Rupees, is a large amount of capital for the middle and low level employees working in Indian firms. Thus, it is the lack of substantial participation of firm employees which results in low employee demand multiple that we observe in Table 8-5.

The proportion of employees participating in our IPO sample is significantly lower than the proportion reported by Degeorge et al., (2004) for France Telecom IPO. While one average only about 26% of the total employees participate in our sample of Indian IPOs, Degeorge et al., (2004) report that about 60% of current and former employees participated in the France Telecom offering. As discussed in the institutional features section, the difference in employee participation levels can be attributed to various measures undertaken by France Telecom to boost employee participation including payments in instalments and effective communication about the benefits ownership of firm's shares. Further, while Indian firms offer shares to only current permanent employees, France Telecom offered shares to its former employees as well.

The group of employees who are least likely to face liquidity constraints and also be well informed about the benefits of firm ownership schemes are most likely to be the

[79] We exclude two outliers where the number of applications are significantly larger than average. The two outliers are Petronet LNG and Tata Consultancy services with 68,417 and 18,598 applications respectively.

key managerial employees (KMEs). Hence, if we assume that all the KMEs participate in a firm's IPO, their participation on average (median) will account for about 30% (17%) of the total applicants[80]. What this suggests is that while KMEs, perhaps, apply and receive the largest proportion of shares offered to employees, there are other middle and lower level employees who also participate in the firm's share offering.

Overall, our analysis on the nature of employee participation in IPOs strongly suggests that firm and offer characteristics are not significantly different between IPOs with high and low employee demand and it is unlikely that they drive the difference in employee demand that we observe in the two IPO categories.

8.6 Empirical Results

8.6.1 Determinants of employee reservation in IPOs

In this section we examine the determinants of employer's decision to reserve shares for its employees. For this analysis, we use variables that have been previously used in the employee stock option literature, which primarily rely on the principal-agent framework (Kaarsemaker et al., 2009). We use a probit regression model with EMPPAR as our dependent variable which takes the value of 1 for IPOs which offers shares to its employees and 0 otherwise.

Prior research suggests that larger firms are more likely to have employee ownership schemes than smaller firms as information asymmetries and monitoring costs increase with firm size (Kruse et al., 2008, Festing et al., 1999).We use the log of total assets at the time of IPO, LnTA, as a proxy for firm size. Prior literature also considers firms liquidity constraints in examining the prevalence of employee stock ownership. Yermack (1997), for instance, argues that firms with severe cash constraints may substitute equity for cash compensation. Further, Core and Guay (2001) find that firms facing cash flow constraints and high external cost of equity use non-executive stock options as a substitute for cash compensation. To control for liquidity constraints, we

[80] We find significant variation in employee participation. In some IPOs the number of applicants resembles the number of KMEs and as a result KMEs as a fraction of total employees appears to be high. In about 20 IPOs the number of KMEs reported is more than half that of the total applicants. Hence, the median value is a proper measure in this instance.

include a dummy variable, INFOR, which equals 1 for firms in the information technology industry and 0 otherwise as new firms in the technology industry face both liquidity constraints and have high investment requirements (Kaarsemaker et al., 2009).

It is also plausible to assume that a firm which has an employee ownership scheme prior to an IPO is more likely to offer shares to its employee at the time of an IPO. We, therefore, include previous employee ownership as one of the determinants and capture this by using PREEMP, a dummy variable which equals 1 for IPOs with either prior employee ownership and/or outstanding stock options and 0 otherwise. Following Lowry and Murphy (2007), who examine the determinants of employee stock options at the time of the IPO, we also include VC, a dummy variable which equals 1 for IPOs backed by venture capital fund and 0 otherwise, and LMREP, a dummy variable which equals 1 for reputed underwriters and 0 otherwise. We define as prestigious underwriters the top ten underwriters based on the amount of proceeds raised during the sample period (Bubna and Prabhala, 2010).

Prior literature discusses about managerial self-dealing in important firm decisions (Yermack, 1997, Lowry and Murphy, 2007). Since underpriced IPO shares are highly valuable, it is possible that top executives of the firm may influence the decision to reserve IPO shares to the employee category when initial returns are expected to be high. Hence, following Lowry and Murphy (2007), we argue that if KMEs are involved in important IPO decisions then we should expect to see a positive relationship between employee share reservations at the time of IPO and expected initial returns. To capture this, we use IR6M, average initial returns over the prior six months, as a measure of expected returns (Lowry and Murphy, 2007)[81]. To control for unspecified industry effects, we create a dummy variable, MANUFAC, which takes a value of 1 for firms belonging to manufacturing industry and 0 otherwise.

<< Insert Table 8-7 here>>

[81]Lowry and Murphy (2007) use average initial returns in industry over the prior six months as a measure of expected initial returns. Due to limited observations we use the average initial returns for all industry over the prior six months.

Column (1) in Table 8-7 reports the coefficients of the probit regression analysis, while column (2) reports the corresponding marginal effects. Consistent with evidence from prior research, results confirm that larger firms are more likely to offer shares to its employees. Our measure of firm's liquidity constraints, INFOR, is negative and statistically insignificant. The insignificance of the variable is probably due to the fact that employee ownership scheme at the time of the IPO does not necessarily translate into an alternative compensation plan. It is, perhaps, more of an opportunity provided to employees by promoters' to participate in an investment plan. On the other hand, the variable measuring prior employee ownership, PREEMP, is, positive and statistically significant at less than the 5% level suggesting that prior employee ownership has a significant influence on a firm's decision to reserve shares for its employees. We do not find any relationship between the presence of venture capital and reputed underwriters and employee share offering at the time of the IPO.

The coefficient on the expected initial returns variable (IR6M) is negative and statistically insignificant[82]. The result is interesting as it suggests that managers who participate in IPOs appear to have little or no influence on firm's decision to offer shares to its employees. The result is consistent with prior studies on internal corporate governance of Indian firms. Indian firms are traditionally family owned with promoters (founders) having significant share of ownership and control of the firm. More importantly, as prior research suggest, these promoters' also participate in the day to day operation of the firm and make all the important decisions (Young et al., 2008, Chakrabarti et al., 2008). It is, therefore, not surprising that we do not find a significant relationship between expected initial returns (IR6M) and the employers' decisions to reserve IPO shares for its employees. Offering IPO shares to employees at a time of recent high IPO returns may be important for employee retention and motivation. The insignificant coefficient on IR6M, however, indicates that firms offering IPO shares consider employees as just another class of investors.

[82] As an additional measure of expected return, we also use the recent market return. The recent market return variable is also insignificant.

8.6.2 Employee Participation in IPOs and Firm Performance

Investor categories: participation and returns

In this section, we compare the participation of employees with the participation of other investor categories. While Panel A of Table 8-8 shows the extent investors' participation of in IPOs, Panel B shows the initial returns for institutional investors, retail investors and employees. We have data on institutional and retail investor participation for 308 and 306 firms respectively. IPOs are classified as having either low or high investor participation on the basis of their subscription in their respective quota of the offer[83]. As shown in Table 8-8, on average, institutional investors' participation can be considered as high in 279 of the total 308 IPOs. The corresponding figure for retail investors is 270 out of 306 IPOs. Institutional and retail investors have high participation in a majority of IPOs. Hence, they participate highly not only in underpriced IPOs, but also in overpriced IPOs. As Panel B shows, if institutional investors had participated in only underpriced IPOs, their first day (one month) return would have been almost 20% (34%) higher.

<< Insert Table 8-8 here>>

Similar evidence emerges from the data on the sub-sample of IPOs in which employees are offered IPO shares. The participation of institutional (retail) investors is high in 91(88) out of the 97 underpriced IPOs. On the other hand, institutional (retail) investors also subscribe heavily in 39 (38) out of the 49 overpriced IPOs. On average, both classes of investors could have significantly enhanced their returns had they participated only in underpriced IPOs. In contrast, on average, employee participation appears to be much more restrained in overpriced IPOs (27 out of 49) and considerably higher in underpriced IPOs (69 of the 97). In aggregate terms, the lower participation of employees in overpriced IPOs and higher participation in underpriced IPOs contributes to significantly high overall returns. The results are even more pronounced when we consider the first week and the first month returns. This comparison on the participation of various investor categories suggests that employees possess value relevant

[83]We use the same criteria of 95% subscription threshold for institutional and retail investors to classify IPOs into high and low IPO categories.

information and hence high employee participation should predict superior financial performance of the firm.

Employee participation and initial returns: multivariate regression analysis

The univariate analyses in prior sections provide preliminary support to the view that employees possess relevant information about the value of the firm. In this section, we extend our analysis further by using a multiple regression. We use one week and one month initial returns as our dependent variables[84]. Our main variable of interest is EMPHIGH, which captures high or low employee participation. In the multiple regression setting we include a variety of control variables that have been considered relevant in the extant IPO literature.

Demand Multiple (LnDMTL). Prior research has shown that investors' demand (times subscribed) has a positive relationship with IPO initial returns (How et al., 2007, Khurshed et al., 2011). We use the log of one plus the demand multiple as a measure of investors' demand of an IPO. We also include the demand multiples of all the other investor categories, institutional investors (LnDMTLQIB), non-institutional investors (LnDMTLNII) and retail investors (LnDMTLRII). By including the demand multiple of other investor categories, we can argue more convincingly that employees have valuable private information and that their participation is not a reflection of the participation of other investor categories.

Size (Log of gross IPO proceeds, LnGPCDS). Beatty and Ritter (1986) posit that initial returns increase with *ex ante* uncertainty. More information appears to be available for larger firms and hence, such firms should have lower initial returns. We use the log of gross proceeds as a proxy for the firm size.

Retained Ownership (proportion of the shares retained by promoters, OVERHANG). Loughran and Ritter (2004) argue that the opportunity cost of underpricing is lower when promoters sell a lower fraction of the firm. Lee et al. (1996) find a positive and significant relationship between retained ownership and initial returns. We therefore

[84] Our choice of first week and first month initial return as the dependent variable follows from the findings of Khurshed et al., (2011) who find that initial returns (first day) of Indian IPOs are influenced by the unmet demands of sentiment or noisy traders.

expect a positive relationship between overhang and initial returns. As a measure of OVERHANG we use the ratio of shares retained by promoters and promoters' group to total shares issued[85].

Age (Log of Age, LnAGE). Mature firms are expected to have more information available than younger firms and therefore they should offer lower initial returns. We use the log of firm's age to capture this effect. Age is the difference between a firm's IPO year and its founding year. We follow Loughran and Ritter (2004) by using a firm's incorporated year as its founding year.

Venture capital backing (VC). Megginson and Weiss (1991) show that issues with venture capital backing have lower initial returns because the markets perceive involvement of venture capitalists as a certification of the quality of the offer. On the other hand, Lee and Wahal (2004) find a positive relationship between venture capital backing and initial returns once the selection bias is accounted for. We include in our analysis VC, is a dummy variable which takes the value of 1 if the IPO is backed by a venture capitalist and 0 otherwise.

Risk (variance of stock returns, VAR). Prior literature suggests that risky firms are expected to have higher initial returns. As a proxy for the *ex ante* risk we use the unsystematic (firm specific) risk, based on the variance of the residuals from the market model using 60 daily stock returns after listing.

Market returns (MKT30). Prior literature has shown that initial returns are positively influenced by overall markets returns at the time of the IPO (Hanley, 1993, Loughran and Ritter, 2004). As a measure of recent market returns, we use the compounded market returns on the BSE Sensex index for a period of 30 days prior to the issue opening date of the IPO.

Underwriter reputation (LMREP). Carter and Manaster (1990) argue that issues certified by reputed underwriters will have less uncertainty and therefore they predict a negative relationship between underwriter reputation and initial returns. On the other

[85]As a robustness check we also use the ratio of pre-IPO shareholders to the shares issued. Our results do not change significantly.

hand, Loughran and Ritter (2004) find a positive relationship between underwriter reputation and initial returns. They attribute this to the analyst lust hypothesis. In our analysis, LMREP is a dummy variable which takes the value of 1 for reputed underwriters and 0 otherwise. We define as prestigious underwriters the top ten underwriters based on the amount of proceeds raised during the sample period (Bubna and Prabhala, 2010).

Pure primary (PRPRM). Habib and Ljungqvist (2001) argue that selling shareholders will have more incentive to reduce initial returns as they are hurt more than retaining shareholders because of a lower issue price. We therefore expect issues with only a pure primary offering to offer higher initial returns. PRPRM is a dummy variable which equals 1 if the issue consists of only primary shares and 0 otherwise.

Listing delay (LnDAYS2LIST). For Indian IPOs we observe a considerable delay from issue closing the listing on the stock market. We expect that higher the listing delay, the higher will be the uncertainty surrounding the issue. Hence, following Beatty and Ritter (1986), we expect a positive relationship between listing delay and initial returns.

Industry controls (INDDUM). We also control for unspecified industry effects by creating two broad industry categories: manufacturing and information technology. Dummy variables MANUFAC and INFOR take values of 1 for firms in manufacturing and information technology industry respectively and 0 otherwise.

In Table 8-9 we report the Spearman's correlation coefficient matrix for the variables used in our study. The correlation coefficients suggest that multicollinearity should not be a problem in our regression analysis.

<< Insert Table 8-9 here>>

The OLS results are shown in Table 8-10 where the reported t-statistics are adjusted for heteroskedasticity. Consistent with our argument that employees possess valuable private information about the IPO firm, we find that high employee participation is positively and significantly related to initial returns. The estimated coefficients for EMPHIGH are positive and significant at less than 5% for one month returns and at less

than 10% for one week returns. Notably, the coefficients of EMPHIGH are positive and significant after controlling for the total demand and demand by other investor categories. In regressions (1) and (4) we use the total demand (LnDMTLQIB), in (3) and (5) we use institutional investors' demand and in (3) and (6) we include the demand of institutional investors along with non-institutional (LnDMTLNII) and retail investor (LnDMTLRII). In all regressions, EMPHIGH coefficeints remain positive and statistically significant[86]. The strong and positive relationship between high employee participation and high initial returns, after accounting for demand multiples of all the investor categories, suggests that increased participation by employees is due to the private information that they possess about the IPO firm and is not a reflection of the demand of other investor categories. Consistent with our evidence reported in Chapter 5, we find that both institutional investors and non-institutional investors' appear to be the most significant variable in explaining initial returns.

<< Insert Table 8-10 here>>

While not always significant, the coefficients on most of the other control variables are consistent with findings reported in the literature. Size of the issue (LnGPCDS) and age of the firm (LnAGE) are both negative and marginally significant. The coefficient on the retained ownership (OVERHANG) variable is positive though not statistically significant. The relationship between venture capital backing (VC) and initial returns is negative and marginally significant when we consider one month returns. As reported in the univariate analysis, market returns prior to the offer (MKT30) are negatively related to the initial returns. Consistent with previous studies, the pure primary offer variable (PRPRN) is positive and marginally significant. Finally, we find a lack of statistically significant association between underwriters' reputation (LMREP), risk (VAR), and listing delay (LnDAYS2LIST) and initial returns.

<< Insert Table 8-11 here>>

In Table 8-11 we re-run the analysis after controlling for sample selection bias by using the Heckman two-stage treatment effect model. We use the probit selection model

[86]We examined the VIF for the control variables in each of the regressions and found them to be within limits which indicate that multicollinearity is not a major concern.

presented in Table 8-7 as the first stage of our two-stage analysis. We argue that while pre-IPO employee ownership (PREEMP) should affect a firm's decision to reserve shares for employees, it should not affect the degree of initial returns. Hence, we consider PREEMP as our instrument variable for the two-stage regression analysis. The result of the second stage regression, which includes the sample selection factor, presented in Table 8-11 is similar to result reported in Table 8-10. The coefficients for EMPHIGH are positive and significant in all different specifications at either less than 5% or 10% significance level. The coefficients on the control variables are also similar to those reported in Table 8-10. The sample selection correction factor, Mills Lambda, is not robust in all specifications. The result is consistent with our interpretation of IR6M, the expected initial return variable, which we discuss in section 8.5.3. The insignificant sample correction factor further supports our argument that Indian IPO firms consider employees as just another class of investors and do not appear to reserve shares for employees when initial returns are expected to be high.

Employee participation and influence of the participation of other investor categories

Since the transparency in the Indian IPO mechanism allows investors to observe demand placed by prior investors, it is possible that employees may participate in IPOs on the basis of the early demand placed by other investor categories, in particular the informed institutional investors (QIBs). Although we control for aggregate investor demand in our earlier regression analysis, it is still likely that employee participation is influenced by the early participation of other investor categories. Hence, in this section, we examine the influence of the participation of other investor categories on employee participation by analysing demand prior to the close of the bookbuilding period. In addition, we also examine whether employee participation influences the participation of other investor categories.

To run this analysis we follow Khurshed et al. (2011) and use a sample of 117 IPOs for which we have daily bidding data over the offer period for the 2007-08 period. We use the final aggregate demand as the main dependent variable and the penultimate day's demand of other investor categories as the main independent variable. For regression examining the demand of retail investors (RII), for instance, we use the institutional (QIB_Pen) non-institutional (NII_Pen) and employees' (EMP_Pen) penultimate day's

demand as the main independent variable. Following Khurshed et al., (2011), we also use logarithm of age, logarithm of the gross proceeds and the reputation of the underwriter as other control variables. Results of the regression analysis are reported in Table 8-12 where the reported t-statistics are adjusted for heteroskedasticity.

<< Insert Table 8-12 here>>

Consistent with Khurshed et al., (2011), we find that the participation of retail (RII) and non-institutional (NII) investors is significantly influenced by the prior participation of institutional investors. In regressions (1) and (3), we find that the coefficient on institutional investors' penultimate day's demand (QIB_Pen) is positive and highly significant for RII and NII respectively. In regression (3) examine the influence of prior participation of QIB and NII investors on employees' participation. While the coefficients on both QIB_Pen and NII_Pen are positive, they are not statistically significant. Further, in regressions (4) and (5) we examine the influence on employee participation separately for EmpHigh and EmpLow IPOs. The coefficients on QIB_Pen and NII_Pen remain statistically insignificant for the two sub-samples. Since the early participation of other investor categories does not appear to influence employee participation it further supports our view that employees possess valuable private information about the firm in which they work.

In regression (6), (7) and (8) we examine the influence of early employee participation on the participation of other investor categories. In regression (6) and (7), where we examine the influence of prior employee participation on the participation of retail and non-institutional investors, we find that the coefficient on EMP_Pen is not statistically significant. Since prior research has shown that retail and non-institutional investors are sentiment or noisy traders (Derrien, 2005, Khurshed et al., 2011), it is not surprising that we do not find any relationship between the EMP_Pen and the participation of RII and NII investors.

In regression (8) we examine the effect of prior employee participation on the participation of institutional investors. The coefficient on EMP_Pen is statistically significant at less than 10% significance level. The positive and statistically significant coefficient on EMP_Pen and the insignificant coefficient on QIB_Pen in the employee

regression suggest that employees appear to bid early compared to the institutional investors. It is also plausible that, unlike retail and non-institutional investors, institutional investors consider employees' demand for shares while participating in IPOs. Our data limitation does not allow us to investigate this in much greater detail. However, this is a promising avenue for future research.

Employee participation and ex-post operating performance

Our analyses in the preceding sections have focussed on the financial performance of stocks. However, it is also likely that employees participating in firms may be interested in the operating performance of firms in which they invest. Hence, in this section we present a comparison of the *ex post* operating performance of IPO firms with high and low employee participation. We analyse the post IPO operating performance of our sample firms for three years following the IPO. Table 8-13 presents the median post IPO operating performance of the two groups of IPO firms. In Panel A we report the annual growth in sales while in Panel B we show the annual EBITDA profit margin. We define EBITDA profit margin as the ratio of EBITDA to total sales. In Panel C, we report the EBITDA return on assets, which is the ratio of EBITDA to total assets. Panels D and E report net profit margin and return on assets respectively. The equality of medians is tested using the Wilcoxon-Mann-Whitney nonparametric tests.

The annual growth of sales in IPOs with high employee participation is about 15% higher than those with low employee participation in the first year following the IPO with the difference statistically significant at less than 5% significance level. The differences in sales growth persist in years 2 and 3 after the IPO. In all our measures of profitability, IPOs with high employee participation have better margins than those with low participation in the year of IPO and the difference persists over the three year period following the IPO. The difference in net profit margin, in particular, increases

<< Insert Table 8-13 here>>

over time with a difference of more than 4% the second and third year following the IPO with the difference statistically significant at less than 5% significance level. Further, the difference in return on assets is also significant at less than 10% significance level in the second and third year after the IPO. The analysis of operating

performance in the years following the IPO compliments our earlier analysis and provides additional evidence of our main argument that employee participation in IPOs is based on valuable private information about the IPO firm and that such participation predicts superior operating performance of the firm.

Overall, our analysis of both financial and operating performance provides strong support of our hypothesis that high employee participation in IPOs is positively associated with the quality of the offer and that high employee participation in IPOs predicts superior firm performance.

8.7 Conclusions

Over the last few decades, employee participation in broad-based ownership schemes such as the ESPPs and 401 (k) in the US and SAYE in the UK has significantly increased the proportion of employees owing shares in the company in which they work. While there is rich literature on employee participation in ESOPs, we still know very little about employee participation in schemes where participation is voluntary. In this study, we examine whether employees possess valuable private information about the firm in which they work. More specifically, we examine whether high employee participation predicts superior financial and operating performance of the firm. Since prior research has shown that employees bring financial orientation in their participation in employee ownership schemes, we posit that high employee participation should be positively related to the quality of firm.

For our analysis we use a sample of Indian IPOs which offer shares to its employees at the time of its IPO. We find that high employee participation at the time of IPO is positively associated with subsequent superior financial and operating performance of the firm. Although a small proportion of total employees of the firm participate in the IPO offering, we find that the initial market returns and well as post IPO operating performance of firms with high employee participation is significantly higher than IPOs with low employee participation. We also find that, despite a transparent IPO mechanism, the participation of other investor categories does not appear to influence employee participation in IPOs. Further, we do not find any evidence of key managerial employees influencing important IPO decisions. Overall, our study strongly supports the notion that employees possess valuable private information about the firm in which

they work. One important implication of the study is that uninformed investors can use information on employee participation in IPOs to improve their returns on IPO investment.

Table 8-1: Sample Selection

Firms from BSE/NSE data (2002-2008) + other sources (2000-2001)		424
Less: Listed in regional stock exchanges	-79	
Less: privatization IPO	-8	
Less: firms for which no prospectus is available	-7	
Less: firms for which no market data is available	-9	
Total IPO firms		**=321**
IPO firms with employee reservation		**=146**

The Table shows the total number of Indian IPOs issued during the 2000-2008 period as well as a detailed break-down of the IPOs which we have excluded from our study. Regional stock exchanges refer to exchanges other than the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). We also exclude privatization IPOs since they are much larger than our average sample size.

Table 8-2: Descriptive Statistics

Particulars	2000	2001-03	2004	2005	2006	2007	2008	Total	Median
Number of IPOs	24	12	20	55	74	100	36	**321**	
IPOs with employee share reservation	4	1	6	25	37	54	19	**146**	
Average age at IPO	10	10	16	15	13	14	13	**13.3**	11.74
Mean total assets (M INR)	942	12,585	3,479	5,009	4,785	5,142	3,184	**4,555**	1,098
Mean net assets (M INR)	417	10,430	1,942	1,705	1,866	1,462	1,286	**1,734**	424
Mean gross proceeds (M INR)	1,308	2,715	3,722	1,820	3,225	2,434	3,233	**2,580**	732
Leverage (%)	0.47	0.34	0.52	0.53	0.57	0.59	0.56	**0.55**	0.58
Promoter's pre-IPO holdings	0.74	0.83	0.9	0.8	0.87	0.81	0.81	**0.82**	0.89
Promoter's post IPO holdings	0.55	0.54	0.61	0.56	0.62	0.57	0.57	**0.58**	0.59
Raw initial returns (%)	0.49	0.2	0.47	0.44	0.19	0.34	0.1	**0.31**	0.16
Market adjusted initial returns (MIR_1) (%)	0.55	0.21	0.47	0.41	0.16	0.32	0.15	**0.3**	0.16
Market adjusted one week return (MIR_7) (%)	-0.2	0.2	0.54	0.47	0.19	0.3	0.1	**0.26**	0.15
Market adjusted one month return (MIR_{30})(%)	0.26	0.3	0.49	0.46	0.18	0.29	-0.05	**0.27**	0.12
IPOs with +ve initial returns	15	8	17	46	40	62	22	**210**	
IPOs with -ve initial returns	9	4	3	9	34	38	14	**111**	
Market Return	0	0.06	-0.03	-0.03	-0.04	-0.04	0.08	**-0.02**	-0.04
Time closing to listing (days)	61	29	21	22	22	22	21	**22**	21
Mean demand multiple	20.98	5.27	21.22	24.74	16.34	27.6	9.73	**22.27**	8.02

The Table presents descriptive statistic for our sample which includes IPOs from January 2000 and December 2008. All values are reported in Indian Rupees (INR) and adjusted for inflation using consumer price index. All values are reported in 2004 INR. (1 US$ approximately equal to INR 40) Age is the difference between a firm's IPO year and the founding year. *Total assets* is the total assets of the firm for the quarter prior to the IPO as reported in the offer document. *Net Assets* is the difference between total assets and total liabilities of the firm for the quarter prior to the IPO as reported in the offer document *Gross proceed* is the gross proceeds of the offer calculated by multiplying the offer price with the number of shares offered. *Leverage* is the ratio of total liabilities to total assets for the last quarter prior to the IPO. *Promoter's pre & post-IPO holdings* refer to the fraction of the total shares owned by promoters' of the firm before and after the IPO respectively. *Raw initial return* is the simple return calculated between IPO offer price and the closing price at the end of the first day of trading. *Market adjusted first day, first week and first month return is* the difference between raw first day, first week and first month return and the market returns over the same period of time. Market return is the compounded return on the BSE Sensex index 30 days prior to the date of the IPO. *Time closing to listing* is the number of days between issue closure data and the listing date. *Demand multiple* is the ratio of the investors' demand for shares (at and above the offer price) and the total number of shares offered.

Table 8-3: IPOs with and without share reservation

Particulars	w/o Employee Reservation	With employee Reservation	t-statistics
Number of IPOs	175	146	
Average age at IPO	13	13	
Mean total assets (M INR)	3,678	5,606	-1.40
Mean net assets (M INR)	1,793	1,662	0.23
Mean gross proceeds (M INR)	2,378	2,822	-0.47
Leverage (%)	0.54	0.57	-1.32
Promoter's post holdings	0.57	0.57	0.33
Raw initial returns (%)	0.34	0.28	0.91
Market adjusted initial returns (MIR_1) (%)	0.33	0.27	0.96
Market adjusted one week return (MIR_7) (%)	0.25	0.27	-0.23
Market adjusted one month return (MIR_{30}) (%)	0.28	0.26	-0.53
Mean market return 30 days prior to close (MKT30)	-0.01	-0.02	1.04
Time closing to listing (days)	27	22	2.10*
Number of IPOs with venture capital funding	43	46	-1.38
Mean demand multiple	19.70	22.14	-0.45
IPOs with +ve initial returns	113	97	
IPOs with -ve initial returns	62	49	

The Table reports descriptive statistics of IPOs with and without employee share reservation at the time of IPO. All values are reported in Indian Rupees (INR) and adjusted for inflation using consumer price index. All variables are defined in Table 3. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 8-4: IPOs with high and low employee participation

Employee Subscription	EmpLow	EmpHigh	t-statistic
Number of IPOs	55	91	
Venture capital funding	14	32	-1.22
Mean age at IPO	14	13	0.19
Mean total assets (M INR)	3,489	6,886	-1.35
Mean net assets (M INR)	1,099	2,003	-1.43
Mean gross proceeds (M INR)	1,565	3,582	-1.48
Leverage (%)	0.56	0.57	-0.17
Promoters' post IPO holdings	0.57	0.60	-1.84*
Raw initial return	0.14	0.37	-3.00***
Market adjusted initial returns (MIR_1) (%)	0.13	0.36	-3.05***
Market adjusted one week return (MIR_7) (%)	0.06	0.39	-3.94***
Market adjusted one month return (MIR_{30}) (%)	0.04	0.39	-3.60***
Mean demand multiple	11.91	28.36	-3.72***
IPOs with +ve initial returns	28	69	
IPOs with -ve initial returns	27	22	

The Table reports descriptive statistics for IPOs with high (*EmpHigh*) and low (*EmpLow*) employee participation. *EmpLow* refers to IPOs with less than 95% employee subscription, while *EmpHigh* refers to IPOs with at least 95% employee subscription. All values are reported in Indian Rupees (INR) and adjusted for inflation using consumer price index. All variables are defined in Table 3. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 8-5: Descriptive statistics on employee participation and returns

Panel A: Descriptive statistics on employee subscription (demand multiple) in IPOs

Employee participation	*Full*	*EmpHigh*	*EmpLow*
Mean	1.652	2.405	0.457
Standard Error	0.439	0.704	0.043
Median	1.000	1.085	0.450
Mode	1.000	1.000	0.930
Standard Deviation	5.285	6.645	0.324
Sample Variance	27.932	44.160	0.105
Kurtosis	95.856	59.784	-1.452
Skewness	9.386	7.451	0.051
Minimum	0.000	0.962	0.000
Maximum	58.320	58.320	0.930
No of observations	146	91	55

Panel B: Orders, Allocations and Returns

Particulars	EmpLow	EmpHigh	P-value
Number of IPOs	55	91	
Valid orders per Million share on Offer	18.21	42.38	0.0712
Mean Allocation	1	0.782	
AWIR_1	0.1376	0.3618	0.0231
AWIR_7	0.1221	0.2574	0.0017
AWIR_30	0.0463	0.2749	0.0030

Panel A shows descriptive statistics of employee subscription (demand multiple) in IPO shares. *EmpLow* refers to IPOs in which employee subscription is less than 95% while *EmpHigh* are IPOs with at least 95% employee subscription. Panel B shows the number of valid orders (applications), allocation and allocation weighted returns. *Mean Allocation* is equal to 1 for undersubscribed IPOs and is the inverse of demand multiple for oversubscribed IPOs. AWIR_1, AWIR_7 and AWIR_30 are the allocation weighted returns for employees based on returns for the first day, first week and first month following the listing. *p-values* are for the t-test of the equality of means between EmpHigh and EmpLow.

Table 8-6: Firm, offer and employee bidding characteristics

Particulars	Total			EmpHigh			EmpLow		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Panel A: Firm and offer characteristics									
Total shares on offer ('000)	18,051	6,980	39,060	19,149	6,400	43,823	16,235	8,000	29,841
Shares reserved for employees (EMP) ('000)	810	212	2,704	770	200	2,837	875	325	2,492
EMP as % of total shares on offer	4.50%	4.31%	3.18%	4.37%	4.42%	3.02%	4.71%	4.00%	3.46%
Number of permanent employees	1,836	589	7,608	2,437	626	9,532	807	430	1,149
IPO shares offered per employee	1,719	493	4,757	1,210	374	2,384	1,829	552	7,059
IPO value per employee at offer price	137,556	81,683	202,341	142,121	79,995	231,225	129,093	89,612	138,287
Key managerial employees (KME)	12	11	7	12	10	8	12	12	5
KME as % of total employees	3.83%	2.22%	4.89%	3.46%	2.18%	4.37%	4.37%	2.32%	5.62%
IPO shares offered per KME	63,304	25,000	158,733	61,289	25,000	167,324	66,636	25,000	144,830
Panel B: Bidding characteristics									
Total applicants	818	62	5,877	1,232	83	7,399	119	50	297
Total applicants minus outliers**	221	62	509	275	78	589	119	50	297
Applicants as % of total employees[b]	26.48%	13.95%	54.97%	26.20%	16.57%	24.14%	26.47%	12.43%	84.26%
KME as % of total applicants**[c]	29.26%	17.04%	48.97%	23.69%	13.95%	26.68%	37.41%	19.35%	71.25%

The Table reports firm, offer and employee bidding characteristics for 146 IPOs in which shares are reserved for employees. Panel A presents the firm and offer characteristics while panel B presents employee bidding characteristics. *Total shares on offer* is the total number of shares available to all the investor categories including employees. *Shares reserved for employees (EMP)* is the number of shares reserved for employees in the IPO. *EMP as % of total shares on offer* is the fraction of employee shares to the total shares on offer. *Number of permanent employees* is the total number of permanent employees as mentioned in the offer document. *IPO shared offered per employee* is calculated by dividing the shares reserved for employees by the number of permanent employees. *IPO value per employee at offer price* is calculated by multiplying the IPO shares offered per employee with the offer price. *Key managerial employees (KME)* are the top managerial employees as reported in the IPO offer document. *KME as % of total employees* is calculated by dividing the number of KMEs by the total number of permanent employees. *IPO shares offered per KME* is calculated by dividing the number of shares offered to employees by the number of KMEs. *Total applicants* is the total number of employees who participate in the firm IPO offering. To examine the difference in mean and median between these two groups we use t-test and Wilcoxon-Mann-Whitney test respectively. The two outliers are Petronet LNG and Tata Consultancy services with 68,417 and 18,598 applications respectively. * $p<0.10$, ** $p<0.05$, *** $p<0.01$ for t-test and [a] $p<0.10$, [b] $p<0.05$, [c] $p<0.01$ for Wilcoxon-Mann-Whitney test.

Table 8-7: Probit estimates for the probability of share reservation for employees at the time of IPO

EMPPAR	Probit (1)	Marginal Coefficients (2)
LnTA	0.153**	0.061**
	(2.48)	(2.48)
INFOR	-0.144	-0.056
	(-0.64)	(-0.64)
PREEMP	0.351**	0.139**
	(2.18)	(2.18)
LMREP	0.077	0.031
	(0.44)	(0.44)
VC	0.019	0.007
	(0.11)	(0.11)
IR6M	-0.471	-0.186
	(-1.56)	(-1.56)
MANUFAC	0.101	0.041
	(0.62)	(0.62)
Constant	-1.246***	
	(-2.79)	
Observations	321	321
R^2	0.0476	0.0476

The Table reports results of probit regression model which examines the determinants of share reservation for employees at the time of an IPO. Our dependent variable is *EMPPAR* which is a dummy variable which equals one for IPOs with IPO share reservation for employees and zero otherwise. *LnTA* is the log of total assets at the time of IPO adjusted for inflation and reported in 2004 INR. *INFOR* is a dummy variable that takes the vaule of 1 for IPOs in the information technology industry and 0 otherwise. *PREEMP* is a binary variable which equals 1 for IPOs with prior employee ownership. *IR6M* is the average initial return for IPOs which were issued during the six months prior to the IPO. *LnAGE* is the log of age at the time of IPO. *LMREP* is a binary variable which equals one for reputed underwriters. *VC* is a binary variable which equals one for IPOs with venture capital backing. *MANUFAC* is a dummy variable which takes the value of 1 for IPOs in the manufacturing industry and 0 otherwise. Robust *t*- statistics are in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 8-8: IPO participation and returns for different investor categories

	Full Sample				Employee Participation Sample					
	Institutional		Retail		Employee		Institutional		Retail	
Participation	High	Low	High	Low	High	Low	High	Low	High	Low
Panel A: Investor Participation										
Number of IPOs	279	29	270	36	91	55	130	16	126	20
Underpriced IPOs	190	12	189	13	69	28	91	6	88	9
Overpriced IPOs	89	17	81	23	22	27	39	10	38	11
Panel B: Investors Returns										
Market adjusted first day returns	0.33	0.02	0.33	0.08	0.36	0.13	0.30	0.07	0.28	0.22
Return on underpriced IPOs	*0.54*	*0.24*	*0.53*	*0.43*	*0.50*	*0.36*	*0.46*	*0.43*	*0.44*	*0.62*
Return on overpriced IPOs	*-0.12*	*-0.14*	*-0.12*	*-0.11*	*-0.08*	*-0.11*	*-0.09*	*-0.14*	*-0.10*	*-0.10*
Market adjusted one month returns	0.28	0.04	0.30	0.01	0.39	0.04	0.26	0.20	0.26	0.21
Return on underpriced IPOs	*0.62*	*0.54*	*0.63*	*0.53*	*0.58*	*0.49*	*0.53*	*0.88*	*0.53*	*0.77*
Return on overpriced IPOs	*-0.23*	*-0.31*	*-0.24*	*-0.25*	*-0.24*	*-0.24*	*-0.22*	*-0.34*	*-0.24*	*-0.25*

The Table shows the participation of various categories of investors in underpriced and overpriced IPOs. Participation is considered as high if investors subscribe to at least 95% of the shares reserved for their category. We have complete data investors' participation for the entire sub-sample of IPOs with employee reservation. Data on the participation of institutional and retail investors is available for 308 and 306 IPOs respectively. *Underpriced IPOs* refers to IPOs with a positive return on the first day of trading, while overpriced IPOs refer to IPOs with a negative return on the first day of trading.

Table 8-9: Correlation matrix of the variables employed in the study

	EMPHIGH	DMIL	DMILQIB	DMILNI	DMILRI	GPCDS	TA	OVERHANG	ACE	LEV	VAR	MIR1	MIR7	MIR30	LMREP	VC	MKT30	IR6M	PRPRM	PREEMP
EMPHIGH	1																			
DMIL	0.286***	1																		
DMILQIB	0.314***	0.929***	1																	
DMILNI	0.231**	0.865***	0.708***	1																
DMILRI	0.201**	0.690***	0.431***	0.676***	1															
GPCDS	0.123	0.038	0.106	0.074	-0.057	1														
TA	0.112	0.064	0.140**	0.033	-0.076	0.636***	1													
OVERHANG	-0.140	-0.201*	-0.266**	-0.106	0.055	-0.477***	-0.442***	1												
ACE	-0.026	0.063	0.006	0.027	0.099	0.107	0.121	-0.133	1											
LEV	-0.022	0.022	0.097	-0.052	-0.119	0.140	0.245**	-0.350***	0.045	1										
VAR	0.167*	0.332***	0.380***	0.222**	0.057	0.027	0.098	-0.174*	0.036	0.081	1									
MIR1	0.246***	0.533***	0.451***	0.562***	0.501***	-0.048	-0.018	0.022	0.078	-0.151	0.139	1								
MIR7	0.312***	0.488***	0.416***	0.505***	0.423***	-0.032	0.016	0.010	-0.046	-0.127	0.129	0.812***	1							
MIR30	0.288***	0.470***	0.375***	0.438***	0.415***	-0.029	0.015	0.000	-0.031	-0.154	0.259**	0.761***	0.771***	1						
LMREP	0.059	0.366***	0.360***	0.215***	0.123**	0.224	0.262***	-0.218**	0.057	0.241**	0.160	-0.008	-0.045	0.080	1					
VC	0.099	0.306***	0.305***	0.287***	0.189*	0.124	0.194*	0.029	-0.061	-0.006	0.095	0.129	0.073	0.089	0.361***	1				
MKT30	-0.105	-0.328***	-0.289***	-0.184***	-0.151***	-0.031	-0.019	0.016	-0.096	0.089	-0.104	-0.099*	-0.182***	-0.158***	-0.058	-0.054	1			
IR6M	-0.004	0.117	-0.045	0.087	0.241**	-0.002	-0.026	-0.019	0.101	-0.112	-0.016	0.213*	0.029	0.005	0.128	0.121	0.062	1		
PRPRM	0.011	-0.064	-0.077	-0.028	0.002	-0.106	-0.034	0.068	-0.112	0.105	-0.015	0.054	0.102	0.086	-0.257**	-0.133	0.085	-0.046	1	
PREEMP	0.069	0.167*	0.150	0.116	0.047	-0.109	-0.057	0.192*	-0.136	-0.185*	0.040	0.166*	0.027	-0.006	0.141	0.225**	0.000	0.034	-0.023	1

The Table reports the correlation coefficients of the variables used in the study. * p<0.10, ** p<0.05, *** p<0.01.

Table 8-10: Relationship between employee participation and initial returns: Multivariate Regression

	MIR_7			MIR_{30}		
	(1)	(2)	(3)	(4)	(5)	(6)
EMPHIGH	0.1400*	0.152**	0.111*	0.1870**	0.191**	0.148*
	(1.88)	(2.35)	(1.74)	(2.15)	(2.26)	(1.82)
LnDMTL	0.1940***			0.2340***		
	(5.27)			(5.03)		
LnDMTLQIB		0.125***	0.0705***		0.147***	0.0839***
		(5.08)	(3.55)		(3.72)	(3.32)
LnDMTLNI			0.0856***			0.0957***
			(3.25)			(4.01)
LnDMTLRI			-0.0730			-0.0160
			(-0.81)			(-0.30)
LnGPCDS	-0.0849*	-0.0629	-0.0786	-0.0601	-0.0345	-0.0283
	(-1.87)	(-1.27)	(-1.29)	(-1.27)	(-0.79)	(-0.67)
OVERHANG	0.0226	0.0869	0.0469	0.0805	0.168	0.127
	(0.13)	(0.48)	(0.28)	(0.39)	(0.74)	(0.62)
LnAGE	-0.0947	-0.0683	-0.0425	-0.1630	-0.0549	-0.0327
	(-1.30)	(-0.92)	(-0.61)	(-1.55)	(-0.75)	(-0.48)
VC	-0.1120	-0.0470	-0.0759	-0.1670*	-0.117	-0.130
	(-1.47)	(-0.63)	(-0.97)	(-1.81)	(-1.24)	(-1.43)
VAR	0.0022	0.00213	0.00173	-0.0003	0.000375	0.000333
	(1.24)	(1.27)	(1.20)	(-0.19)	(0.24)	(0.24)
MKT30	-1.0180*	-1.032**	-1.007*	-0.0980	-0.524	-0.209
	(-1.94)	(-2.38)	(-1.77)	(-0.18)	(-0.98)	(-0.40)
LMREP	-0.0646	-0.0221	0.119	0.0090	0.0391	0.170
	(-0.68)	(-0.24)	(1.18)	(0.07)	(0.26)	(1.05)
PRPRM	0.1300*	0.180***	0.181***	0.1290	0.176*	0.174**
	(1.81)	(2.62)	(2.82)	(1.41)	(1.98)	(2.08)
LnDAYS2LIST	-0.0671	0.155	0.208	0.2050	-0.0316	-0.0926
	(-0.26)	(0.50)	(0.72)	(0.73)	(-0.07)	(-0.21)
INFOR	-0.2000*	-0.0991	-0.107	-0.1380	-0.117	-0.152
	(-1.78)	(-0.98)	(-1.16)	(-1.19)	(-1.02)	(-1.29)
MANUFAC	-0.0727	-0.130	-0.152*	-0.0401	-0.111	-0.118
	(-0.91)	(-1.64)	(-1.93)	(-0.47)	(-1.28)	(-1.49)
Constant	0.7240	-0.0748	-0.213	-0.2010	0.226	0.244
	(0.77)	(-0.07)	(-0.20)	(-0.24)	(0.16)	(0.18)
Observations	146	134	133	146	134	133
Adjusted R^2	0.381	0.352	0.466	0.337	0.290	0.396

The Table reports the results of the OLS regression model examining whether high employee participation predicts superior financial performance of the firm. MIR_7 & MIR_{30}, our main dependent variables, are the first week and first month market adjusted initial returns. MIR_7 is the dependent variable in regression (1), (2) &(3) and MIR_{30} is the dependent variables in regressions (4), (5) & (6). *EMPHIGH* is a binary variable which equals to one for IPOs with high employee participation (at least 95% subscription) and 0 otherwise. *LnDMTL* is the log of the overall demand multiple. *LnGPCDS* is the log of the gross IPO proceeds adjusted for inflation and reported in 2004 INR. *OVERHANG* is proportion of the shares retained by promoters in the post issue period. *VAR* is the variance of the residuals of the stock return for 60 days after listing using the market model. *MKT30* is the compounded return on the market 30 days prior to the IPO offering. *PRPRM* is a binary variable which equals one for pure primary offerings. *LnDAYS2LIST* is the log of days between the issue closure date and the date of listing. *LnAGE, VC, LMREP, INFOR and MANUFAC* are defined in table 8. Heteroskedasticity adjusted *t* statistics in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 8-11: Relationship between employee participation and initial returns: Controlling for sample selection bias

	MIR_7			MIR_{30}		
	(1)	(2)	(3)	(4)	(5)	(6)
EMPHIGH	0.1331*	0.1288**	0.0946*	0.1771**	0.1662**	0.1348*
	(1.75)	(1.98)	(1.68)	(1.97)	(2.02)	(1.71)
LnDMTL	0.1971***			0.2381***		
	(6.25)			(6.39)		
LnDMTLQIB		0.1343***	0.0874**		0.1561***	0.0682***
		(4.84)	(3.07)		(4.68)	(3.65)
LnDMTLNI			0.0904***			0.0824***
			(5.02)			(4.11)
LnDMTLRI			-0.0815**			-0.0232
			(-2.01)			(-0.46)
LnGPCDS	-0.0631	-0.0320	-0.0573	-0.0272	-0.0036	-0.0102
	(-1.44)	(-0.73)	(-1.40)	(-0.51)	(-0.07)	(-0.21)
OVERHANG	0.0495	0.0946	0.0553	0.1216	0.1751	0.1342
	(0.28)	(0.52)	(0.34)	(0.57)	(0.83)	(0.70)
LnAGE	-0.0896	-0.0583	-0.0357	-0.1551**	-0.0449	-0.0269
	(-1.46)	(-0.90)	(-0.62)	(-2.09)	(-0.59)	(-0.39)
VC	-0.1005	-0.0178	-0.0539	-0.1484	-0.0878	-0.1116
	(-1.12)	(-0.19)	(-0.64)	(-1.35)	(-0.81)	(-1.15)
VAR	0.0024	0.0024*	0.0019	-0.0001	0.0006	0.0005
	(1.63)	(1.67)	(1.43)	(-0.01)	(0.38)	(0.29)
MKT30	-1.1354**	-1.1421**	-1.1413**	-0.2767	-0.6356	-0.3224
	(-2.37)	(-2.43)	(-2.49)	(-0.49)	(-1.11)	(-0.57)
LMREP	-0.0347	0.0397	0.1642*	0.0544	0.1015	0.2081*
	(-0.38)	(0.43)	(1.85)	(0.50)	(0.90)	(1.89)
PRPRM	0.1475	0.2184**	0.2102**	0.1555	0.2141**	0.1994**
	(1.59)	(2.44)	(2.56)	(1.41)	(1.98)	(1.98)
LNDAYS2LIST	-0.0983	0.2201	0.2691	0.1574	0.0333	-0.0404
	(-0.60)	(0.76)	(0.97)	(0.82)	(0.09)	(-0.12)
INFOR	-0.2391**	-0.2012	-0.1784	-0.1975	-0.2192	-0.2126
	(-2.02)	(-1.53)	(-1.52)	(-1.36)	(-1.43)	(-1.56)
MANUFAC	-0.0660	-0.1481	-0.1644**	-0.0300	-0.1283	-0.1285
	(-0.78)	(-1.63)	(-2.05)	(-0.29)	(-1.23)	(-1.39)
Constant	0.3813	-0.9585	-0.9063	-0.7204	-0.6602	-0.3425
	(0.54)	(-0.92)	(-0.93)	(-0.86)	(-0.53)	(-0.29)
Mills Lambda	0.298	0.448**	0.348*	0.451*	0.449*	0.294
	(1.39)	(2.18)	(1.89)	(1.72)	(1.88)	(1.36)
Observations	321	309	308	321	309	308
Adjusted R^2	0.372	0.361	0.453	0.319	0.305	0.378

The Table reports results of the regression model examining whether high employee participation predicts superior financial performance of the firm after controlling for sample selection bias. Mills lambda is sample selection bias correction factor. All other variables are defined in Table 10. Heteroskedasticity adjusted *t* statistics in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 8-12: Determinants of investors' participation: Multiple Regression

	RII	NII	EMP	EmpHigh	EmpLow	RII	NII	QIB
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
QIB_Pen	2.036***	0.269**	0.0879	0.0483	-0.0107	1.782***	0.234***	
	(6.33)	(2.52)	(1.37)	(0.64)	(-0.16)	(4.13)	(3.53)	
NII_Pen	-0.924***		0.226	0.278	-0.101	-1.482		
	(-2.65)		(1.09)	(1.15)	(-1.04)	(-1.44)		
EMP_Pen						-0.538	1.372	10.505*
						(-0.28)	(0.18)	(1.71)
LnAge	-0.905	-0.0158	-0.0745	-0.214	0.0142	2.544	-1.199	-0.8245
	(-0.46)	(-0.04)	(-0.45)	(-1.12)	(0.10)	(1.11)	(-0.11)	(-0.09)
LnGPCDS	-6.721***	0.745	-0.0624	0.0699	-0.0448	-6.548***	0.589	11.031
	(-4.77)	(1.13)	(-0.71)	(0.57)	(-0.33)	(-3.87)	(1.34)	(2.37)**
LMREP	4.271	-1.959**	0.471	0.475	-0.0282	6.971	-1.852**	26.196**
	(1.15)	(-2.35)	(1.61)	(1.48)	(-0.09)	(1.53)	(-1.89)	(2.39)
Constant	51.76***	-3.709	0.966	0.741	0.973	42.55***	8.458*	-62.66*
	(4.07)	(-0.78)	(1.56)	(0.74)	(1.11)	(3.53)	(1.83)	(-1.74)
Observations	117	117	65	40	25	65	65	65
Adjusted R^2	0.463	0.383	0.422	0.440	0.068	0.377	0.369	0.273

The Table reports results of the OLS regression model examining the influence of the participation of prior investors on the on the participation of different investor categories. The dependent variable is the final day demand multiple of each investor category while the main independent variable is the penultimate day's demand of other investor categories. *RII, NII, QIB and EMP* refer to the final day's aggregate demand multiple for retail, non-institutional, institutional and employee investor categories. *EmpHigh* refers to IPOs with at least 95% employee subscription and EmpLow refers to IPOs with less than 95% employee subscription. *QIB_Pen*, *NII_Pen* and *EMP_Pen* refer to the penultimate day's demand multiple for institutional, non-institutional and employee investor categories respectively. All other variables are defined in Tables 8 and 10. Heteroskedasticity adjusted *t* statistics in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 8-13: Employee participation and post-IPO operating performance

Category	Year 0	Year 1	Year 2	Year 3
		Panel A: Annual growth in sales		
EmpLow		40.02%	28.95%	20.15%
EmpHigh		55.20%	38.13%	26.28%
EmpLow- EmpHigh		-15.18%	-9.18%	-6.13%
z-statistics		-2.0520**	-1.928*	-1.652*
Prob> |z|		0.0402	0.0538	0.0855
Number of obs.		146	146	123
		Panel B: EBITDA profit margin		
EmpLow	17.05%	15.55%	13.35%	12.96%
EmpHigh	22.25%	19.43%	18.65%	18.19%
EmpLow- EmpHigh	-5.20%	-3.88%	-5.30%	-5.23%
z-statistics	-1.4210	-0.7920	-2.343**	-2.576**
Prob> |z|	0.1436	0.4264	0.0368	0.0153
Number of obs.	146	146	146	126
		Panel C: EBITDA return on assets		
EmpLow	15.33%	10.86%	10.61%	9.27%
EmpHigh	15.84%	12.02%	11.62%	10.31%
EmpLow- EmpHigh	-0.51%	-1.16%	-1.01%	-1.04%
z-statistics	-0.2190	-0.3450	-1.349	-1.213
Prob> |z|	0.8369	0.7234	0.1774	0.225
Number of obs.	146	146	146	126
		Panel D: Net Income profit margin		
EmpLow	8.91%	9.35%	7.53%	3.70%
EmpHigh	12.06%	11.17%	11.87%	7.91%
EmpLow- EmpHigh	-3.15%	-1.82%	-4.34%	-4.21%
z-statistics	-1.7470*	-0.2950	-2.482**	-2.526**
Prob> |z|	0.0862	0.7681	0.0461	0.0116
Number of obs.	146	146	146	126
		Panel E: Return on assets		
EmpLow	7.50%	6.20%	5.64%	3.39%
EmpHigh	8.74%	7.82%	6.37%	4.93%
EmpLow- EmpHigh	-1.24%	-1.62%	-0.73%	-1.54%
z-statistics	-0.8910	-0.3631	-1.7831*	-1.867*
Prob> |z|	0.3732	0.7871	0.0932	0.0714
Number of obs.	146	146	146	126

This table shows the median sales growth and profitability measures for IPOs with high and low employee participation. Year 0 refers to the year of IPO while Year 1, 2 and 3 refers to the first year, second year and third year after the IPO respectively. *EBITDA profit margin* is EBITDA divided by total sales. *EBITDA return on assets* is EBITDA divided by total assets. *Net income profit margin* is net profit divided by total sales and *return on assets* is net profit divided by total assets. z-statistics are Wilcoxon-Mann-Whitney test statistics for difference in median between IPOs with low and high employee participation.* $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Chapter 9 : Conclusions, Limitations and Future Research

9.1 Summary

Since the burst of the internet bubble and some high profile accounting scandals reported in early part of last decade, there has been a great deal of interest and deliberation on the functioning of financial intermediaries. In particular, in the context of initial public offerings (IPOs), the immense discretion which underwriters enjoy in pricing and allocating IPO offerings have come under the spotlight. This coupled with the fact that IPO mechanism is characterised by completely secrecy have led to calls for reform in the IPO issuance mechanism. IPOs, which are characterised by high levels of information asymmetry make them prone to abuse and manipulation. Further, prior research in the US and some other markets has established quid-pro-quo relationships between the underwriter and investors (Reuter, 2006, Nimalendran et al., 2007). In spite of the evidence of misconduct and high profile court settlements by large investments banks on deals during the internet bubble period (Nimalendran et al., 2007), the IPO mechanism is most capital markets largely remain opaque where very little information is available about investors' participation, pricing and allocation.

In this study we examine a number of issues associated with IPOs and investors' participation in an IPO market whose characteristics are far different from those that we observe is most IPO markets. The Indian IPO market is characterised by high levels of transparency which makes it significantly different from the opaque settings of most IPO markets around the world. Information on investors' participation, such as demand for shares at different points of the offer price range and the level of demand by different investor categories, is publicly available on a real time basis on the stock exchange websites during the offer period. The availability of this important information has a number of implications for IPO research. First, it allows us to examine in significant detail the participation of investors in IPOs which until now has been examined using only a limited sample of proprietary data (Cornelli and Goldreich, 2003, Jenkinson and Jones, 2004, Degeorge et al., 2010). Second, it also allows an examination of the role that investment banks play in managing the IPO process. Third, the analysis of a transparent mechanism also allows us to weigh in the strengths and

weaknesses of a transparent mechanism which critics of bookbuilding have been advocating.

We use the information on investors' participation in the context of Indian IPOs to examine a number of issues which have been relatively less examined in the IPO literature. Since different investor categories participate and receive allocation in Indian IPOs, we examine the nature of information production from their participation during the offer period. As information on investors' participation is publicly available we carefully analyse the role of underwriters by focussing on the influence that reputation has on IPO pricing. We also analyse whether the transparency in the mechanism has any influence on the conflicts of interest that studies based on US IPOs have suggested.

In addition to the transparency in the IPO process, Indian IPOs also exhibit several other interesting characteristics. Our sample includes IPOs which have been issued in fixed price, bookbuilding and auction mechanisms. Hence, we also examine the determinants of the choice of IPO mechanism and compare the pricing efficiency of different IPO placement methods. A large number of Indian IPOs also borrow banks loans as a part of the regulatory requirement at the time of the IPO to supplement the proceeds from the offering. We examine the uniqueness of bank loans by analysing the participation of institutional investors. Finally, since a large number of Indian IPOs reserve a certain fraction of their IPO shares to their employees, we also examine the participation of employees as an investor category and analyse whether such participation is as a result of managerial influence or their ability to identity well performing firms.

We present a summary of our empirical analysis in the following sections.

9.1.1 Transparency in the IPO Mechanism (Chapter 5)

Chapter 5 tests a number of hypotheses on investors' participation, information production, pricing of IPOs. Using a sample of 306 bookbuilding and auction IPOs over a ten year period from January 2001 to December 2010, our analysis of aggregate demand shows that the transparency in the IPO mechanism creates significantly inelastic demand curves. Our analysis of the evolution of investors' demand during the offer period reveals that different investor categories take lead in subscribing to IPOs. We find that while institutional investors (QIBs) take lead in subscribing to hot and

strong IPOs, non-institutional investors (NIIs), on the other hand, appear to bid aggressively in the early stages in weak and cold IPOs. The strong early participation of these two investor categories triggers heavy participation by retail investors at the end of the offer period.

Thus, the transparency in the mechanism appears to mitigate winners' curse for retail investors as they participate in well performing IPOs by following the participation of institutional investors. However, their participation on account of early strong participation by non-institutional investors in some dubious offerings raises serious concern about investor welfare. Further, our analysis of IPO offer prices show that the favourable demand of retail investors is one of the most significant determinants of high IPO offer price. More importantly, the favourable demand of the retail investors is fully incorporated into the offer prices. We also find that less reputed underwriters exercise far less discretion in setting IPO in presence of favourable demand by uninformed investors. On the basis of our findings we suggest a change in the existing IPO regulation to protect the welfare of the retail investors.

9.1.2 IPO Initial Returns and Choice of Allocation Mechanism (Chapter 6)

Using almost the entire sample of IPOs issued during the period 2001-2010, Chapter 6 examines the determinants of choosing a particular allocation mechanism and the after-market returns of IPOs. Consistent with prior studies we find that IPOs issued with auction mechanism are least underpriced while those issued with fixed price mechanism are most underpriced. Results from our analysis of determinants of IPO allocation mechanism show that fixed price mechanism is mostly used by firms of smaller size who are exposed to higher levels of information asymmetry. Further, we find that IPOs exposed to higher risk are also more likely to use fixed price mechanism rather than auction or bookbuilding mechanism. Our analysis of bookbuilding and auction after-market initial returns suggests that the demand of informed investors (both QIB and NII) is more influential in determining initial returns (first day and first month) than the demand of retail investors. Since high demand by retail investors is already incorporated in setting high offer prices, they appear to lose significance in explaining IPO initial returns. In case of fixed price IPOs, however, retail investors' demand becomes significant in determining initial returns. Our analysis of flipping suggests that it is

primarily concentrated in cold IPOs and IPOs which are managed by less reputed underwriters.

9.1.3 New Bank Loans at the Time of the IPO (Chapter 7)

Using a sample of 294 Indian IPOs issued during the period January 2001 to December 2008 this chapter examines the impact of new bank loans made at the time of IPOs on the participation of informed institutional investors. We find that only small firms borrow new bank loans at the time of the IPO who are, perhaps, unable to finance their project entirely from the proceeds of the IPOs. More importantly, we find that firms that resort to bank loans have significantly larger projects compared to other similar firms which do not resort to such bank funding at the time of the IPO. The result is perhaps an evidence of empire building by small business in wake of inefficient bank lending (Manove and Padilla, 1999). Contrary to the findings reported in research most prior studies on bank loan announcements, we find that bank loans do not appear to be a unique form of finance. Our results show that the degree of institutional investors' participation, a proxy for the quality of the offer, is significantly smaller in IPOs with new bank loans than in IPOs without new bank loans. Further, we also find that the early participation of institutional investors is significantly less in IPOs with bank loan at the time of the IPO. Our result is consistent with a recent research which suggests that the association of bank loan announcement and abnormal stock performance is on account of sample selection issues rather than the uniqueness of bank lending.

9.1.4 Employee participation in IPOs (Chapter 8)

Chapter 8 examines employee participation in IPOs. In our analysis of employee participation in IPOs, we essentially examine whether employees, owing to their unique position in the organization, can select well-performing IPOs and whether key managerial employees influence important IPO decisions to benefit themselves. We find statistically significant evidence of high employee participation in IPOs which perform well both in terms of financial and operating performance. We find that IPOs which attract high employee participation at the time of the IPOs deliver both high initial financial returns and superior operating performance in the three years following the IPO compared to IPO firms with low employee participation. Further, we find that the participation of employees in IPOs is not influenced by the participation of informed

institutional investors. Our analysis on the influence of key managerial employees on important IPO decisions suggests that such influence is unlikely in the context of Indian IPOs. The support for hypothesis suggests that information about employee participation can be used by uninformed investors to selectively participate in high quality Indian IPOs.

9.2 Contributions of the Study

While each of our empirical chapters enumerates the contributions made by the respective study, we briefly present some of the important contributions of the study in the following paragraphs.

The research presented in the thesis comprehensively investigates investors' participation in Indian IPOs market which is characterised by high levels of transparency which is significantly different from the US and most other markets. This is important particularly since reports of abuse and manipulation by large institutional investors have renewed the calls for introducing greater transparency in the IPO process. The analysis presented in the thesis demonstrates the strengths and weaknesses of a transparent mechanism and offers valuable insights to both practitioners and regulators. As shown in this research, the findings are also relevant to the regulatory authorities in India and we make a recommendation to change the existing regulations to protect the welfare of the vulnerable retail investors. The study also makes significant contribution to the literature on information production and IPO pricing. The finding of the study also enriches the existing evidence on the participation of institutional and retail investors. Our study also provides comprehensive evidence on the role of underwriter's reputation in pricing of IPOs.

Our study on the new bank loans at the time of the IPO also makes some important contributions to the literature. The most important finding of the study is that bank loans do not appear to be a unique form of finance as has been previously reported in a large number of studies on bank loan announcements. We find that borrowing bank loans at the time of the IPO does not reduce information asymmetry as we find that IPOs with bank loans attract much less participation of the informed institutional investors that IPOs without such bank loan. Our study provides strong support to a recent study which shows that the association between bank loan announcements and abnormal stock

returns is driven by sample selection issues. Our examination of new bank loans at the time of the IPO allows us to avoid sample selection issues and presents us with an appropriate sample of control firms to examine the uniqueness of bank loans. Our study also deviates from the existing methodology in assessing the uniqueness of banks loans as we focus on the participation of informed investors rather than on the stock prices. This assumes significance in an emerging market like Indian where the level of market efficiency could be a cause for concern since a large number of retail or sentiment investors participate extensively in both IPOs and the stock market.

To the best of our knowledge, our analysis on employee participation in IPOs is one of the first to examine the investment behaviour of employees using a large sample of financial data. While most of the prior studies on employee participation in firm ownership schemes have used survey data, our studies uses stock returns to examine the ability of employees to select well-performing firms. By examining the investment behaviour of participating employees, we highlight a new and potentially valuable class of IPO investor who provide useful information about unobservable characteristics of the issuing firm. The findings of the study should be of interest to issuers, investment bankers and general investors since where available, the extent of employee participation could signal the quality of the IPO. A further contribution of the study is that it provides valuable insights on the extent and determinants of participation in a voluntary employee ownership scheme.

9.3 Limitations of the Study

Although we have made efforts to address all relevant issues and make our results as robust as possible, our study, nevertheless, does have some limitations. Our first limitation is the unavailability of detailed bid-by-bid data on investors' participation. While we have data on aggregate investors' participation in IPOs, we do have data for each individual investor would have allowed us to examine this issue in greater details. The limitation restricts us particularly in our analysis of the participation of non-institutional investors. Since our aggregate data reveals that non-institutional investors participate aggressively in weak and cold IPOs, a more detailed data on their participation would have thrown very interesting findings. The same limitation also restricts our analysis on the participation of employees in some more detail. Availability

of data at the employee level would have allowed us to examine issues of wealth and income which have a significant bearing on the participation of employees in firm ownership schemes. Further, it would also have enhanced our understanding of the participation of key managerial employees and the ability to influence important IPO decisions.

Another limitation that has constrained our analysis is the unavailability of data on the participation of various investor categories at different points of the price range. As we have shown in Chapter 5, the demand curves that we present for Indian IPOs is based on aggregate demand of all investor categories. Demand curves for each investor category would have been extremely useful in assessing the strength of the transparent Indian IPO mechanism. Since each investor category bids and receives shares from it pre-determined quota of shares, availability of demand submitted by each investor category at different points of the price range would have allowed us to analyse the influence of the participation of different investor categories on offer price in a robust manner.

Since we use a very recent data-set, it precludes us from analysis the long-run performance of Indian IPOs. Evidence of the long-run performance of Indian IPOs would have given additional insight into the usefulness of a transparent IPO mechanism as a large number of US and other countries have documented negative long run performance for IPOs. Since most of our data is hand-picked either from the prospectus or from publicly available sources such as websites, it has taken a significant time and effort to gather data necessary for empirical analysis.

9.4 Avenue for Future Research

The rich data-set available from Indian IPO market presents a number of interesting avenues for future research. First, there is very little current evidence on the association between participation of different investor categories and the long run IPO performance. We could use the information on the participation of different investor categories to examine whether some investors are better informed than others with respect to the long term performance of IPO firms. Further, since the Indian IPO market allows us to observe the participation of different categories of institutional investors (mutual funds, banks and financial institutions, foreign institutional investors, insurance companies), it also allows us to examine whether some institutional investors are more informed that

others. This analysis could yield interesting results as Jenkinson and Jones (2009) report that only one half of their respondents of a survey of large institutional investors develop their own valuation models before investing in IPOs.

The Indian IPO setting also allows us the opportunity to examine the behaviour of sentiment or noisy traders (retail investors) who appear to bear the brunt of the abuse of the transparency of the mechanism. Although our study has examined the participation of these investors in some detail there is still a significant more to learn about them who appear to invest in weak offerings in spite of the information available on the participation of informed investors and the experience of loss incurred in previous weak offerings. We aim to extend our analysis on the participation of retail investors by using data on grey market prices which we have recently gathered from a number of different sources.

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