

# Does new bank loan at the time of IPO reduce information asymmetry?

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## Abstract

Previous research has examined the role of existing bank loans in reducing information asymmetry. In this paper, we posit that new bank loans made at or just prior to the IPO should have significant information content for investors. This should reduce information asymmetry and lower underpricing of IPOs. Using data on Indian IPOs over the period 2001-2008, we find that new bank loan initiated at or just before the IPO significantly reduces information asymmetry as both underpricing and price revisions are much lower for firms with new bank loans at the time of IPO. Our results are robust to a number of control variables and sample selection bias.

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## **1. Introduction**

This paper examines whether the presence of new bank loan at the time of an initial public offering (IPO) affects information asymmetry and therefore the degree of underpricing. Underpricing of initial public offerings (IPOs) is a widely documented phenomenon and has persisted over time and across countries. There are a number of competing theories that explain underpricing. One of the main strands in the literature attributes underpricing to the information asymmetry amongst investors and the issuing firm. Rock (1986) and Benveniste and Spindt (1989) for instance, assume that only a select group of investors are well informed about the value of the firm. On the other hand, Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989), assume that only issuing firm is well informed about the value of the offer. In presence of asymmetric information amongst the participants, IPOs are underpriced to maintain equilibrium.

Further, there is a body of literature that has examined the role of bank loans in mitigating information asymmetry. Research has shown that new bank loans or renewals are associated with positive abnormal stock returns (James, 1987; Lummer and McConnell, 1989). James and Wier (1990), find that firms that have existing bank loans experience lower IPO underpricing. Monitoring, screening and certification benefits provided by banks are used in explaining why bank loans help in reducing information asymmetry. Related literature on relationship banking has shown that universal banks through their lending and underwriting functions also mitigate information asymmetry. The reduced information asymmetry arising from the involvement of universal banks in IPOs is attributed to their role in information production. Supporting empirical evidence is provided by Ang and Richardson (1994), Kroszner and Rajan (1994) and Puri (1994) for bond issues and by Ber et al., (2001) and Schenone (2004) for IPOs.

Previous literature has shown that existing bank loans and banking relationship reduce information asymmetry. This paper's aim is to provide evidence on the impact of new bank loans at the time of IPO on information asymmetry. The unique settings of the Indian IPO market provide us with an opportunity to examine whether new bank loans offer the benefit of certification of the quality of the offer. In India, most IPOs are initiated for specific projects and it is mandatory for the issuing firm to disclose both the uses and sources of funds. The regulations require firms to demonstrate confirmed sources of funding through verifiable means towards at least 75% of the required funds for the proposed project<sup>2</sup>. In many cases firms resort to bank loans to meet the financing requirements of the project<sup>3</sup>.

The paper utilises a sample of 280 Indian IPOs issued during the period January 2001 to December 2008 and finds that the presence of new bank loans at the time of the IPO significantly reduces information asymmetry. The findings show that both underpricing and price revisions are significantly less when new bank loans are used in financing of the projects by the issuing firms. Our results are robust after controlling for sample selection bias, impact of existing bank loans (James and Wier, 1990), and where commercial banks act as underwriters to the IPO (Schenone, 2004). Another notable finding is that firms which resort to bank loans are relatively

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<sup>2</sup> 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".

<sup>3</sup> Proceeds from IPO and bank loan are the two primary sources of funds. Others include promoter's contribution and internal accruals.

smaller in size. This is consistent with Diamond's (1991) hypothesis that smaller firms are more likely to use bank loans to improve their reputation for raising equity capital via the IPO market.

We make a number of significant contributions to the growing literature on bank loans and relationship banking. To the best of our knowledge, this is the first paper which examines relationship banking in the context of an emerging market. Further, while a substantial body of literature has investigated relationship banking in the context of bond markets, there are relatively few studies on IPOs where information asymmetries are far more critical. Our study also contributes towards this gap. James and Wier's (1990) study on the role of bank loan examines the impact of existing bank loans on information asymmetry. Our study, however, examines the impact of bank loans made at the time or just prior to an IPO. Since new bank loans provide implicit support for future investment activities undertaken by the IPO issuing firm, the impact of this information in the offer letter should have a more pronounced effect in reducing information asymmetry.

The rest of the paper is structured as follows. In section 2 we review the related literature and discuss Indian IPO market. Section 3 explains hypothesis development. Section 4 presents the data and data sources. Section 5 provides empirical results and Section 6 concludes.

## **2. Literature review and the Indian IPO market**

### *2.1. Information asymmetry and participation of commercial banks*

The monitoring, certification, screening and information production role of commercial banks has been widely discussed in the IPO literature. Further, a number of studies have shown that presence of commercial banks helps in reducing information asymmetry in IPOs. The role of commercial banks in reducing information asymmetry has been broadly discussed in two ways.

One set of studies have examined the impact of past bank lending relationships on information asymmetry. The other has investigated the role played by commercial banks as underwriters.

Boot (2000) highlights a number of benefits of bank loans such as exchange of information, flexibility, control of potential conflicts of interest, better monitoring, and mitigation of moral hazard among others. Diamond's (1991) study examines the reputation effect of bank loans and shows that firms may first want to borrow from banks in order to establish sufficient credibility before accessing capital markets. He suggests that reputation is a valuable asset which can help firms lower their cost of public funds. Using data on straight bond offers, Datta et al., (1999) find that firms' reputation is negatively related to yield spreads. Hoshi et al. (1993) show that bank lending exposes borrowers to monitoring which serves as a certification device facilitating simultaneous capital market funding. Both James (1987) and Lummer and Scott (1989) examine the impact of the announcement of bank loan on stock prices. They report a positive relationship between announcement of bank loan and stock prices thus supporting the positive effects of bank loans. 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. Further, Fields et al., (2006) find that bank loan relationship are particularly valuable for smaller and underperforming firms.

Commercial banks' participation 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. Benston

(1990) and Saunders and Walter (1985) argue that commercial banks monopolize underwriting business and drive out investment banks. Further, there are a number of studies that have examined the role of universal banking in underwriting bond issues. Most find support for information production hypothesis. Kroszner and Rajan (1994) find that both quality of the issue and long term performance of issuing firms are better in cases where they are underwritten by commercial banks compared to those IPOs 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 as far underpricing is concerned. Using US data Schenone (2004) examines the impact of pre-IPO banking relationship and finds lower average 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. She attributes lower underpricing to continuous monitoring by commercial banks which leads to greater information production at the time of IPO.

## *2.2. The Indian IPO market*

In this section, we present some key institutional features of the Indian primary and secondary stock markets. Most of the Indian IPOs are listed on either the Mumbai (BSE) and/or the National Stock exchange (NSE). The Mumbai Stock exchange (originally Bombay Stock Exchange) is one of the oldest stock exchanges in the world with over 4,000 listed companies. NSE is the largest exchange in terms of trading volume for both equity and derivatives and has

over 1,500 listed firms. The IPO issuance process in India is regulated by the Securities and Exchange Board of India (SEBI) which is an autonomous institution.

<<INSERT TABLE 1>>

The Indian IPO market provides an ideal case for testing certification hypothesis. 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<sup>4</sup>. 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 1 shows information that issuing firms typically disclose in an IPO prospectus. Disclosure of information about new bank loan in the prospectus allows us to test our hypothesis on whether the presence of new bank loan at the time of IPO helps in reducing information asymmetry.

Over the last decade there have been a number of significant changes in the way IPOs are priced and allocated in India. Shares in a public offer are allocated in a predetermined proportion<sup>5</sup> to

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<sup>4</sup> As far as we are aware, prospectus from most countries only discloses the uses of funds raised from the equity proceeds.

<sup>5</sup> As per the SEBI regulation retail individual investors are those who bid for securities for a value not more than INR 100,000. This limit was initial set at INR 25,000 in 1995 and has been gradually increased over the years. QIB

three different investor categories of qualified institutional (QIB), non-institutional (NI) and retail investors (RI). On average QIB, NI and RI are allocated 60%, 15% and 35% of the shares respectively<sup>6</sup>. Until the late 1990s fixed price was the only placement method available in which issue prices were fixed in advanced and shares were allocated on a proportional basis. When introduced in 1999, the US style bookbuilding quickly became the most dominant form of pricing and allocation mechanism which allowed issuers to solicit demand from investors in pricing and allocating the issue. The introduction of bookbuilding mechanism allowed discretion not only in pricing but also in allocation to institutional investors. Allocation to the two other investor categories remained on a proportional basis. Following allegation of irregularities in the IPO market in late 2005 SEBI introduced a number of changes in the bookbuilding method<sup>7</sup>. New regulations replaced discretionary share allocation to the institutional investor's category with pro-rata allocation<sup>8</sup>. The defining characteristics of this new allocation mechanism are significantly different from that used in the US and the UK. Further, unlike in the US, information on various aspects of bookbuilding such as the number of shares bid by different investor categories and the number of share allocated them is publicly available. In fact the

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refers to institutional investors such as commercial banks, mutual funds, venture capital fund, etc. All other investors who do not fall in the above two categories are referred to as non-institutional or high net worth investors.

<sup>6</sup> In case of fixed priced offering 50% of the total shares on offer is reserved for investors who bid of a value not more than INR 100,000.

<sup>7</sup> SEBI investigated an IPO scam during the 2003-2005 period where, in many issues, quota fixed for retailers were cornered by a group of influential investors through opening of multiple fictitious demat accounts.

<sup>8</sup> Some other changes included the reservation of 5% of the QIB tranche for mutual funds and introduction of IPO grading by institutions approved by SEBI.

information on the number of shares bid by different investor categories is available on a real time basis on the exchange websites where IPOs are to be listed.

### **3. Hypothesis Development**

Prior research suggests that the association of banks in the initial public offering provides quality certification due to commercial banks' better monitoring, screening and information production ability. Underpricing is, in part, attributed to information asymmetry among the IPO participants about the true value of the firm. If, as suggested in previous studies, the presence of commercial bank alleviates information asymmetry we argue that new bank loan made at or just prior to the IPOs should have similar, if not higher, impact on reducing information asymmetry. Since there is very little information available on private firms before they go public, the IPO offer document is considered as a valuable source of information by investors. While the banking relationship developed through historical bank lending has been shown to influence the degree of underpricing (James and Wier, 1990), the impact of new bank loans at the time of IPO is likely to be far greater because this will imply bank's ongoing support to firms' future investment projects. Further, firms with bank loans need not resort to underpricing in order to signal the value of the firm as implied in the signalling model of Allen and Faulhaber (1989) and Grinblatt and Hwang (1989). Additionally, with the monitoring, screening and information production benefits available via bank loans, the need for information extraction to also diminishes (Benveniste and Spindt, 1989). Thus, our first testable hypothesis is:

**H<sub>1</sub>:** *Other things being equal, IPOs of firms with new bank loans at the time of the IPO will be less underpriced than IPOs of firms without new bank loans.*

Offer price revisions often referred as the partial adjustment, have also been used in the literature as a proxy for information asymmetry (Hanley, 1993). The partial adjustment phenomenon is also consistent with Benveniste and Spindt's (1989) information acquisition hypothesis as adjustment in the offer price stems partly from the information acquired during the bookbuilding process<sup>9</sup>. Consequently, offers in which the issuers and investors are more asymmetrically informed about the value of the firm should witness larger revisions in the offer price. As such we argue that offers with new bank loan at the time of the IPO should have lower price revisions. This forms our second testable hypothesis:

**H<sub>2</sub>:** *Other things being equal, the degree of price revision during the bookbuilding process should be smaller for IPOs with new bank loans than those without new bank loans.*

#### **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. Further, we also exclude some IPOs for which there was no information available on the firm characteristics. Out of the final sample of 280 firms, 113 firms have disclosed bank loan 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 the prospectus of IPO firms from Perfect Filings, Thomson Research and

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<sup>9</sup> Other explanations include agency cost and bargaining power between underwriter and managers; the opportunity cost of failed offerings and pricing based on long run value. See Kutsuna, Smith and Smith (2009) for a detailed explanation on partial adjustment phenomenon.

the SEBI website. We obtain market data from DataStream and supplement this with data obtained from the BSE/NSE websites. 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<sup>10</sup>.

<<INSERT TABLE 2>>

## **5. Empirical results**

### *5.1. Sample description*

In this section, we present descriptive statistics of our sample. Table 2 shows descriptive statistics for each year starting from 2001 to 2008. 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 triggered by the credit crunch in 2007 brought about a halt to the feverish IPO activity as issuers stayed away from the Indian capital markets.

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<sup>10</sup> As a measure of robustness we also used the broad BSE100 index. This did not alter the conclusions of our results.

The descriptive statistics show that the mean (median) firm age at the time of IPO for our sample IPOs is 13.82 (12.01) years. The mean (median) total assets at the time of the offer is INR 4,977 (1,181) million while the mean (median) gross proceeds is INR 2,824 (831) million. Data suggest that during 2005-07 buoyed by the huge investors' 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 (8.66) 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 59% (59%). The overall mean (median) raw initial return (first day) for the period is 29% (18%) and the mean (median) market adjusted first day initial return is 27% (16%).

<<INSERT TABLE 3>>

Table 3 presents comparative descriptive statistics for IPOs with and without new bank loan at the time of the IPO. Of the 280 IPO firms, 113 have new bank loan at the time of IPO as disclosed in the prospectus. Based on the tests of differences of means, the two groups of IPOs do not differ significantly in terms of pre-IPO leverage and promoter's post IPO holdings. However, the value of total assets, total loan, revenues, operating profits, and net income are all significantly smaller for firms that have new bank loan. The univariate results suggest that firms of smaller size are more likely to have bank loan as one of the funding sources. This is consistent with the hypothesis suggested by Fama (1985) and Diamond (1991). Fama argues that for smaller firms, contracting costs for bank loan are lower than the cost of raising funds from the primary market. Therefore it appears that it is suitable for smaller firms to have a combination of debt and equity at the time of the IPO to reduce its contracting costs. Further, consistent with Diamond's (1991) argument that bank financing becomes an attractive avenue for meeting the financing needs of smaller and less prestigious firms, we find that the pre-IPO loan ratio (total

bank loan to total assets) of smaller firms is significantly higher (37%) than larger firms (29%). The monitoring and certification benefits arising from commercial bank's lending relationship is evident in Table 3 as firms with new bank loan show lower underpricing (23%) when compared to underpricing for firms without bank loan (30%)<sup>11</sup>. The univariate analysis lends prime facie support to our hypothesis that new bank loan at the time of IPO reduces information asymmetry and subsequently the degree of underpricing.

<<INSERT TABLE 4>>

### 5.2. Multiple regression analysis: OLS

Table 4 reports OLS regression results. The dependent variable is market adjusted initial returns (MIR), which is the difference between raw underpricing (IR) and the market returns (MR) over the same period<sup>12</sup>. MIR 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, year and allocating mechanism dummies to control for unobservable industry and year fixed effects. The reported t-statistics are adjusted for heteroskedasticity.

The second column of Table 4 shows the results of basic regression model 1. The results indicate that new bank loan at the time of the IPO reduce the degree of underpricing as the coefficient on

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<sup>11</sup> This is consistent with Slovin Shane and Myron (1992) who find that the price effect of loan initiation and renewal is significantly positive for small firms suggesting that smaller firms receive more benefit from commercial bank's certification and monitoring activities.

<sup>12</sup> Raw underpricing (IR) is calculated as:  $(\text{First day closing price} - \text{offer price}) \div (\text{Offer Price})$ . Market return (MR) is calculated as:  $(\text{Index value on the date of listing} - \text{Index value on the offer date}) \div (\text{Index value on the date of listing})$

*BkLoan* is negative and statistically significant. Since underpricing partly arises from the information asymmetry between issuers and investors, lowering of underpricing due to the presence of bank loan provides support to our hypothesis that new bank loan at the time of reduces information asymmetry.

In regressions (1) to (6) we include a number of control variables that have been found to influence IPO underpricing. 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 total assets (*LnTa*) and prior year's sales (*LnPySales*) 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 firm's age (*LnAge*) to capture this effect. Age is the difference between the firm's IPO year and the founding year. To control for IPO specific characteristics we include logarithm of gross proceeds (*LnGpcds*), share retained by promoters (*Overhang*), venture capital backing (*VC*), primary shares offering (*Primary*), and leverage of the firm (*Lev*). With respect to shares retained by promoters, Loughran and Ritter (2004) argue that the opportunity cost of underpricing is lower when promoters sell a lower fraction of the firm. We therefore expect a positive relationship between overhang and underpricing. Megginson and Weiss (1991) show that those IPOs which have venture capital backing experience lower underpricing because the markets perceive involvement of venture capitalists as a certification of the quality of the offer. In contrast, once the selection bias is accounted for, Lee and Wahal (2004) find a positive relationship between venture capital backing and underpricing. In our analysis we control for this effect by including a dummy *VC* which takes the value of 1 if the IPO is backed by a venture capitalist and 0 otherwise.

As additional control variable, we also include logarithm of demand multiple ( $LnDmtl$ ) as a measure of number of times an IPOs is subscribed. Prior research has shown that demand multiple (times subscribed) has a positive relationship with underpricing (How et al., 2007; Khurshed et al., 2009). 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. Further, previous research has shown 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 ( $Var$ ) based on the variance of residuals from the market model using 60 daily stock returns after listing. Finally, following the 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 use cumulative market returns ( $Mkt30$ ) on the BSE Sensex index 30 days prior to the date of the IPO as a measure of market returns.

Results of regression models 2 to 6 that include control variables suggest that the coefficients for most of the control variables are consistent with findings reported by previous literature. Generally, it is found that IPOs with larger gross proceeds are less underpriced than those with smaller proceeds. The relationship between demand for shares and the degree of underpricing is positive and highly significant. Consistent with the results reported by Carter and Manaster (1990) and Megginson and Weiss (1991), we find that the use of a prestigious underwriter reduces underpricing by almost 10%.

### *5.3. Controlling for firm selection*

Since only a sub-sample of the firms have new bank loan, it is important that we control for any sample selection bias. Specifically, our OLS regression results may be biased if the factors that determine the firms' choice of new bank loan as a source of funding are correlated with the

factors that determine IPO issue price. It is possible that firm might choose to have new bank loan as a source of funding with an aim to reduce underpricing. We employ the Heckman two-step procedure to control for any sample selection bias. In the first step we use a probit regression model to examine the determinants of new bank loan at the time of IPO. We then use the sample selection correction factor from the probit model in our main regression to consistently estimate the effect on new bank loan on the degree of underpricing.

<<INSERT TABLE 5>>

#### 5.4. Determinants of bank loan

Table 5 shows results from the probit regression model. We follow the capital structure literature 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. 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 relationship is negative (Kayhan and Titman, 2007). We use operating margin as a proxy for firm profitability. We also include growth ( $growth$ ) as one of the variables as prior studies have 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. Further, we include variance of residuals from the market model using 60 daily stock returns after listing as a proxy for the ex ante risk ( $Var$ ). As additional determinants, we also include log of total project cost to control for the size affect

(*LnProjectCosts*), promoter's post IPO holding (*Overhang*) and venture capital backing (*VC*). We further control for industry and year effects in our regression model.

Our results reported in Table 5 are supportive of the pecking order theory explanation since firms with higher project costs, higher total leverage<sup>13</sup>, lower total assets and lower profitability are more likely to use bank loan. Consistent with univariate results reported in Table 3, we find that smaller firms are more likely to have new bank loan than larger firms. Further, firms with lower degree of profitability and higher leverage are more likely to have new bank loan. A possible explanation of higher leverage for firms using bank loan at the time of IPO is that perhaps firms with previous banking relationship find it easier to raise further debt to finance their projects. The results reported in Table 5 show the importance of bank lending for firms, especially smaller ones, before or at the time of accessing the capital markets.

<<INSERT TABLE 6>>

##### *5.5. Heckman sample selection model*

Our sample of IPO firms has been grouped into firms which have new bank loan at the time of the IPO and those which do not have a new bank loan. OLS regression will produce unbiased estimates as long as factors that determine the choice of funding are not correlated with those which determine IPO underpricing. However, if the choice of funding sources is not random, OLS regression will produce biased results. In order to control for this, we use a variant of the Heckman two-step estimation model. Following Li and Prabhala (2007), since we can observe the magnitude of the selection variable i.e. the amount of bank loan, we use the probability of bank loan as the selection correction term rather than the inverse Mills ratio term. This method

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<sup>13</sup> For robustness purposes we also use the debt ratio as a proxy for leverage. The results are conclusively similar.

has an advantage since it does not require exclusion restrictions and introduces an independent source of variation in the private information variable, freeing one from reliance on non-linearity for identification (Li and Prabhala, 2007). Using the results of the probit regression model from the previous section we estimate the probability of a firm making use of a bank loan at the time of IPO.

Table 6 reports the results of the second stage of the Heckman selection model. We find that the new bank loan variable, *BkLoan*, remains negative and significant at either less than 5% or 1% level of significance after controlling for any possible sample selection bias. The magnitude of the effect of new bank loan also remains similar to those reported with OLS regression in Table 4. Further, coefficients on firm size, market demand, risk of the firm and lead underwriter reputation are also similar. The sample selection correction factor is insignificant confirming that firms do not deliberately use new bank loan to reduce underpricing. On the other hand, investors, consider the association of commercial banks through new loans as certification of the quality of the offer.

<<INSERT TABLE 7>>

#### 5.6. *Additional robustness tests*

Schenone (2004) reports evidence which suggests that a source of certification of IPO quality is the participation of commercial bank as underwriters to the IPO. It is likely that the certification effect of new bank loan reported in Table 6 may be due to the underwriting reputation of commercial banks. To control for this effect we create a dummy variable, *CbkLbm*, which equals to 1 if the lead underwriter is a commercial bank or an underwriter affiliated to a commercial bank and 0 if the underwriter is a pure investment bank. This helps us in examining whether the

observed lower underpricing arises from reputation of the commercial bank as the lead underwriter or the presence of the new bank loan. If the underwriting reputation of the commercial bank is more influential, we should find a negative relationship between *CbkLbm* and the degree of underpricing. Further, the effect of the new bank loan variable should decline or become insignificant. Table 7 presents both the OLS and the Heckman regression models with *CbkLbm* as one of the control variables. The coefficient on *CbkLbm* is neither negative nor significant. On the other hand, coefficients for new bank loan variable and other control variables remain significant and consistent with those reported earlier via Tables 4 and 6.

<<INSERT TABLE 8>>

James and Wier (1990) report that IPOs of firms that have established borrowing relationship experience lower degree of underpricing. It is likely that our results may have been driven by the previously established borrowing relationship. We 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. The results of the both OLS and Heckman regression model are presented in Table 8. Consistent with results of James and Wier (1990), we find a negative relationship between underpricing and existing loans. The relationship is, however, not statistically significant. The new bank loan variable remains significant and so do the coefficients for other control variables.

### 5.7. *Effect of new bank loan on offer price revision*

In this section, we further analyse the effect of new bank loan on information asymmetry by examining its impact on the degree of price revision during the IPO bookbuilding process. In this analysis we only include those IPOs which were issued through the bookbuilding mechanism. As a consequence our sample is reduced to 215 IPOs. Our dependent variable is the degree of price revision, *PR*, measured as the percentage difference between the final offer price and the midpoint of the initial filing price range. The new bank loan variable, *BkLoan*, remains as our main variable of interest and we expect this variable to carry a negative sign to support our hypothesis that firms with new bank loan at the time of IPO will exhibit lower degree of price revision than those without such a bank loan.

<<INSERT TABLE 9>>

We include a number of control variables from the literature which have been reported to be associated with price revisions during the bookbuilding process. These include firm size, issue size, firm age, venture capital backing, post IPO promoter's holdings, demand multiple, risk of the firm, transparency, lead underwriter reputation and prior market movements before the offer date. The regression models also include industry and year dummies to control for unobservable industry and year fixed affects. All t-statistics are adjusted for heteroskedasticity.

Results reported via Table 9 show that firms with new bank loan at the time of their IPOs exhibit lower degree of price revision during the bookbuilding process. The coefficient for new bank loan remain significant at 1% significance level confirming that the presence of new bank loan at the time of the IPO reduces information asymmetry. The coefficients for other control variables are mostly consistent with those found in previous literature. Firms with larger gross proceeds

have fewer price updates. Firms with higher proportion of post IPO promoter's holding and those issued by prestigious underwriters experience less price revisions. IPOs with greater market demand exhibit higher price revisions. We also address for sample selection bias and run the regression with sample selection correction factor. Results reported in the second column of Table 9 are similar to those reported by OLS. The sample selection correction factor is not significant.

## **6. Conclusions**

Information asymmetry among IPO participants is considered to be one of the determinants of IPO underpricing. The role of commercial banks in new security issuance and especially their perceived value regarding certification of quality of the offer has been well documented in the literature. Further, the role of bank lending in establishing reputation of less well-known firms has also been documented. In this paper we examine the impact of new bank loan at the time of the IPO on information asymmetry. 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 ongoing and future firm's investment activities by a commercial bank should provide certification of the quality of the offer. This in turn should reduce information asymmetry and lower the degree of underpricing.

Using a sample of Indian IPOs issued during the period 2001-2008 we find that firms which use new bank loan show reduced information asymmetry. Firms with new bank loans at the time of IPO have significantly less underpricing than those that do not have new bank loans. We also find that IPOs with new bank loans have much lower price revisions during the bookbuilding process which provides further support to the hypothesis that bank loans reduce information

asymmetry. Our analysis shows that firms with smaller size and profits are more likely to use bank loans as one of the sources of funding. After accounting for any possible sample selection bias and controlling for a number of variables, our results remain robust.

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Project Costs	Million INR	Sources of Funds	Million INR	
Cost of the expansion	1,845.70	Public Issue	839.80	<b>Table 1</b> Typical Indian
Issue expense	31.50	Term Loan	1,037.90	
<b>Total Project Costs</b>	<b>1,877.70</b>	<b>Total Sources of Funds</b>	<b>1,877.70</b>	

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

**Table 2**

Descriptive Statistics. 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. All values are reported in Indian Rupees (INR) and adjusted for inflation using consumer price index. All values are reported in 2004 INR. Leverage is the ratio of total liabilities to total assets. (1 US\$ approximately equal to INR 40).

Particulars	2001	2002	2003	2004	2005	2006	2007	2008	Total	Median
Number of IPOs	4	2	5	19	53	69	96	32	280	
IPOs with new bank loan	2	1	1	5	18	27	46	13	113	
Average age at IPO	11	10	11	16	15	13	14	13	13.82	12.01
Total assets (M INR)	355	25,727	11,732	3,629	5,089	4,643	5,340	3,448	4,977	1,181
Net assets (M INR)	199	24,378	6,743	2,031	1,745	1,647	1,517	1,405	1,852	474
Gross proceeds (M INR)	301	5,622	2,274	3,521	1,938	2,386	2,928	4,738	2,824	831
Market capitalization (M INR)	822	54,132	12,565	26,724	9,134	11,324	19,248	32,905	17,316	2,484
Leverage (%)	0.59	0.08	0.45	0.52	0.53	0.58	0.59	0.54	0.56	0.59
Promoter's post IPO holdings	0.60	0.53	0.56	0.61	0.57	0.62	0.58	0.57	0.59	0.59
Raw initial returns (%)	0.05	-0.04	0.34	0.42	0.41	0.20	0.31	0.15	0.29	0.18
Market adjusted initial returns (%)	0.18	-0.08	0.26	0.43	0.38	0.16	0.29	0.18	0.27	0.16
Mean demand multiple	0.59	2.53	12.81	20.76	24.68	16.41	26.88	10.46	22.27	8.66

**Table 3**

IPOs with and without new bank loan at the time of IPO. 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. Loan ratio is the ratio of total loans to total assets. (1 US\$ approximately equal to INR 40).

Particulars	Bank Loan (N=113)	No Bank Loan (N=167)
Number of IPOs	113	167
Average Age at IPO	13.89	13.78
Total assets (M INR)**	2,794	6,453
Net assets (M INR)*	1,179	2,306
Gross proceeds (M INR)**	1,313	3,845
Market capitalization (M INR)	6,719	24,486
Total project costs	3,619	4,054
Total Revenues**	1,618	3,912
EBITDA Profit**	328	747
Net Income**	122	351
Total Loan **	2,001	4,637
Loan Ratio (%) ***	0.37	0.29
Total Leverage (%)	0.58	0.54
Promoter's post IPO holdings (%)	0.57	0.60
Raw initial returns (%)*	0.24	0.32
Market adjusted initial returns (%)*	0.23	0.30

\* Significance of the estimated parameters at 10% level indicated.

\*\* Significance of the estimated parameters at 5% level indicated.

\*\*\* Significance of the estimated parameters at 1% level indicated.

**Table 4**

Effect of new bank loan on the degree of underpricing: Multivariate OLS Regression. This table presents the results of the OLS regression examining the effect of new bank lending on underpricing. The dependent variable is the first day market adjusted initial returns. BkLoan is a binary variable which equals to one 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. Lev is the total leverage of the firm at the time of IPO. LnAge is the log of age at the time of IPO. LnGpcds is the log of the gross IPO proceeds. Overhang is proportion of the shares retained by promoters post issue. Primary is a binary variable which equals one for pure primary offerings. LnDmtl is the log of the overall demand multiple. VAR is the variance of the residuals of the stock return for 60 days after listing using the market model. Transparent refers to the number of objects of the issue disclosed in the prospectus. MKT30 is the return on the market 30 days prior to the IPO offering. VC is a binary variable which equals one for IPOs with venture capital backing. LBMREP is a binary variable which equals one for reputed underwriters. Heteroskedasticity adjusted t statistics are in parentheses.

	Basic (1)	Basic (2)	Transparent (3)	VC Backed (4)	Underwriter Reputation (5)	All controls(6)
BkLoan	-0.1410*** (-2.96)	-0.1513*** (-3.11)	-0.1521*** (-3.11)	-0.1413*** (-2.94)	-0.1512*** (-3.21)	-0.1631*** (-3.36)
LnTa	0.0199 (0.55)		0.0268 (0.73)	0.0199 (0.55)	0.0202 (0.56)	0.0274 (0.75)
LnPySales		-0.0216 (-0.93)				
Lev	-0.1101 (-0.83)	-0.0442 (-0.33)	-0.1322 (-1.00)	-0.1112 (-0.83)	-0.0974 (-0.73)	-0.1181 (-0.90)
LnAge	0.0132 (0.40)	0.0208 (0.61)	0.0092 (0.29)	0.0126 (0.39)	0.0061 (0.18)	0.0018 (0.06)
LnGpcds	-0.0980** (-2.16)	-0.0692** (-2.09)	-0.1031** (-2.25)	-0.0978** (-2.17)	-0.0868* (-1.90)	-0.0917** (-1.98)
Overhang	-0.2271 (-1.05)	-0.1682 (-0.79)	-0.2464 (-1.11)	-0.2163 (-0.96)	-0.1838 (-0.85)	-0.2091 (-0.91)
Primary	-0.0150 (-0.28)	-0.0159 (-0.29)	-0.0276 (-0.51)	-0.0166 (-0.31)	-0.0300 (-0.55)	-0.0428 (-0.77)
LnDmtl	0.2231*** (7.62)	0.2255*** (7.61)	0.2268*** (7.52)	0.2241*** (7.41)	0.2343*** (7.81)	0.2366*** (7.66)
Var	0.0022** (2.06)	0.0022** (2.09)	0.0022** (2.04)	0.0022** (2.06)	0.0022** (2.08)	0.0022** (2.06)
Mkt30	-0.1361 (-0.34)	-0.1552 (-0.39)	-0.1205 (-0.30)	-0.1307 (-0.33)	-0.0489 (-0.12)	-0.0310 (-0.07)
Transparent			0.0122 (1.41)			0.0127 (1.46)
VC				-0.0141 (-0.24)		0.0115 (0.19)
LbmRep					-0.0987* (-1.74)	-0.105* (-1.75)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.047***	1.078***	0.989***	1.053***	1.075***	1.012***
Observations	280	280	280	280	280	280
R <sup>2</sup>	0.384	0.385	0.390	0.384	0.389	0.395

\* Significance of the estimated parameters at 10% level indicated.

\*\* Significance of the estimated parameters at 5% level indicated.

\*\*\* Significance of the estimated parameters at 1% level indicated.

**Table 5**

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. LnProjectCost is the total cost of the project as mentioned in the prospectus. Profit is the operating profit margin of the IPO firm in the year prior to the IPO. Growth is the three year average sales growth at the time of the IPO . All other variables are defined in Table 4. Heteroskedasticity adjusted t statistics are in parentheses.

BkLoan	Probit
LnProjectCosts	1.1744*** (6.80)
LnTa	-1.0373*** (-6.42)
LnAge	0.1892 (1.24)
Overhang	-2.1541** (-2.31)
Lev	1.4398*** (2.95)
Var	-0.0071 (-1.69)
VC	-0.0674 (-0.28)
Profit	-1.0304** (-2.01)
Growth	0.1113 (0.84)
Constant	-0.0733 (-0.07)
Industry fixed effects	Yes
Year fixed effects	Yes
Observations	280
Pseudo $R^2$	0.3258

\* Significance of the estimated parameters at 10% level indicated.

\*\* Significance of the estimated parameters at 5% level indicated.

\*\*\* Significance of the estimated parameters at 1% level indicated.

**Table 6**

Heckman sample selection correction regression. This table presents regression analysis with Heckman sample selection correction factor. The dependent variable is underpricing. The sample selection correction factor is the probability of having new bank loan at the time of IPO derived from the probit model presented in Table 5. All other variables are defined in Table 4. Heteroskedasticity adjusted t statistics are in parentheses.

	Basic (1)	Basic (2)	Transparent (3)	VC Backed (4)	Underwriter Reputation (5)	All controls(6)
BkLoan	-0.1621** (-2.49)	-0.1363** (-2.17)	-0.1672** (-2.57)	-0.1627** (-2.49)	-0.1712*** (-2.61)	-0.1773*** (-2.71)
LnTa	0.0328 (0.79)		0.0360 (0.87)	0.0325 (0.79)	0.0322 (0.78)	0.0357 (0.87)
LnPySales		-0.0260 (-1.05)				
Lev	-0.1341 (-0.96)	-0.0359 (-0.26)	-0.1495 (-1.06)	-0.1356 (-0.96)	-0.1203 (-0.87)	-0.1344 (-0.96)
LnAge	0.0132 (0.41)	0.0218 (0.64)	0.0093 (0.29)	0.0126 (0.39)	0.0061 (0.19)	0.0019 (0.06)
LnGpcds	-0.1153** (-2.11)	-0.0631* (-1.74)	-0.1152** (-2.12)	-0.1145** (-2.12)	-0.1025* (-1.88)	-0.1036* (-1.87)
Overhang	-0.1723 (-0.69)	-0.2082 (-0.83)	-0.2062 (-0.80)	-0.1634 (-0.63)	-0.1326 (-0.53)	-0.1734 (-0.65)
Primary	-0.0198 (-0.36)	-0.0119 (-0.22)	-0.0308 (-0.55)	-0.0211 (-0.38)	-0.0343 (-0.61)	-0.0456 (-0.80)
LnDmtl	0.2242*** (7.54)	0.2255*** (7.46)	0.2274*** (7.45)	0.2253*** (7.34)	0.2348*** (7.73)	0.2373*** (7.59)
Var	0.0024** (2.08)	0.0021** (2.02)	0.0023** (2.05)	0.0024** (2.07)	0.0023** (2.09)	0.0022** (2.06)
Mkt30	-0.0995 (-0.24)	-0.1791 (-0.44)	-0.0935 (-0.23)	-0.0953 (-0.23)	-0.0161 (-0.04)	-0.0082 (-0.02)
Transparent			0.0119 (1.39)			0.0125 (1.44)
VC				-0.0127 (-0.22)		0.0122 (0.20)
LbmRep					-0.0979* (-1.73)	-0.1053* (-1.74)
Sample selection factor	0.0844 (0.53)	-0.0557 (-0.37)	0.0616 (0.40)	0.0829 (0.52)	0.0784 (0.49)	0.0556 (0.35)
Industry Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.005*** (3.11)	1.100*** (3.48)	0.960*** (3.01)	1.011*** (3.13)	1.035*** (3.22)	0.985*** (3.13)
Observations	280	280	280	280	280	280
R <sup>2</sup>	0.385	0.386	0.390	0.385	0.390	0.396

\* Significance of the estimated parameters at 10% level indicated.

\*\* Significance of the estimated parameters at 5% level indicated.

\*\*\* Significance of the estimated parameters at 1% level indicated.

**Table 7**

Commercial Bank as the Lead Underwriter. This table presents the results of the OLS regression examining the effect of new bank lending on underpricing after controlling the effect of commercial bank as the lead underwriter. The dependent variable is the first day market adjusted initial returns. *CbkLbm* is a dummy variable which is equal to 1 if the lead underwriter is a commercial bank or affiliated to a commercial and 0 otherwise. All other variables are defined in Table 4. Heteroskedasticity adjusted t statistics are in parentheses.

	OLS	Heckman
BkLoan	-0.164*** (-3.35)	-0.177*** (-2.71)
LnTa	0.0274 (0.75)	0.0356 (0.86)
Lev	-0.119 (-0.90)	-0.134 (-0.96)
LnAge	0.00180 (0.06)	0.00195 (0.06)
LnGpcds	-0.0925** (-1.97)	-0.103* (-1.87)
Overhang	-0.208 (-0.91)	-0.173 (-0.65)
Primary	-0.0420 (-0.76)	-0.0448 (-0.79)
LnDmtl	0.236*** (7.64)	0.237*** (7.57)
Var	0.00217** (2.06)	0.00225** (2.05)
Mkt30	-0.0275 (-0.07)	-0.00573 (-0.01)
Transparent	0.0128 (1.47)	0.0125 (1.45)
VC	0.0108 (0.18)	0.0116 (0.19)
LbmRep	-0.106* (-1.74)	-0.105* (-1.72)
CbkLbm	0.00715 (0.16)	0.00596 (0.13)
Sample selection factor		0.0545 (0.35)
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Constant	1.017*** (3.25)	0.990*** (3.09)
Observations	280	280
$R^2$	0.395	0.396

\* Significance of the estimated parameters at 10% level indicated.

\*\* Significance of the estimated parameters at 5% level indicated.

\*\*\* Significance of the estimated parameters at 1% level indicated.

**Table 8**

The effect of existing borrowing relationship. This table presents the results of the OLS regression examining the effect of new bank lending on underpricing after controlling the effect of existing long term debt. The dependent variable is the first day market adjusted initial returns. *LoanRatio* is the ratio of the total pre-IPO loans to the total assets. All other variables are defined in Table 4. Heteroskedasticity adjusted t statistics are in parentheses.

	OLS	Heckman
BkLoan	-0.1588*** (-3.13)	-0.1721** (-2.58)
LnTa	0.0291 (0.79)	0.0373 (0.90)
Lev	-0.0558 (-0.33)	-0.0713 (-0.40)
LnAge	0.0015 (0.05)	0.0016 (0.05)
LnGpcds	-0.0902* (-1.91)	-0.1011* (-1.82)
Overhang	-0.2173 (-0.94)	-0.1828 (-0.68)
Primary	-0.0411 (-0.75)	-0.0438 (-0.78)
LnDmtl	0.2354*** (7.54)	0.2362*** (7.48)
Var	0.0021** (2.02)	0.0022** (2.01)
Mkt30	-0.0196 (-0.05)	0.0031 (0.01)
Transparent	0.0128 (1.47)	0.0126 (1.45)
VC	0.0132 (0.22)	0.0139 (0.23)
LbmRep	-0.1053* (-1.74)	-0.1048* (-1.73)
LoanRatio	-0.1052 (-0.64)	-0.1053 (-0.64)
Sample Correction Factor		0.0554 (0.35)
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Constant	0.997*** (3.20)	0.970*** (3.05)
Observations	280	280
$R^2$	0.396	0.396

\* Significance of the estimated parameters at 10% level indicated.

\*\* Significance of the estimated parameters at 5% level indicated.

\*\*\* Significance of the estimated parameters at 1% level indicated.

**Table 9**

Effect of new bank loan at the time of the IPO on degree of offer price revision. This table presents the regression analysis of the effect of new bank loan on the degree of offer price revision. The dependent variable, *PR*, is the percentage change in offer price from the mid-point of the filling range. All other variables are defined in Table 4. Heteroskedasticity adjusted t statistics are in parentheses.

Price Revision (PR)	OLS	Heckman
BkLoan	-0.0291*** (-3.30)	-0.0311*** (-3.10)
LnTa	0.0073 (1.62)	0.0083 (1.35)
LnAge	0.0023 (0.37)	0.0023 (0.37)
LnGpcds	-0.0105** (-2.04)	-0.0120 (-1.62)
Overhang	-0.0878*** (-2.74)	-0.0827** (-2.34)
LnDmtl	0.0207*** (5.30)	0.0208*** (5.26)
Var	0.0002 (1.28)	0.0002 (1.30)
Mkt30	-0.1851 (-1.64)	-0.1823 (-1.61)
Transparent	-0.0003 (-0.27)	-0.0003 (-0.28)
VC	0.0108 (0.67)	0.0112 (0.69)
LbmRep	-0.0172* (-1.70)	-0.0170* (-1.69)
Sample selection correction factor		0.00821 (0.34)
Industry fixed effects	Yes	Yes
Year fixed effect	Yes	Yes
Constant	0.1402*** (5.27)	0.1367*** (4.46)
Observations	215	215
$R^2$	0.1841	0.1852

\* Significance of the estimated parameters at 10% level indicated.

\*\* Significance of the estimated parameters at 5% level indicated.

\*\*\* Significance of the estimated parameters at 1% level indicated.