Private Placements to Owner-Managers: Theory and Evidence*

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Abstract

We present an asymmetric information model to examine private placements issued to owner-managers. Our main conclusion is that allowing private placements to insiders can mitigate, if not eliminate, the underinvestment problem. Our model predicts that announcement period returns for private placements should be: (1) positive; (2) dependent on regulatory constraints that determine the issue price; (3) positively related to volatility; (4) negatively related to leverage; (5) negatively related to owner-managers' shareholdings (6) inversely related to proxies of manipulation; and (7) negatively related to illiquidity. We empirically test our model's predictions, along with others from literature, on a sample of private placements issued in the Indian capital markets during 2001-09 and report empirical evidence largely consistent with the model.

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Private Placements to Owner-Managers: Theory and Evidence

Significant amounts of capital are raised through private placements of equity around the world.[1] Private placements typically occur in the form of block deals issued to firm managers, private equity players, or banks and other financial institutions. The generally positive market reaction to announcements of private placement issues of equity (in contrast to the generally negative reaction to public issues made through conventional secondary equity offerings) suggests that the market infers a positive signal about firm value when a private placement is announced.

In this paper, we examine the issue of private placements to owner-managers from a theoretical as well as an empirical perspective. Our main conclusion from the theoretical analysis is that allowing private placements to insiders can mitigate, if not eliminate, the underinvestment problem. The intuition for the above result can be explained with a simple example. Consider a variation of the classic lemons problem formulated by Akerlof (1970). A car mechanic and her friend, who is not very knowledgeable about cars, form a 50-50 partnership and buy a car. The car is operated for hire with the understanding that profits would be equally shared. The car owners now face an opportunity to upgrade the interior of the car. This upgrade would yield substantial additional profits in future (and, therefore, increase the resale value of the car today). Should the upgrade be taken up? And how should this investment opportunity be financed?

The interior upgrade is akin to a positive NPV project. Under normal circumstances, either of the car owners should be willing to finance the upgrade. However, the car mechanic and her friend may have differing views because they are asymmetrically informed about the quality of the car. The car mechanic is better informed in that she knows whether the car is a "good" car or a lemon. Her friend, however, is relatively ignorant about the quality of the car. If the car is a "good" car, the car mechanic would be more eager to fund the upgrade because her ownership stake in this "good" car would increase. Her friend, being uninformed, would be less excited about financing the project.

Now suppose that the car mechanic is unable to finance the upgrade (due to capital constraints) or is prohibited from financing the upgrade (due to regulatory constraints). The only

[1] See Fenn et al. (1997) and Wu (2004), for example.

recourse for financing the upgrade would be to raise money from the car mechanic's friend or to go for third party financing. In either case, financing the upgrade (project) is possible only if a sufficiently large ownership stake is offered (effectively selling the additional stake at a substantial discount to its true value). It is likely that such a financing arrangement would not be approved by the car mechanic because it would dilute her ownership interest in the "good" car. This deadlock results in underinvestment. One way to resolve this deadlock is to remove any artificial barriers (such as regulatory constraints) that preclude the car mechanic from financing the upgrade on her own.

This example illustrates that as long as the manager is not constrained by capital or by risk aversion, allowing private placements to insiders may potentially solve the underinvestment problem. Myers and Majluf (1984) and related papers rule out the possibility that managers can subscribe to their firm's equity issues. This assumption is reasonable in markets where (lack of) managerial wealth and managerial risk aversion constrain managers from participating in equity issues (an exception being management buy-outs). However, in many economies, family-controlled business groups dominate the economic landscape. In such economies, promoters of firms often continue to operate them as owner-managers. These promoters usually have access to other resources, for example through other firms they control, which allows them to participate in subsequent equity offerings. Our model, therefore, extends our understanding of financing decisions made by managers in many countries, particularly in the emerging economies. However, the model is not restricted to these markets since the implications of the model are generally applicable to any market where owner-managers have the choice of issuing equity to themselves, in the presence of regulatory constraints. By including a third alternative of issuing equity to owner-managers, in addition to the conventional choice between using internal resources and seeking outside financing, we generalize the Myers-Majluf (1984) model and show that the underinvestment problem can be mitigated.

The extant literature on private placements suggests several possible motivations for private placements. First, Wruck (1989) suggests that private placements are used to bring active shareholders who provide monitoring benefits (*Monitoring Hypothesis*). Second, Hertzel and Smith (1993) suggest that placements to private equity players are used as a certification mechanism to mitigate the information asymmetry problem (*Certification Hypothesis*). Third, more recently (Wu (2004), and Barclay et al (2007)), find that private placements are used to bring in passive shareholders (*Managerial Entrenchment Hypothesis*). Last, (Wu (2004), Baek et al. (2006)

and Barclay et al (2007)) show that private placements to owner-managers are made at significant discounts (*Managerial Self-Dealing Hypothesis*), which is a variation of the *Managerial Entrenchment Hypothesis*. The most recent empirical evidence in the U.S. supports the Managerial Entrenchment and the Managerial Self-dealing Hypotheses. Our work is related to Hertzel and Smith's Certification Hypothesis in that it deals with information asymmetry, but it endogenously accounts for managerial self-dealing and the associated market inference regarding the information asymmetry problem. In general, the hypotheses that emanate from our model can be classified as part of the broad *Undervaluation Hypothesis*, as conjectured in Barclay et al.(2007).[2]

In order to develop clear and testable empirical implications for Indian capital markets, we augment our model to reflect the regulatory constraints of the Securities and Exchange Board of India (SEBI), the Indian securities market regulator. The key feature of SEBI's regulation is that the issue price in a private placement cannot be lower than the maximum of the most recent market price and the average market price in the previous six months. This rule is clearly aimed at discouraging managers from "timing" the market and also from "manipulating" stock prices in order to issue shares to themselves at low prices (managerial self-dealing). Our model explicitly incorporates this pricing rule as well as the possibility of price manipulation by insiders.

Our model predicts that announcement period returns for private placements should be: (1) positive; (2) dependent on regulatory constraints that determine the issue price; (3) positively related to the volatility of prices; (4) negatively related to leverage; (5) negatively related to the owner-manager's ownership interest; (6) negatively related to proxies of manipulation; and (7) negatively related to illiquidity of the stock. We empirically test the model's predictions on a sample of 164 private placements issued in the Indian capital markets during 2001-2009 and report empirical evidence largely consistent with the model. In addition to the empirical pediction of our model, we also find that: (8) firms affiliated to business groups experience lower but statistically insignificant announcement period returns compared to stand-alone firms and (9) private placements made to (active) private equity investors do not experience higher announcement period returns than those made to banks or financial institutions.

[2]On page 478, Barclay et al. (2007) state, "This situation, in many ways, is the reverse of Myers and Majluf (1984). In that analysis, management acting in the interests of all current shareholders issues equity to outsiders when management believes the stock to be over-valued. In this explanation, managers issue stock to themselves when they believe their stock to be undervalued."

In summary, the contribution of our paper is to extend the Myers and Majluf (1984) framework to examine the financing decisions of firms under information asymmetry. Apart from developing the model, we are able to test its predictions with data from the Indian securities market, where owner-managers dominate the capital market and the regulatory environment is different from that existing in the U.S., the focus of many of the prior studies. Overall, our empirical evidence corroborates the Myers-Majluf framework after accounting for competing motivations of private placements.

The paper is organized in five sections. A brief background on the regulation of private placements in India is presented in Section I. Section II presents our theoretical model and the corresponding empirical implications and testable hypotheses that follow from the model. (The proofs are presented in Appendix 1.) Section III describes the data and certain methodological issues, and also presents the results of the empirical analysis. Section IV concludes.

I Private Placements and Regulatory Restrictions in the Indian Securities Market

Before developing a model to generate testable empirical implications related to the Undervaluation Hypothesis, we first discuss the regulatory environment affecting the private placement market in India. This description is essential background for presenting the salient features of our theoretical model. The Indian capital market is regulated by SEBI. In India, private placements of listed companies - often referred to as *preferential issues* or *preferential allotments* - are quite popular. In 2008-2009, Indian firms raised the equivalent of US$7.97 billion through preferential issues compared to US$6.21 billion, US$ 0.75 billion, and US$ 0.04 billion, through rights offerings, outside equity issues (initial public offerings (IPOs) and secondary equity offerings (SEOs)), and qualified institutional placements (QIPs), respectively.[3] It should be emphasized that not all preferential allotments are made to owner-managers (or promoters, as they are known in local parlance). Preferential allotments are also made to private equity players, banks and financial

[3]Source: NSE Fact Book 2008-2009. The figures are converted from Indian Rupees INR) to US dollars (USD) at the exchange rate 1 USD = 45 INR.The popularity of preferential allotments seems to have increased in recent times after the recent introduction of a grading system for IPOs in India provided by major rating agencies or their affiliates. This somewhat unusual system of IPO grading was introduced to provide a mechanism for assessing issuer quality and thereby restricting the entry of fly-by-night operators into the market. Deb and Marisetty (2009) find that the grading of IPOs has information content only for retail investors; institutional investors do not appear to make their IPO investment decisions on this basis. Hence, it is likely that issuers who target institutional investors are better off going for preferential issues, as they eliminate the costs associated with grading and related expenses incurred in public offerings.

institutions. However, all preferential allotments are subject to SEBI's pricing regulations, which are described below.

A. Pricing of Preferential Issues:

The pricing of preferential equity issues in India is governed by the following regulations with the relevant phrases italicized:[4] "The issue of shares on a preferential basis (equity shares/ fully convertible debentures/ partly convertible debentures) can be made at a price *not less than* the *higher* of the following: (a) The average of the weekly high and low of the closing prices of the related shares quoted on the stock exchange during the *six month* period preceding the relevant date; or (b) The average of the weekly high and low of the closing price of the related shares quoted on a stock exchange during the *two week* period preceding the relevant date." The relevant date for this purpose is the date 30 days prior to the date on which the meeting of the general body of shareholders is held.

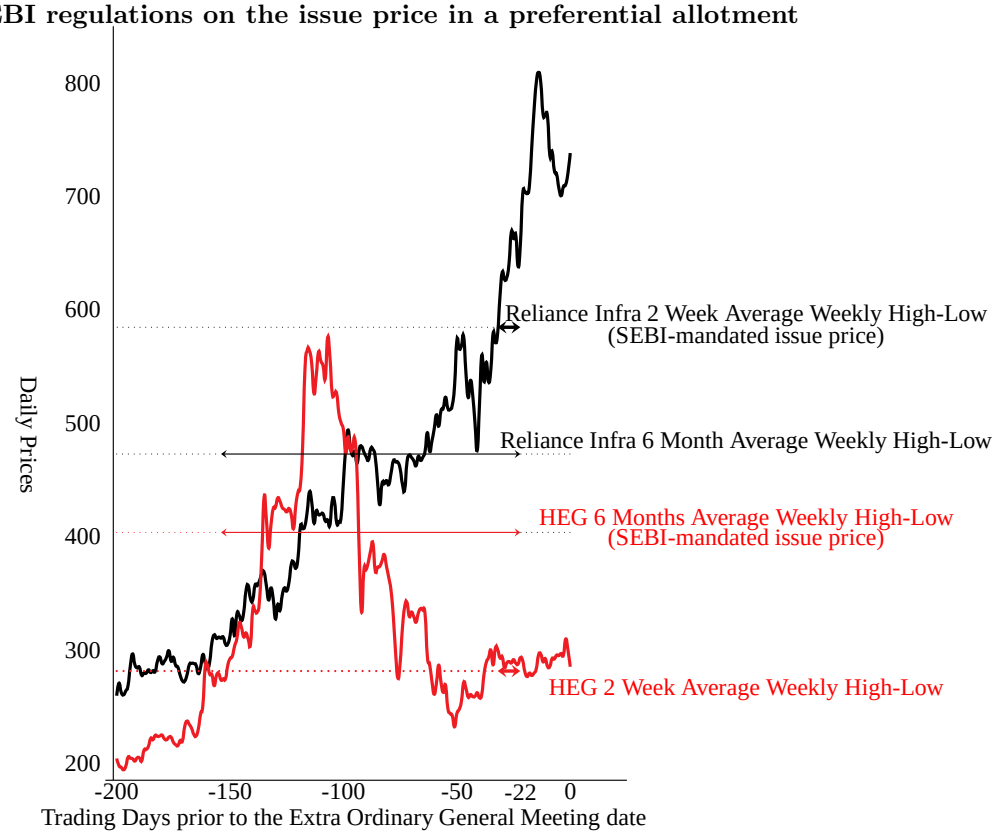
Figure 1 illustrates the SEBI pricing rule. For purposes of illustration, the price histories of two firms, Reliance Infra and HEG, are displayed on the graph. For Reliance Infra, prices had been increasing. Thus, the average price in the two week period prior to the relevant date is *greater* than the average price in the six-month period prior to the relevant date. SEBI rules force the firm to issue at a price greater than (or equal to) the higher of these two prices, namely, the average price in the two-week period prior to the relevant date.

Exactly the converse situation arises for HEG, whose prices had been generally declining. SEBI pricing rules imply that the issue price should exceed the average price in the six-month period prior to the relevant date. In general, if prices are declining, the (lower bound on the) issue price is determined by the historical average price, and if prices are increasing, the (lower bound on the) issue price is determined by more recent period valuation. This arrangement ostensibly protects minority shareholders from managerial self-dealing.[5]

[4] SEBI Disclosure and Investor Protection Guidelines, 2000, updated 2009

[5] In addition to pricing restrictions, there is also a "lock-in" period of three years from the date of allotment. This rule prevents "flipping" by preferential allottees for short term gains based on privileged information. SEBI's norms require the issuer to provide the following information to the stock exchange: (i) The objective of the preferential allotment, (ii) The intention of the promoters and other related parties to subscribe for the offer, (iii) The share holding pattern before and after the offer, (iv) The proposed time within which the allotment will be completed, and (v) The identification of the proposed allottees and the percentage of post-preferential issue capital that may be held by each of the promoters. These disclosures are meant to provide transparency regarding the use of the proceeds of the issue as well as the process of allotment of the issue to investors.

Figure 1: SEBI regulations on the issue price in a preferential allotment



The above figure depicts an example of the preferential allotments of two firms, namely Reliance Infra Limited and HEG Limited. The figure has number of trading days before the relevant date (date 0) on the X-axis and the corresponding daily prices for those days on the Y-axis. As per SEBI regulations, the issue price should be the *higher* of either the two week average of the weekly High-Low prices or the six months average of the weekly High-Low prices prior to the relevant date. The relevant date is itself 30 days (or 22 trading days) prior to the date of the Extraordinary General Meeting of shareholders to approve the issue. Hence for Reliance Infra, the SEBI-mandated issue price is the two week average weekly High-Low price, whereas, for HEG, the SEBI-mandated issue price is the six month average weekly High-Low price.

II Model and Testable Implications

We now present a variation of the Myers and Majluf (1984) model to analyze private placements. In this economy, firms are managed by an individual shareholder or a subset of shareholders (we refer to these investors as owner-managers). Consider a firm that faces a positive NPV invest-

ment opportunity. The firm does not have enough resources to fund this project internally - it has to be funded with external capital. It can raise capital either in the form of an equity issue to outsiders (we refer to this as outside equity or *"OE"*) or in the form of a private placement to the owner-managers or associates (we refer to this alternative as a preferential allotment or *"PA"*).[6] The firm also has the choice of rejecting the positive NPV project, thereby underinvesting (we refer to this situation as *"NI"* or "No Issue"). Similar to the Myers and Majluf setup, we consider equity capital as a new financing choice, on the assumption that the capital structure choice has already been made.[7]

There are three dates in our model: τ= -1, 0 and +1. Firm value consists of three components: value due to assets-in-place (AIP), hidden value (HV), which characterizes the asymmetric information about assets-in-place, and value due to a positive NPV investment opportunity (IO), about which there is no information asymmetry.

The payoffs on the three components of the firm value are uncertain at date τ= -1, but realizations of all these payoffs occur on the liquidation date τ= +1. To keep the model simple and intuitive, we consider a two-state economy (with equal probabilities in each state). Thus, all payoffs arise in a binary form. Further, we assume risk-neutral participants and normalize the risk free rate to 0 without loss of generality. Figure 2 provides an overview of the model structure, which is described in detail below.

A. Assets-in-place (AIP):

At date τ = -1, the market views the firm as consisting of assets-in-place, whose terminal (date τ = +1) payoff is of the form $\{s, 0\}$ with equal probability. The up-state payoff s is itself a random variable; at date τ = -1, the market believes that s can either be h (for "high") or l (for "low") with equal probability. At date $\tau = 0^-$, the market learns whether s is h or l with certainty and updates its assessment of assets-in-place to either $\{h, 0\}$ or $\{l, 0\}$ depending on the realization

[6]Private placements to owner-managers differ from rights issues, which are offered to all shareholders on a pro-rata basis. In terms of modeling, a rights issue is a hybrid between a private placement and an outside equity issue because some existing shareholders (owner-managers) are informed while the remaining shareholders are uninformed (as would be the case for outside equity participants). In the context of our model, it can be shown that in the absence of pricing restrictions, a rights issue would be dominated by either a private placement or an outside equity issue. In general, rights issues cannot solve the underinvestment problem. The special case of private placements made to outsiders is discussed later on in the paper, after we develop the basic model.

[7]Later on in the paper, we discuss the effect of the current leverage of the firm on the choice among the three alternatives.

of s. It should be emphasized that there is no information asymmetry between the owner-managers and the market regarding any of these parameters describing the assets-in-place. This characterization of the evolution in the value of assets-in-place allows us to capture the essence of SEBI's regulatory framework with regard to the issue price of a preferential allotment in a stylized manner. Henceforth, we will refer to the price path dynamics as being under a "high price path" (when $s = h$) or under a "low price path" (when $s = l$).

B. Hidden Value (HV):

The market believes that there could be hidden value (or lack of it) in the firm, in addition to the value of the assets-in-place. Hidden value takes the form of outcomes $\{t, 0\}$ with equal probability, where t itself is a random variable that is uniformly distributed over the range $\{-H, H\}$. Thus, hidden value can be favorable news or unfavorable news. The random variable t captures asymmetric information in the context of the model, in a simple fashion. Both the market and the owner-managers are equally uninformed about the value of t at date τ = -1, and hence, there is no information asymmetry on that date. At date $\tau = 0^-$, owner-managers privately observe a private signal of t, which helps them take a call on their investment-financing decision.

C. Investment opportunity (IO):

At date τ = -1, the market is aware of a positive NPV investment opportunity that the firm possesses. This investment opportunity requires an investment of I and yields cash flows $CF = \{x, y\}$, at date $\tau = +1$ with equal probability. Both the market and the owner-managers are symmetrically informed about the nature of payoffs on the investment opportunity. Since the project has a positive NPV, it implies that $I < \frac{1}{2}(x + y)$.

It is important to clarify our modeling choices about the structure of information. First, one could model the value of assets-in-place (AIP) as simply s instead of a binary variable $(s, 0)$. In similar vein, we could also have defined hidden value (HV) as t instead of a binary variable $(t, 0)$ and the cash flows from the project as a non-random quantity instead of a binary variable, (x, y). Our information structure is only slightly more complex than the minimum required, but it gives the realistic flavor of postponing uncertainty resolution till the terminal date.

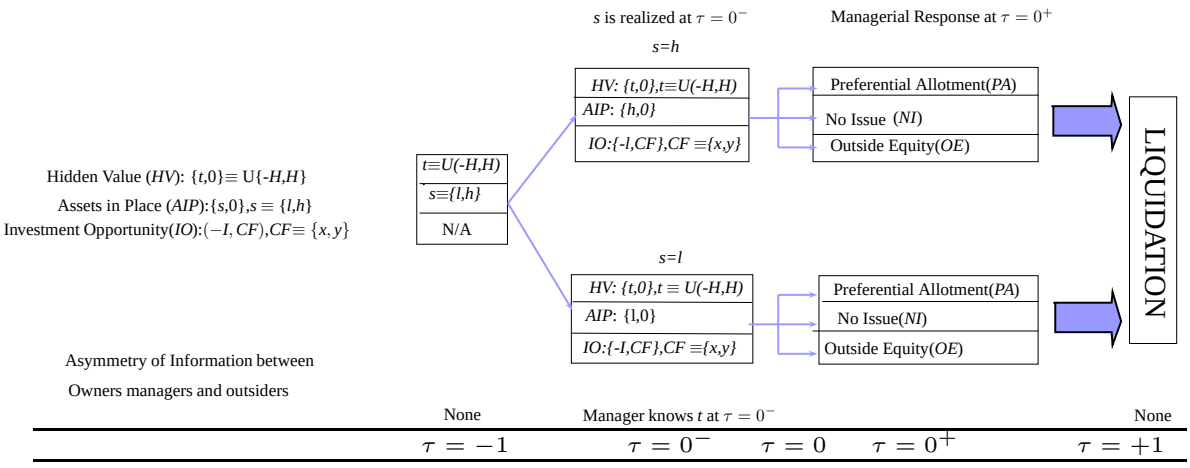
Second, on the terminal date $\tau = 1$, the worst realization of t is $-H$ and the worst possible

realization of the value of the assets-in-place (AIP) is 0. If the firm chooses not to invest in the positive NPV investment opportunity, this worst case scenario could result in negative asset prices. We ensure positive prices in the economy by assuming that the value of assets-in-place consists of a certain part and an uncertain part (given by $s, 0$). The certain part is assumed to be sufficiently high to preclude the possibility of negative asset values.[8]

At date $\tau = 0^-$, the market sees the realization of s and then owner-managers observe a private signal (t) about the hidden value (HV). The main objective of the model is to capture the investment-financing decision of owner-managers. Owner-managers can choose among the following alternatives: (i) issue equity to outsiders (OE) and invest in the positive NPV opportunity, or (ii) issue equity to themselves, using the preferential allotment mechanism (PA) and invest in the positive NPV opportunity, or (iii) reject the project and underinvest (NI).

The time-line of the information revelation and the choices available are summarized below in Figure 2.

Figure 2: Schematic Description of the model



D. Summary of Key Assumptions:

We summarize the main assumptions made in the model:

[8] Without loss of generality, we set this certain part to be equal to 0 for convenience.

1. Firm value consists of value due to asset-in-place (AIP), which consists of a certain part normalized to 0 and an uncertain part, which is described by a equally probable binary variable $(s, 0)$, and hidden value (HV), which is described by an equally probably binary value $(t, 0)$. Owner-managers face a positive NPV investment opportunity, which requires an investment I and throws up cash flows described by an equally probably binary variable (x, y). Firms are allowed to raise equity in the form of public issues or preferential allotments to themselves.

2. The issue price in a preferential allotment to insiders is subject to regulatory constraints - in essence, preferential allotments to insiders can be made at a price *no less than* the maximum of the most recent firm value or the average firm value during the previous period (similar to the SEBI regulations).

3. Owner-managers own a fraction α of the firm and maximize the liquidation value of their total holdings (as on date $\tau = +1$).

4. There is information asymmetry only about the existing assets of the firm, but not about the positive NPV investment opportunity. Owner-managers observe a private signal (t), which determines the hidden value associated with the existing assets of the firm.

5. Debt financing is ruled out.

6. The firm has no financial slack and the entire investment in the positive NPV project has to be raised through equity financing. Due to regulatory restrictions, the firm cannot issue issue stock in excess of the investment in the project.

7. All participants in this economy are risk-neutral. The risk free rate is normalized to 0 without loss of generality.

8. There are no taxes and transaction costs in the model.

9. There are no agency problems among owner-managers.

Assumption # 1 and # 2 describe the nature of the problem being examined in this model. Assumption # 3 is consistent with the assumption in Wu and Wang (2005), but different from the original Myers and Majluf (1984) model, where managers maximize the weighted average of current and future share value of the firm. The only critical assumption in the above depiction of the model is Assumption # 4, which states that there is information asymmetry only about existing assets, but not about the investment opportunity. Employing this simpler set-up allows

us to focus on the key implications of this model with much greater insight into the factors that drive the results of the model. This assumption is relaxed in Appendix 1, where information asymmetry exists about *both* existing assets and the NPV of the project. We show that the results developed in this section continue to hold in the more general setup. Assumptions # 5-9 are purely for convenience in establishing the results and the model is robust to the relaxations of these assumptions. Assumption #6 is made partly for convenience, but also to stay within the spirit of regulatory constraints on preferential allotments.

Before proceeding further, note that firm value at each point of time depends on the information available to the market at that point of time. Let $V_{0^-}(s)$ denote the pre-announcement (date $\tau = 0^-$) market value of the firm. This value will be given by the sum of the market value of the assets-in-place (AIP), the market expectations of the hidden value (HV) and the NPV of the investment opportunity (IO), which is equal to $\frac{x+y}{2} - I$. On this date, the market's expectation of the hidden value (HV) is zero.[9] Furthermore, at date $\tau = 0^-$, the expected value of assets-in-place (AIP) is equal to $s/2$. It follows that $V_{0^-}(s = h) = \frac{h}{2} + \frac{x+y}{2} - I$ and $V_{0^-}(s = l) = \frac{l}{2} + \frac{x+y}{2} - I$, and in general, $V_{0^-}(s) = \frac{s}{2} + \frac{x+y}{2} - I$. If V_{-1} denotes the market value at time $\tau = -1$, then $V_{-1} = V_{0^-}(s = h)\frac{1}{2} + V_{0^-}(s = l)\frac{1}{2} = \frac{h+l}{4} + \frac{x+y}{2} - I$. Note that $V_{0^-}(s = h) > V_{-1} > V_{0^-}(s = l)$.

SEBI pricing rules imply that the issue price in a preferential allotment should be at least as high as the higher of the historical average of past prices and the current (most recent) price levels at the time of the preferential allotment. Starting from date τ = -1, prices can either go up ($s = h$) or down ($s = l$). On the high price path, the historical average price would be lower than current price whereas on the low price path, the historical average price would be greater than the current price. Thus, on the high price path, SEBI regulations imply that the issue price has to be greater than the current price. Conversely, on the low price path, SEBI regulations imply that the issue price has to be greater than the historical average price. This means that owner-managers who buy shares in a preferential allotment pay an additional premium over and above the current market value when $s = l$. The following proposition and corollary describes the owner-managers' decision making criteria at date $\tau = 0$.

[9] It is shown in the appendix that this claim holds true in equilibrium after accounting for the financing and investment decision of owner-managers.

Proposition 1. If the investment opportunity is such that its $NPV \geq \overline{NPV}(s)$, $(s = l, h)$, *there is no underinvestment in the economy. The owner-managers' investment-financing decision can be summarized by three threshold levels or cut-off values for the value of the private signal observed by owner-managers (t). The cut-off,* $\widehat{t}^{NI-PA}(s)$, *denotes the cut-off level of t below which the owner-managers prefer to forgo the investment opportunity (the underinvestment alternative denoted as* NI*) and above which they prefer to go for a preferential allotment (*PA*). In a similar vein,* $\widehat{t}^{OE-NI}(s)$ *and* $\widehat{t}^{OE-PA}(s)$ *denote the cut-off levels that determine the choice between outside equity and underinvestment and between outside equity and preferential allotment, respectively. The threshold cutoffs for the* NPV *of the investment opportunity and the value of the private signal (t) are given below:*

$$\overline{NPV}(s) = \frac{(1-\alpha)\frac{(h-s)}{4}(\frac{x+y}{2})}{s+x+y+\frac{(h-s)}{4}}, s = l, h \tag{1}$$

$$\widehat{t}^{NI-PA}(s) = \left[s+x+y+\frac{1}{4}(h-s)\right]\left[\frac{I-\alpha\frac{x+y}{2}}{I(1-\alpha)}\right] - (s+x+y) < 0, s = l, h \tag{2}$$

$$\widehat{t}^{OE-PA}(s) = \frac{(s+x+y)(1-\alpha)\frac{(h-s)}{4}}{(s+x+y)+\frac{\alpha}{4}(h-s)} \geq 0, s = l, h \tag{3}$$

$$\widehat{t}^{OE-NI}(s) = [(s+x+y)]\left[\frac{\frac{(x+y)}{2}}{I} - 1\right] > 0, s = l, h \tag{4}$$

where,

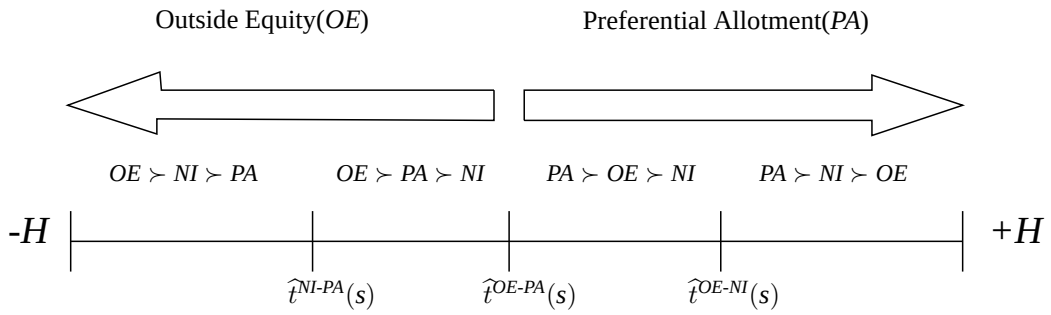
$$\overline{NPV}(s) >= 0, \widehat{t}^{OE-NI}(s) > \widehat{t}^{OE-PA}(s) \geq 0 > \widehat{t}^{NI-PA}(s), s = l, h$$

Proof: See Appendix 1.

The owner-managers' financing choice depends on the private signal of t that they privately observe at $\tau = 0^-$. The threshold cutoffs, $\widehat{t}^{NI-PA}(s)$, $\widehat{t}^{OE-PA}(s)$, and $\widehat{t}^{OE-NI}(s)$, carve out regions in the value of t that determine the (pairwise) preference ordering among the three alternatives: equity financing (OE), underinvestment (NI) and preferential allotment (PA). For instance, the threshold cutoff, $\widehat{t}^{OE-NI}(s)$, denotes the cutoff value of t such that for all $t <= \widehat{t}^{OE-NI}(s)$, owner-managers would prefer the outside equity alternative (OE), and for all $t > \widehat{t}^{OE-NI}(s)$, owner-managers would prefer to forgo the project (NI).

Figure 3 shows the different regions of t corresponding to the various financing choices. It can be seen that the preferential allotment alternative (PA) dominates for higher values of t, whereas the outside equity alternative (OE) dominates for lower values of t. In fact, upon careful inspection of Figure 3, it becomes obvious that the critical threshold is the OE-PA cutoff, $\widehat{t}^{OE-PA}(s)$. The other two threshold cutoffs are irrelevant. So long as owner-managers observe a signal of t greater than $\widehat{t}^{OE-PA}(s)$, they would always opt for a preferential allotment (PA). In contrast, for any signal of t less than $\widehat{t}^{OE-PA}(s)$, they would always opt for an outside equity issue (OE). Note that the NI alternative is always dominated either by PA or OE. As can be seen in Figure 3, there is no underinvestment in this economy!

Figure 3: Schematic representation of the managerial choice of financing.



Proposition 1 states that if $s = h$, i.e., the price path dynamics is along the "high price path", $\widehat{t}^{OE-PA}(s) = 0$. This implies that owner-managers issue equity to outsiders *only* if they observe a negative signal ($t < 0$); otherwise they issue equity to themselves through the preferential allotment mechanism (if $t > 0$). Furthermore, note that the NPV cutoff value ($\overline{NPV}(s)$, as stated in Proposition 1) is exactly equal to 0, when $s = h$. This implies that, under Proposition 1, for the high price path ($s = h$), the firm accepts all positive NPV projects: when the signal, t, is positive, owner-managers finance the project and when the signal, t, is negative, outside equity is used to finance the projects. This situation corresponds to the classic Myers and Majluf (1984) world, if insiders were allowed to finance the project. Thus, underinvestment would be eliminated and all positive NPV projects would be accepted, in line with the intuition of the example in the introduction.

In contrast, when $s = l$, i.e., the price path dynamics follows the "low price path", $\widehat{t}^{OE-PA}(s)$ is strictly greater than 0. Owner-managers would now *always* accept the project (i.e., there is

no underinvestment) *only* if it has sufficiently positive NPV ($\overline{NPV}(s)$, as stated in Proposition 1); furthermore, owner-managers finance the project *only* if the signal, t, is sufficiently positive; otherwise, outside equity is used to finance the project. This situation implies that in the $s = l$ case, if the project does not have a sufficiently positive NPV, it may be rejected for some positive values of the signal, t. In other words, underinvestment can be mitigated but cannot be eliminated when $s = l$.

The reason for this asymmetric decision making by owner-managers with regard to the realization of s is a result of the regulatory constraint on the issue price in a preferential allotment. SEBI regulations state that the issue price should be greater than the maximum of the most recent valuation and the average valuation over the previous six month period. When $s = h$, i.e., when the assets-in-place follow the high price path, SEBI regulations require the preferential issue to be priced at least as high as the most recent valuation (i.e, the issue can be "fairly priced"). On the other hand, when the stock price goes along the low price path, i.e., $s = l$, the preferential issue is priced at the historical average valuation, which, by construction, is always greater than the most recent valuation because prices are declining along the "low price path". As a result, in the $s = l$ case, owner-managers (as buyers in the preferential allotment) pay a premium over and above the most recent market value of the security. This additional payment causes owner-managers to adopt a more conservative investment and financing policy: (i) underinvestment is avoided only if the project NPV is above a cutoff value, and (ii) the preferential allotment alternative is chosen only for sufficiently positive signals of t above a strictly positive threshold cutoff value.

To see the intuition behind these results, it is useful to examine the $s = l$ case in terms of the opportunity gains (costs) faced by owner-managers when opting for each of the three alternatives: OE, PA, and NI. First, if owner-managers forgo the project (NI alternative), their opportunity loss would be $-\alpha NPV = -\alpha(\frac{x+y}{2} - I)$, after noting that owner-managers hold a fraction α of the firm. Now consider the OE alternative. In this case, owner-managers face dilution whenever they observe a good signal of hidden value (i.e, when $t > 0$) because the issue price would reflect a lower firm value than the value based on their private information about the hidden value. Note that the firm value would be understated by an amount equal to $\frac{t}{2}$, given that hidden value takes the form of t in the good state and 0 in the bad state (the probability of each state is $\frac{1}{2}$). If the fraction of the firm sold in the outside equity issue is $f^{OE}(s = l)$, original shareholders, as a group, face a dilution loss of $-f^{OE}(s = l)\frac{t}{2}$. The opportunity loss of owner-managers is given

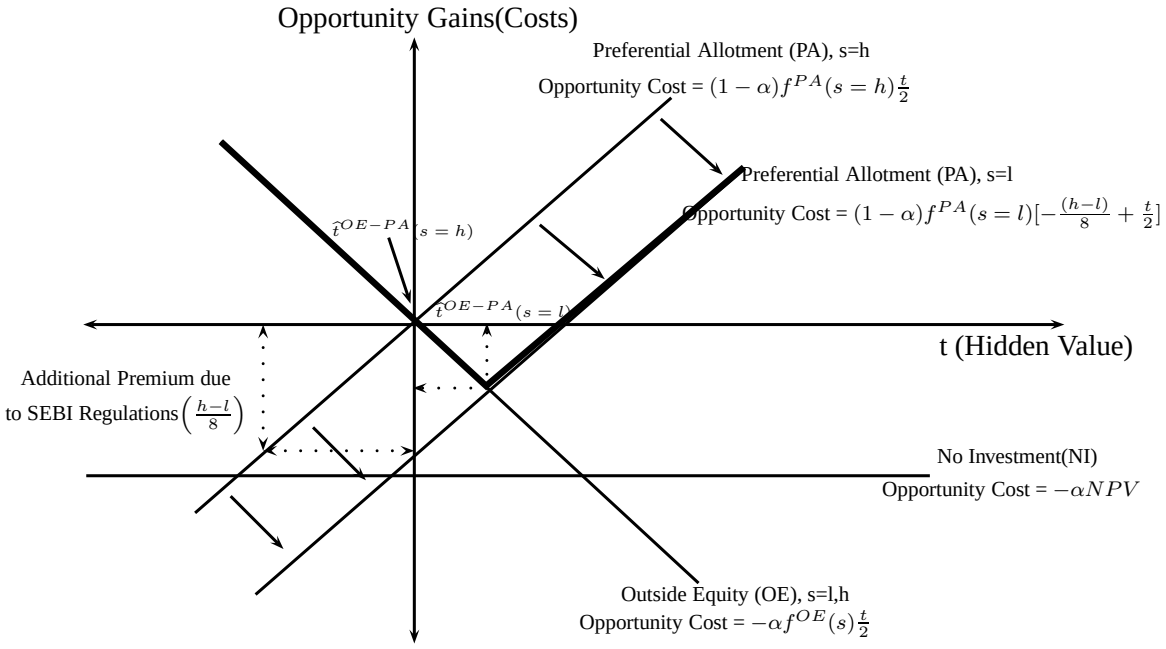
by $-\alpha f^{OE}(s=l)\frac{t}{2}$, where α is the proportionate owner-managers' shareholding. Note that this opportunity loss transforms into an opportunity gain for owner-managers when t is negative, and owner-managers would not mind opting for outside equity for negative signals of t.

Finally, let us consider the preferential allotment alternative, when $s = l$. This case is slightly more complicated because owner-managers play a dual role - as buyers in the preferential allotment and as (part) owners selling a stake in the firm. Whatever owner-managers gain (lose) as new buyers would appear as losses (gains) in their other role as existing owners. To see this, recognize that owner-managers (as buyers) would pay an additional premium due to SEBI regulatory constraints, which require the firm to issue shares at the higher historical average price than the most recent market price of the firm. This difference can be shown to be equal to $\frac{(h-l)}{8}$ (see Equation 10, Appendix 1). If the fraction of shares issued in the preferential allotment is $f^{PA}(s = l)$, then the opportunity loss due to this additional premium is given by $-f^{PA}(s=l)\frac{(h-l)}{8}$.

In addition, owner-managers (as buyers) face an opportunity gain when $t > 0$ because they buy undervalued shares. This opportunity gain is given by $f^{PA}(s=l)\frac{t}{2}$. The net gain (loss) of owner-managers in their role as buyers is equal to $f^{PA}(s=l)[\frac{t}{2}-\frac{(h-l)}{8}]$. Assume that buyers make a net gain. Now consider the role of owner-managers as owners. First, the owners as a group lose whatever the buyers gain. Thus, the owners as a group would lose $f^{PA}(s=l)[\frac{t}{2}-\frac{(h-l)}{8}]$. However, because owner-managers only hold a fraction α of the firm, they will face only a fraction of α of these costs in their role as owner-managers. Now consider the overall effect on owner managers: as buyers they gain $f^{PA}(s=l)[\frac{t}{2}-\frac{(h-l)}{8}]$ but as owner-managers they lose $\alpha f^{PA}(s=l)[\frac{t}{2}-\frac{(h-l)}{8}]$. The net effect is an opportunity gain (loss, if negative) of $(1-\alpha)f^{PA}(s=l)[\frac{t}{2}-\frac{(h-l)}{8}]$. Note that the preferential allotment alternative imposes a reverse dilution effect on owner-managers. An opportunity gain occurs when t is positive and an opportunity loss when t is negative.

The opportunity gains (costs) lines under the three alternatives (NI, OE, and PA) are shown in Figure 4 as a function of the private signal of t observed by owner-managers. The NI alternative is independent of t, the OE alternative is a declining linear function of t, and the PA alternative is an increasing linear function of t. First, note that there is a single opportunity gains (costs) line associated with the OE alternative, but there are two opportunity gains (costs) lines associated with the PA alternative. This situation arises because SEBI pricing regulations,

Figure 4: Opportunity Gains (Costs) of Owner-Managers under the Outside Equity(OE), Preferential Allotment(PA), and No Investment (NA) Alternatives: No Underinvestment Case.



which apply only in the PA alternative, impose different restrictions on the issue price in the $s = h$ case and the $s = l$ case. The $s = l$ opportunity gains (costs) line in the PA alternative reflects a downward shift (relative to the $s = h$ opportunity cost line) due to the additional premium imposed by SEBI regulations. This can be seen in the y-intercept of the $s = l$ line. It is equal to $-\frac{(h-l)}{8}$, the difference in the historical average price and the most recent price. Since, this additional premium is absent in the $s = h$ case, the PA alternative for the $s = h$ case goes through the origin.

Now consider the $s = h$ case. It can be seen from Figure 4 that the OE and $PA(s = h)$ opportunity cost lines intersect exactly at the origin. Note also that the opportunity gains (costs) line of the NI alternative lies completely below the origin. It is easy to note that NI alternative will never be preferred. For any private signal $t < 0$, owner-managers would prefer the OE alternative, and for any private signal $t > 0$, owner-managers would prefer the $PA(s = h)$ alternative. The V-shaped contour that follows the OE opportunity cost line for all values of t below 0 and the $PA(s = h)$ opportunity cost line for all values of t greater than 0 describes the equilibrium investment-financing decision of owner-managers when $s = h$. For no value of t would the NI

alternative be considered worthwhile since the opportunity costs (gains) under other alternatives would be strictly lower (higher). In other words, there will *no* underinvestment in the economy, in line with the intuition of the example in the introduction. The critical value of t when the owner-manager switches from the OE alternative to the PA alternative is 0, which is the same as the value of $\widehat{t}^{OE-PA}(s = h) = 0$, discussed in Proposition 1. It can be seen that the $s = h$ case is simply the Myers-Majluf world where owner-managers face no capital constraints and are allowed to finance projects by investing in the firms's equity at the prevailing market price.

In the $s = l$ case, SEBI regulations affect the equilibrium outcomes. Now the PA alternative shifts downwards, and as can be seen in the figure, the intersection point of the OE and PA alternatives shifts to the right. Furthermore, since the intersection point lies above the opportunity gains (costs) line for the NI alternative for all value of t, the NI alternative is again irrelevant (i.e., there will never be any underinvestment). The optimal investment-financing decision of owner-managers is similar to $s = h$ case, except that the relevant t value shifts from the origin to the right. The new critical cutoff value of t is now given by the x-intercept of the intersection point between the OE and PA alternatives. To the left of this cutoff value, the opportunity gains (costs) under the OE alternative dominate the other alternatives, but to the right of this cutoff value, the opportunity gains (costs) under the PA alternative are superior to the other alternatives. In other words, owner-managers use a more conservative cutoff when opting for a preferential allotment in the $s = l$ case. The V-shaped darkened line represents the opportunity gains (costs) associated with the optimal investment-financing decision of owner-managers for different values of the signal of private information (t). Furthermore, upon equating the opportunity costs under the OE alternative and the PA alternative, one can show that the x-intercept of the intersection point is the same as $\widehat{t}^{OE-PA}(s = l)$, as stated on Proposition 1. Thus, to the left (right) of $\widehat{t}^{OE-PA}(s = l)$, the OE (PA) alternative dominates. Owner-managers use a more conservative cutoff when opting for a preferential allotment in the $s = l$ case.

To see the role of the NPV cutoff condition in Proposition 1, note that if the intersection point of the OE and PA opportunity gains (costs) lines lies below (as opposed to above) the opportunity cost line representing the NI alternative, there could be values of t for which owner managers would prefer to forgo the project. This can be seen in Figure 5 where the locus of the optimal financing alternatives is shown as a dark line. Such a situation is likely to happen when the additional premium imposed due to SEBI regulatory constraints is large in relation to the owner-managers' share of the NPV of the project. An increase in the additional premium pushes

the opportunity cost line of the PA alternative further downwards. At the same time, a decrease in the NPV of the project pushes the opportunity cost of the NI alternative upward. Thus, the relative magnitude of the additional premium as compared to the owner-managers' shareholding (α) times the NPV of the project determines whether the intersection point of the OE and the PA alternatives lies above or below the opportunity cost line of the NI alternative. In Figure 4, the intersection point is above the opportunity cost line of the NI alternative. This implies that there would be no underinvestment in the economy. For the case where the intersection point lies below the NI opportunity cost line, as depicted in Figure 5, it is easy to see that there is an intermediate range of t values around $\widehat{t}^{OE-PA}(s)$ where the owner-managers would prefer the underinvestment alternative (NI). However, for relatively low (high) values of t, the OE (PA) alternative would be preferred. Thus, if α times the NPV of the project is not sufficiently high relative to the additional premium caused by SEBI regulations, underinvestment may occur for certain values of t.

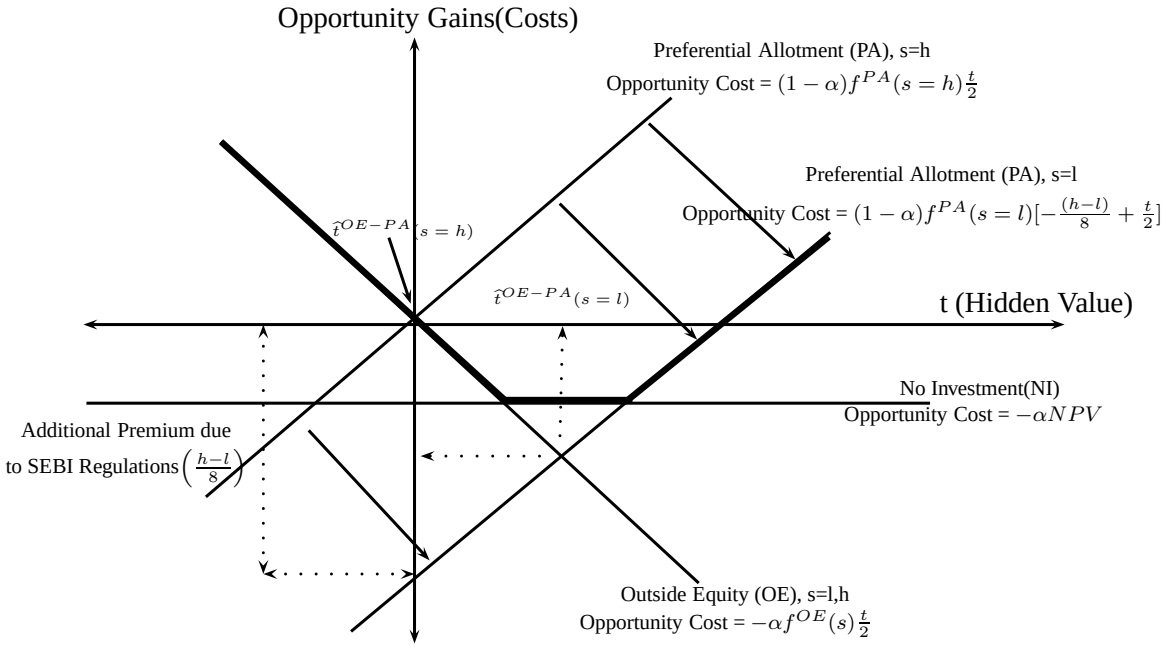
The y-value of the intersection point depends on the additional premium paid by owner-managers when a preferential allotment is made in the $s = l$ situation. By equating the y-value of the intersection point with the constant opportunity cost under the NI alternative, one can back out the critical NPV cutoff that will trigger some underinvestment. This lower bound of the NPV is $\overline{NPV}(s)$, the same as stated in Proposition 1.[10]

To summarize, the underinvestment situation that arises in the Myers and Majluf (1984) world is eliminated (for sufficiently positive NPV projects) when preferential allotment to insiders is allowed.[11] The overall intuition behind this result is as follows. When insiders see

[10] Upon examination of the NPV cutoff condition in Proposition 1, it can be seen that the cutoff, $\overline{NPV}(s)$, is increasing in $h - l$, a measure of the volatility in assets-in-place, and $\frac{(x+y)}{2}$, a measure of the cash flows (project size), but decreasing in α, the owner-managers' shareholding. Since underinvestment is more likely when the NPV condition is violated, the model suggests that underinvestment is more likely for large projects in the case of firms operating in risky businesses, particularly and with small owner-manager stakes.

[11] If the project has a negative NPV, our model implies that for extremely good (bad) news about the hidden value, preferential allotments (outside equity) are used. Thus, overinvestment would occur. For intermediate realizations of the hidden value, the project is not taken up (underinvestment). This fact can be easily verified in graphical terms by considering a negative NPV project in Figure 5. The opportunity cost of the NI alternative would now lie above (and parallel) to the x-axis. The optimal financing plan will be similar to that shown in Figure 5, except that the underinvestment range will increase. Interestingly, one can see that preferential allotments would still be socially beneficial because they arise only when the good news about hidden value more than offsets the bad news implicit in the negative NPV project. Therefore, the information content of a preferential allotment is positive even when the project has a negative NPV. For extremely adverse news about hidden value, the negative NPV project may still be taken up with outside equity financing. Outsiders are never averse to subscribing to

Figure 5: Opportunity Gains (Costs) of Owner-Managers under the Outside Equity(OE), Preferential Allotment(PA), and No Investment (NA) Alternatives: Underinvestment Case.



"good" information, they are reluctant to issue equity to outsiders due to the dilution of original shareholder's wealth, because of the information asymmetry between insiders and outsiders. In our model, subject to the NPV cutoff condition, the information asymmetry-driven "dilution" problem does not generally arise. The information asymmetry is completely resolved because shares would be issued to informed insiders whenever the information is "good". When the information is "bad", shares would be issued to outsiders, who are always willing to buy them because they are issued at fair value (SEBI regulations apply only to preferential allotments).[12]

an equity issue because the issue price is always "fair," conditional on their information set. This would result in socially sub-optimal overinvestment. Finally, there would be a positive reaction to underinvestment because the pre-announcement price reflects the negative NPV investment opportunity. The general case of negative NPV investment opportunities is discussed in detail in Cooney and Kalay (1993).

[12]The special case where private placements can be made to private equity players has not been explicitly considered in this model. If private equity players are uninformed, they are no different from outside equity holders in our model. There would be no need to consider them separately. However, if private equity players are informed participants (for instance, if they can either acquire information by incurring a cost or if they are partially informed about t), then the model can be extended to consider this possibility. Given that the private equity player either faces costs of information acquisition or observes only partial information, she would require an even higher threshold value of t to participate in a preferential allotment (because she is also subject to SEBI's regulatory pricing restrictions). In other words, it would never be the case that the private equity preferential allotment will replace a preferential allotment to owner-managers. In equilibrium, there will be no preferential allotments made

(Of course, they may be interested in selling even more equity than the requirement of funds for the project, which is not permitted by assumption.) Finally, the strong "no underinvestemnt" result is weakened when the NPV of the investment opportunity is low relative to the additional premium on the issue price imposed by SEBI rules. Owner-managers have less to forgo when the NPV of the investment opportunity is low and may prefer to underinvest when their private information about the hidden value is marginally positive.

We next explore the comparative statics properties of the critical threshhold $\widehat{t}^{OE-PA}(s)$, which determines the cutoff between OE and PA in our model.

Corollary 1.

i. *The critical threshold cutoff,* $\widehat{t}^{OE-PA}(s)$ *has the following properties:*

$$\widehat{t}^{OE-PA}(s=h) < \widehat{t}^{OE-PA}(s=l), \frac{\partial \widehat{t}^{OE-PA}(s=l)}{\partial(h-l)} > 0, \frac{\partial \widehat{t}^{OE-PA}(s=l)}{\partial \alpha} < 0 \qquad (5)$$

ii. *The announcement period reaction,* $\Delta P(s)$*, is greater than* 0*.*

$$\Delta P(s) = \frac{[\widehat{t}^{OE-PA}(s)+H]}{4} = \frac{1}{16}\frac{[(s+x+y)(1-\alpha)(h-s)]}{\left[(s+x+y)+\frac{\alpha}{4}(h-s)\right]} + \frac{H}{4} > 0, s = l, h \qquad (6)$$

iii. *The announcement period return is inversely related to the price path dynamics* $(s = l, h)$ *and the degree of information asymmetry about the hidden value (t), as measured by* H*. Conditional on* $s = l$*, announcement period returns are positively related to the degree of uncertainty in the value of assets-in-place,* $(h - l)$*, but inversely related to the owner-managers' shareholding* (α)*.*

$$\Delta P(s=h) < \Delta P(s=l), \frac{\partial \Delta P(s)}{\partial H} > 0, \frac{\partial \Delta P(s=l)}{\partial(h-l)} > 0, \frac{\partial \Delta P(s=l)}{\partial \alpha} < 0 \qquad (7)$$

to private equity players. But if owner-managers are capital-constrained then the choice is between outside equity financing to the public or the private equity player, if the project is to be undertaken. It is obvious that as long as owner-managers do not observe too high a value of t (that would trigger significant dilution when shares are sold to outsiders), she would prefer issuing shares to a private equity player rather than going for a public issue, because the private equity player would be willing to pay more than the uninformed outsiders. This conclusion is similar to what Hertzel and Smith (1993) find from their empirical analysis based on the Myers and Majluf (1984) model.

Proof: See Appendix 1.

Corollary 1 (i) presents a few properties of the critical threshold cutoff, $\widehat{t}^{OE-PA}(s)$. As discussed earlier, the cutoff is exactly equal to 0 for $s = h$, but strictly greater than 0 for $s = l$. Corollary 1(ii) discusses the model's implications about the announcement period effects of preferential allotments. Upon announcement of a preferential allotment to owner-managers, the market infers that the owner-managers must have seen a private signal, $t > \widehat{t}^{OE-PA}(s)$. Given that t arises from a uniform distribution over the interval $(-H, H)$, the market computes the expectation of t, conditional on the announcement of a preferential allotment, as equal to $\frac{[\widehat{t}^{OE-PA}(s)+H]}{2}$. Furthermore, since hidden value is given by the outcomes $(t, 0)$, where each of the outcomes is equally likely, the inferred expectation of the hidden value, conditional on a preferential allotment is $\frac{[\widehat{t}^{OE-PA}(s)+H]}{4}$. Corollary 1 (ii) states the announcement period returns for preferential allotments in closed form after substituting for $\widehat{t}^{OE-PA}(s)$. Note that the announcement period return is positive for preferential allotments.[13] Furthermore, the announcement period reaction depends on price path dynamics ($s = l, h$) and owner-managers' shareholding (α), but is positively related to the degree of uncertainty in value of the assets-in-place, $(h-l)$, and the degree of information asymmetry about the hidden value (t), as measured by H. Corollary 1 (iii) identifies these relationships.

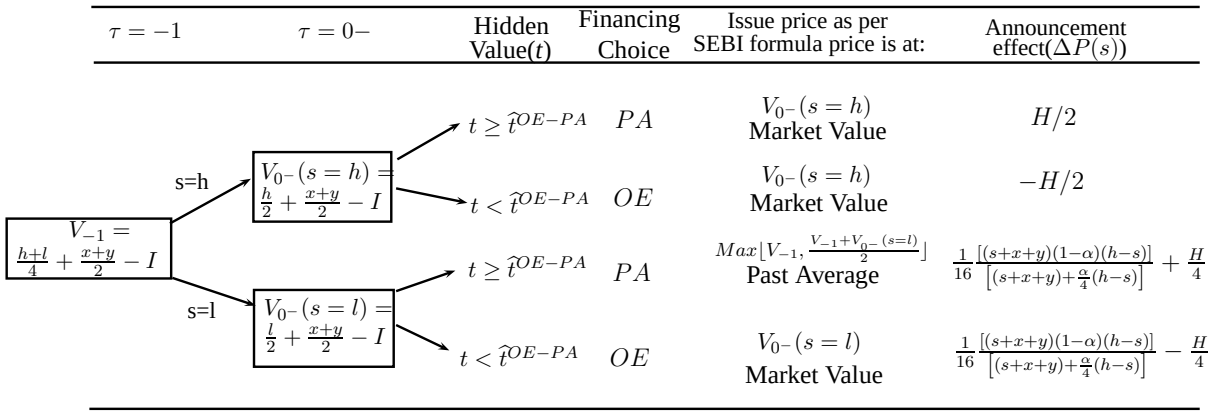
E. Manipulation

From a social perspective, private placements to owner-managers are a positive institutional arrangement.[14] However, the price at which these shares are issued to insiders is critical because managers may have incentives to manipulate share prices (in order to issues shares to themselves at discounts to the true value). Mechanisms such as the SEBI-mandated issue price (for

[13]The focus of our study is on preferential allotments, but the model also provides emprically testable implications for outside equity issues. The model suggests that the average inferred news about t, conditional on the announcement of an outside equity issue, is equal to $\frac{[-H+\widehat{t}^{OE-PA}(s)]}{2}$. Furthermore, since hidden value is given by the outcomes $(t, 0)$, where each of the outcomes is equally likely, the inferred expectation of the hidden value, conditional on an outside equity issue is $\frac{[-H+\widehat{t}^{OE-PA}(s)]}{4}$. On average, the announcement period reaction will be negative, *a la* Myers and Majluf (1984). This implication is a well-documented empirical phenomenon across the world. Furthermore, if $s = l$, the announcement period returns for outside equity would be less negative than if $s = h$.

[14]The discussion does not deal with possible "tunneling" activity where owner-managers siphon resources from the new project.For instance, see Bertrand et al (2002)

Figure 6: Owner-Managers Investment-Financing Decisions and Announcement Period Returns.



preferential allotments)try to ensure that manipulation of share prices yields lower benefits to owner-managers, since they are forced to issue shares at a historical average price rather than at the most recent valuation (as would be the case in an outside equity issue). This feature of the SEBI preferential allotment regulations allows the market to preserve the social benefits of preferential allotments, without too much of an adverse effect on minority shareholders. In this subsection, we formulate a generalized version of the model that captures manipulation possibilities in order to develop testable empirical implications.[15]

In our model, we are indifferent as to what drives manipulation. We are just interested in the influence of manipulation on the decision to opt for a preferential allotment. Therefore, we define manipulation in the model by the variable w, which captures the dollar amount by which the price level per share can be brought down before the announcement of a preferential issue.[16]

[15]In this paper, our objective of empirically testing the model on Indian securities market data can be achieved under the assumption of an exogenous issue pricing rule (as shown in our model). However, from a policy perspective, it may be useful to develop a model of optimal regulation where the issue pricing rules in preferential allotments are endogenously derived.

[16]Models of manipulation can be classified into trade-based manipulation models [Allen and Gorton (1992), Brunnermeier (2000)], information based manipulation models [Benabou and Laroque (1992)] and action-based [Bagnoli and Lipman (1996)] manipulation models. In trade-based manipulation models, prices are manipulated using sophisticated trading strategies. In information-based manipulation models, prices are manipulated by the strategic release of news about a firm. The classic popular legend regarding Nathan Rothschild's alleged opportunism during the Battle of Waterloo illustrates this style of manipulation. With the help of carrier-pigeons and a network of spies, Rothschild came to know much before other traders in London that the Duke of Wellington was about to defeat Napolean in the famous Battle of Waterloo. He asked his agents to vigorously sell consol bonds (perpetual treasury bonds) issued by U.K. Treasury. Seeing this, other traders began to liquidate their

Owner-managers benefit from manipulation because they are able to issue shares at a lower price (by an amount equal to w) than otherwise. Obviously, owner managers would want to increase w by as much as possible. However, it is reasonable to assume that manipulation is a costly exercise that may involve deadweight (fixed) costs, increasing marginal costs, as suggested in the market microstructure literature (see Kyle (1985) and other studies on price impact of trades), and finally, because manipulation is an illegal activity, it attracts penalties and reputation costs. These costs are likely to be increasing in the degree of manipulation and it is safe to assume that manipulation will be bounded within an upper limit due to such costs. Even within this upper limit - a breakeven level of manipulation, beyond which costs of manipulation exceed benefits of manipulation - owner-managers may prefer to choose an interior level of manipulation (w^*) depending on the marginal costs and benefits of manipulation. For the purposes of our paper, the exact nature of such an optimization exercise is of secondary importance. Therefore, we generalize our model under the assumption that the owner-managers choose a level of manipulation given by w^*, where w^* has been determined from an exogenously specified optimization exercise.[17]

In Appendix 1, we show that in this generalized model, the earlier results on the threshold cutoffs stated in Proposition 1 get modified as follows:

$$\widehat{t}^{NI-PA}(s) = \left[(s+x+y-\frac{1}{4}(h-s)-w^*)\right]\left[\frac{I-\alpha\frac{x+y}{2}}{I(1-\alpha)}\right]-(s+x+y)<0, s=l,h \quad (8)$$

$$\widehat{t}^{OE-PA}(s) = \left[\frac{\left[s+x+y-w^*\right]\left[s+x+y-w^*+\frac{1}{4}(h-s)\right]}{(s+x+y-w^*)+\frac{\alpha}{4}(h-s)}\right]-(s+x+y), s=l,h \quad (9)$$

$$\widehat{t}^{OE-NI}(s) = (s+x+y-w^*)\frac{\frac{(x+y)}{2}}{I}-(s+x+y), s=l,h \quad (10)$$

Note that the critical cutoff, $\widehat{t}^{OE-PA}(s)$ is decreasing in w^*. The intuition behind this result is straightforward. With manipulation, the issue price would be lower than otherwise; correspondingly, a greater fraction of the firm ($f^{OE}(s)$ and $f^{PA}(s)$) has to be put on sale to raise the same amount of money. The effect of manipulation can be seen in Figure 4. The slopes of the

inventory of consols. Rothschild mopped up all these bonds at incredibly cheap price levels. When the news about England's success in the battle finally broke out, Rothschild's strategy of manipulating Consol prices paid handsome dividends! Other observers attribute the profits to shrewd analysis. Finally, in action-based manipulation models, profitable trading positions are taken up just prior to a critical action that is initiated by a related party (for instance, a takeover bid may be announced).

[17] We discuss the nature of such an optimization exercise in Appendix 1.

opportunity cost lines for OE and $PA(s = l)$ change as the fraction of shares sold increases (the opportunity cost line for the NI alternative remains unaffected). The net result is that both lines become steeper - the OE opportunity cost line rotates clockwise and the PA opportunity cost line rotates counterclockwise. The x-intercept of the point of intersection (i.e., $\widehat{t}^{OE-PA}(s)$) of the OE and $PA(s = l)$ opportunity cost lines shifts to the left. This implies that in a world with manipulation, one can, *ex-ante*, expect a greater frequency of preferential allotments. This result is consistent with our intuition that allowing the preferential allotment mechanism as a feasible alternative encourages manipulation. Owner-managers consider private placements for lower values of the private signal (t) than in a world where manipulation is restricted.[18] It also provides the basis for a testable empirical implication of the model, as will be discussed below. In particular, it justifies the use of our empirical methdology to estimate the announcement effects of privatge placements, in the presence of possible manipulation of prices.

F. Testable Hypotheses

We formulate the following hypotheses based on our model and the extant literature. Hypotheses H.1-H.5 are based on the empirical implications arising from the model and we refer to these collectively as the Undervaluation Hypotheses.

Hypotheses based on the model:

H.1 *On average, the overall announcement period price reaction for preferential allotments should be positive.*

H.2 *On average, the announcement period price reaction should be more positive if the preferential allotment occurs after a low price path ($s = l$), compared to an allotment that occurs after a high price path ($s = h$).*

H.3 *On average, the announcement period price reaction should be positively related to the volatility of returns.*

H.4 *Conditional on an issue being made after a low price path ($s = l$), the average announcement period reaction should be inversely related to the owner-managers' pre-announcement shareholding (α).*

[18] In the modification of the Takeover Code that is under discussion, SEBI proposes to increase the time interval over which the average price will be computed to a period greater than six months.

H.5 *On average, the announcement price reaction should be negatively related to the leverage of the firm.*

Proposition 1 shows that the manager's choice of financing depends on the signal of the hidden value (t), and whether $s = h$ or $s = l$. The owner-managers favor preferential allotment for positive signals of t, when $s = h$, and for sufficiently positive signals of t, when $s = l$. Hypothesis H.1 states that announcement period reactions, on average, should be positive for preferential allotments. It follows from Corollary 1 (ii).

One of the key drivers of empirical implications of the model is the cutoff, $\widehat{t}^{OE-PA}(s)$. Note that a change in any one of the parameters of the model triggers a response by owner-managers. The response may either be an increase or a decrease in $\widehat{t}^{OE-PA}(s)$. An increase corresponds to a more cautious preferential allotment policy in the sense that owner-managers become more selective in opting for the preferential allotment alternative. As a result, the average announcement period reaction would be higher under a cautious policy. In contrast, a decrease in $\widehat{t}^{OE-PA}(s)$ corresponds to a more aggressive preferential allotment policy that results in a lower announcement period return. As a result, a cross-sectional difference in environment would imply cross-sectional differences in announcement period returns. Hypotheses H.2-H.4 are based on this line of reasoning.

Hypothesis H.2 discusses the impact of the price path dynamics. When $s = l$, the SEBI-imposed formula issue price is based on the historical average price, which is greater than the most recent market valuation. As a result, the issue price reflects an additional premium, and owner-managers become more cautious about preferential allotments when $s = l$ than when $s = h$. Owner-managers would choose a higher cutoff, $\widehat{t}^{OE-PA}(s))$, for the $s = l$ case. The announcement period reaction to preferential allotments when $s = l$ would, therefore, be greater than when $s = h$, because preferential allotments in the former case occur more selectively (i.e., for higher signals of t).

Hypotheses H.3-H.4 also follow directly from Corollary 1 (iii). First, the announcement period reaction is positively related to H, which captures the magnitude of information asymmetry about the hidden value (HV). Further, the announcement period reaction is positively related to $(h - l)$, which captures the uncertainty in the value of the assets-in-place (AIP). Now, since the volatility of returns is positively related to uncertainty about both hidden value and asset-in-place, it follows that the announcement period return should be increasing the volatility of

returns (Hypothesis H.3). In terms of intuition, more volatile stocks imply a greater amount of information uncertainty (H), as well as higher additional premium (which depends on $(h-l)$, due to SEBI mandated issue-pricing restrictions). Although an increase in H does not affect the cutoff, $\widehat{t}^{OE-PA}(s)$, it leads to a greater announcement effect (because it is equal to $\frac{\widehat{t}^{OE-PA}(s)+H}{4}$). An increase in $(h-l)$ results in a more cautious preferential allotment policy (a higher cutoff). No matter what the source of the increase in the volatility of returns happens to be, it would cause the announcement period reaction to increase.

Hypothesis H.4 follows after recognizing that the owner-managers' shareholding, α, matters only in the $s=l$ state because $\widehat{t}^{OE-PA}(s)$ is 0, when $s=h$, but is non-zero only when $s=l$. Note that owner-managers experience the greatest marginal benefit from a preferential allotment when their shareholding (prior to the financing event) is high because the opportunity loss due to dilution effects is higher when they hold more shares. This makes the PA alternative more attractive than the OE alternative. Therefore, owner-managers use a lower threshold cutoff value, $\widehat{t}^{OE-PA}(s)$, as a trigger for the preferential allotment alternative when they hold a greater fraction of the firm. Conversely, when the shareholding is low, the threshold cutoff that triggers a preferential allotment, increases. Thus, for a low α, when the market does observe a preferential allotment, it infers that the managers have seen a highly positive signal of t. The announcement period reactions to preferential allotments are, therefore, inversely related to the proportionate shareholding of the owner-managers.

Hypothesis H.5 states that leverage has a negative effect on announcement period returns. It can be shown that $\widehat{t}^{OE-PA}(s=l)$ decreases with leverage.[19] In other words, a leverage increase induces a more aggressive policy of opting for the preferential allotment alternative, and therefore, the announcement period effect decreases with leverage.[20]

[19]Suppose debt payments amounting to the face value of debt are due on the liquidation date ($\tau=1$). An easy way to assess the impact of leverage is to assume that h and l reflect cash flows arising from asset-in-place (AIP) net of face value payments on debt contracts. Thus, an increase in debt can be modeled as a reduction in the cash flow from assets-in-place (AIP), namely, h and l. The impact of leverage can be seen by differentiating $\widehat{t}^{OE-PA}(s=l)$ in Equation 3, after noting that leverage does not affect the difference $(h-l)$ but affects l only.

[20]It is also important to note that leverage, in general, can have a direct exogenous affect on announcement period returns. In the context of our model, a leverage-induced symmetric reduction in h and l only changes the mean of cash flows (arising from assets-in-place (AIP)) without affecting the volatility of cash flows because h and l arise from a binary distribution with equally likely outcomes. Thus announcement period *price* reaction will not change with leverage because the volatility of cash flows, $(h-l)$, is invariant to leverage. However, announcement period *returns* would increase because the denominator of returns, namely equity value, decreases with leverage. This implication suggests a positive relationship between announcement period returns and leverage, whereas the model suggests a negative relationship. It is an empirical question as to which effect will dominate or whether these two effects will offset each other.

Hypotheses regarding manipulation:

Manipulation is an important issue in the context of preferential allotments because it could suggest empirical implications similar to those suggested by the information asymmetry explanation proposed in this paper. In other words, manipulation could affect announcement period effects associated with preferential allotments. This could happen in two ways. The first is because the announcement of a preferential allotment reveals to the market that owner-managers might have been manipulating prices downward in the prior period. The market would then correct itself with a positive adjustment, i.e., the announcement period reaction would be positive. We refer to this effect as the manipulation revelation effect. It suggests that, in a world of manipulation, preferential allotments should be associated with positive announcement period returns. This effect would arise even without information asymmetry.

In contrast, our model explicitly incorporates a second effect by which manipulation possibilities occur in a world of information asymmetry. We show that owner-managers will use a lower threshold cutoff to trigger preferential allotments when manipulation is possible, thereby leading to a lower announcement period effect. This aggressive preferential allotment policy effect arises purely due to information asymmetry issues. Note that this effect implies a lower announcement period return in a world of manipulation - exactly opposite to that suggested by the manipulation revelation effect. It is an empirical matter as to which of the two effects dominates.

H.6 *On average, the announcement period reaction should be decreasing in the illiquidity of the firm's stock.*

H.7 *On average, the announcement period price reaction should be positively (negatively) related to the abnormal returns (abnormal volume) experienced during the six-month prior to the announcement date.*

Hypotheses H.6 and H.7 are useful because they present testable propositions that arise in a world of information asymmetry and manipulation. Hypothesis H.6 follows because illiquidity reduces the costs of manipulating asset prices (market prices move much more in a direction favorable to owner-managers for a given amount of investment in manipulation). In illiquid stocks, manipulation is easier and owner-managers would employ even lower threshold cutoffs to trigger a preferential allotment (as a result, the announcement period reaction would be lower). As stated in Hypothesis H.6, the announcement period reaction should be inversely related to the

illiquidity of the stock.

Two alternative empirical proxies for manipulation are the abnormal volume and the abnormal return in the six-month period prior to the announcement date. If manipulation (in the period prior to the announcement) causes a depressed stock price, it would result in a negative (or a lower) abnormal return during this period than in a world without manipulation. In addition, an indirect indication of manipulation is the abnormal trading volume in the six month period prior to the announcement. Hence, in the presence of manipulation (as measured by a lower abnormal return or a higher abnormal volume in the six month period prior to the announcement date), the announcement period return would be lower than otherwise. In other words, the announcement period price reaction should be positively (negatively) related to the abnormal return (volume) experienced during the six-month period prior to the announcement date). Hypothesis H.7 is a unique testable proposition of our model.

Hypotheses based on existing literature:

Our empirical tests are based on a set of preferential allotments issued to all types of buyers (not just owner-managers, but also to private equity firms, banks and financial institutions) because our basic model is applicable in all these cases. It is therefore important to allow for competing hypotheses generated in the context of private placements. Although some of the above predictions are unique to our model (Hypotheses H.2, H.3, and H.4), the remaining predictions can also arise in the context of alternative hypotheses. For instance, Hypothesis H.1 (positive announcement period returns) is also implied by the Monitoring Hypothesis (private equity players provide better monitoring) as well as the Certification Hypothesis (presence of private equity is a credible signal of hidden value). Note also that exactly the converse of Hypothesis H.1 is implied by the Entrenchment Hypothesis, which suggests that private placements should be associated with negative announcement period returns because of managerial self-dealing.

Hypothesis H.4 applies to the sub-sample of preferential allotments that follow a low price path ($s = l$). The same implication, as applied to the entire sample could also arise in the context of the Entrenchment Hypothesis, which states that high managerial ownership should result in greater self-dealing, and hence, lower announcement period returns. Interestingly, the Monitoring Hypothesis implies that the announcement period reaction should increase in the owner-managers' share-holding, because the value of monitoring is higher if the manager holds

a higher ownership stake. This prediction is exactly opposite to that from our model and from the Entrenchment Hypothesis. Empirical tests of competing hypotheses can, therefore, help us understand the relative importance of the various alternative hypotheses in explaining private placements in the Indian capital markets.

In addition to the hypotheses based on our model, we also test the following hypotheses that arise from the existing literature:

H.8 *Preferential Allotments issued by business group affiliated firms should experience under-reaction compared to stand-alone firms.*

Baek, Kang, and Lee (2006) find that group firms are able to expropriate shareholder wealth by issuing shares at steep discounts in private placements. As noted earlier, business groups in India often engage in private placements. Given the propensity of business groups to transfer resources across companies (see for example, Rajan, Zingales and Sarvaes, 2000), it is likely that private placements by business groups will be viewed less favorably than private placements made by stand-alone firms. This prediction is also consistent with the Entrenchment Hypothesis.

H.9 *Preferential allotments made to private equity investors should experience a more positive reaction compared to preferential allotments made to banks and financial institutions.*

Hypothesis H.9 is a manifestation of the Monitoring Hypothesis and is confirmed in the studies of Hertzel and Smith (1993) and Barclay et al. (2007). There is evidence to suggest that private equity players are active shareholders (Monitoring Hypothesis) and often possess superior information about the prospects of a firm (Certification Hypothesis). On the other hand, banks and financial institutions are likely to be passive shareholders (Entrenchment Hypothesis), especially in the context of India where preferential allotments to banks are often the result of financial restructuring when debt is stressed. The net effect from any or all of these hypotheses is that the market views preferential allotments to banks and financial institutions less favorably than preferential allotments to private equity players.

The detailed hypotheses discussed above can be related to the various theories advanced in the literature relating to announcement effects of private placements. To summarize, Hypotheses H.1 - H.5 can classified as the Undervaluation Hypotheses, H.1, (the converse of) H.4, and H.8 as the Monitoring Hypotheses, H.1 and H.8 as the Certification Hypotheses, H.1, H.4, H.8, and H.9 as the Entrenchment Hypotheses, and H.6 and H.7 as the Manipulation Hypotheses.

III Empirical Analysis

In this section, we present empirical tests of hypotheses developed in the previous subsection. First, we discuss the construction of the data sample. Then, we provide details of the empirical methodology used to determine the abnormal return and volume measures used to test the hypotheses. Finally, we present summary statistics that describe the data and results associated with our tests.

A. Construction of the Database

We obtained data from several sources for building our database of preferential allotments of equity in India. We started with news reports from Bloomberg regarding the announcement dates of preferential allotments of equity. These were matched with corresponding data obtained from the corporate announcements site of the Bombay Stock Exchange (BSE). Once the firms had been identified, the details of the preferential allotments (available as .pdf files) were obtained by searching for each individual firm in the corporate actions dataset on the BSE website. We manually digitized the available .pdf files, extracting data on issue price, names of buyers, types of buyers, purpose of issuing preferential shares, number of shares issued to each subscriber, and proportion of the shares issued to the total share capital of the firm. Using this procedure, we were able to obtain a sample of 175 preferential allotments made by BSE-listed firms during the period 2001-2009. In addition, we also obtained firm level financial, ownership, and stock price data from the Prowess database of the Center for Monitoring Indian Economy (CMIE). These data were matched with the data on preferential allotments. After completing the matching exercise, our final sample was reduced to 164 preferential allotments, due to unavailability of firm level data for some firms.

The definitions used for identifying family business group affiliated firms and stand-alone firms as well as the industry classification of firms in the sample were also obtained from Prowess. (The Prowess industry classification is similar to the 3-digit SIC code in the U.S.) Our sample of preferential allotments is spread across 42 industries with no significant concentration in any one industry. However, software, infrastructure and banking firms each account for more than 5% of the total number of issues.

B. Measurement of abnormal returns and abnormal volume

In order to test the hypotheses related to manipulation, we computed the Cumulative Abnormal Return (CAR) and the Cumulative Abnormal Volume(CAV), over the period prior to the announcement date. Announcement period reactions are estimated by calculating these values around the announcement date. We used the standard single-factor market model to measure the abnormal return on a stock around the announcement date of the preferential allotment. The model is specified as follows:

$$R_{i,t} = a_i + b_i R_{m,t} + \varepsilon_{i,t}, \tag{11}$$

where $R_{i,t}$ is the return to security i at time t, $R_{m,t}$ is the corresponding market return, b_i is the sensitivity parameter estimate for security i, a_i is the intercept term for security i and ε_{it} is the error term. Abnormal return is defined as the estimated error term for a particular security for a given time.

Given that the announcement day of the offer is defined as day 0 in the event window period, abnormal returns are calculated over event window periods of [-1 to +1], [-5 to +5] and [-10 to +10] trading days around the announcement day of the issue. The estimation period used to calculate the parameters in Equation 11 comprises returns over days [-240 to -31] prior to the announcement day of the issue. The cumulative abnormal return (CAR) of stock i for the [-10 to +10] window can be defined as follows (the $CARs$ for the other windows are defined similarly):

$$CAR_{it} = \sum_{t=-10}^{+10} AR_{i,nt} \tag{12}$$

Cumulative Abnormal Volume is estimated using a model akin to the market model where the daily volume of a security is regressed on the corresponding day's market volume.[21] We measure market volume as the value-weighted trading volume of the top 1,000 Bombay Stock Exchange(BSE) listed securities.

$$V_{i,t} = c_i + d_i V_{m,t} + \nu_{i,t}, \tag{13}$$

where $V_{i,t}$ is the actual volume for the security i on day t and $V_{m,t}$ is the market volume. Abnormal volume is defined as the estimated error term for a given time. CAV, which is similar

[21] Cumulative Abnormal Volume (CAV) is commonly used in empirical analysis of manipulation. For example, Sanders and Zdanowicz (1992) uses CAV while investigating insider trading in corporate takeovers.

to CAR, is defined as follows:

$$CAV_{i,t} = \sum_{t=-10}^{+10} AV_{i,t}. \tag{14}$$

We calculate the CAR and CAV for three specific windows namely CAV(-22,-32), CAV(-22,-154) and CAV(-22,-250).The numbers for the three windows correspond to the respective days before the announcement date. The first two windows are used to capture abnormal volumes during the two periods used to compute the SEBI-mandated issue price. The third window (CAV -22, -250) is used to check for robustness.

C. Descriptive Statistics

Table 1 reports the descriptive statistics of the sample data. Our sample consists of 164 preferential allotments, of which 91 were made to insiders (promoters or owner-managers), 73 to private equity players, and banks and other outsiders. The variables in the data are presented under different categories - firm, issue and investor characteristics, and the size of the insider holdings. Since there were a few outliers at either end of the data, we winsorized one percent of the sample at both the high and low end for the following variables: illiquidity, volatility, interest coverage, and debt equity ratio. The average firm size is Indian Rupees 1,956.35 million, the average illiquidity (as measured by the Amihud measure of illiquidity) is 6.18%, the average daily volatility (of stock returns) is 4.01%, the average interest coverage is 6.03, and the average debt equity ratio is 0.93. The issue size, on average, is 60% of the promoter's equity or about 16% of the outstanding shares. Owner-managers and private equity investors subscribe to the placements in roughly equal measure at around 45% each, with the balance being subscribed by banks. On average, the owner-manager's stake prior to the issue is 42.39%.

To gain a more detailed understanding of the data, we stratify our sample in three ways: 1) the group affiliation of the firm, if any, 2) the price path ("high" or "low"), which determines the SEBI-mandated minimum issue price, and 3) the type of investor. Group firms, on average, are significantly larger (almost three times) than stand-alone firms. In addition, group firms are more liquid, but experience similar volatility levels as that of stand-alone firms. Group firms are more levered, by a large margin, in terms of their interest coverage than stand-alone firms. In terms of the debt-equity ratio, however, there is no significant difference between the two groups. We can also see that stand-alone firms relied less on private equity as compared to group-affiliated firms (35.2% vs. 49.5%). Other than size and extent of private equity investment, there are no other

significant differences in the issue characteristics between the group-affiliated and stand-alone firms, since the two categories of firms appear to have large cross-sectional variation on other dimensions. In particular, we find that issue size, in terms of the owner-managers' holdings or the number of shares outstanding, is not significantly different between the two groups.

In a similar vein, we divide the sample into issues that are placed after a high price path and those that are placed after a low price path. The average weekly price in the two-week period prior to the relevant date is compared with the average weekly price in the six-month period prior to the relevant date.[22] If the former is greater, the price path is classified as a "high" price path. If the latter is greater, the price path is classified as a "low" price path. Upon classification of the preferential allotments into those that occur after a "high" price path and those that occur after a "low" price path, we find that there are no significant differences in terms of issue characteristics between these two groups, as shown in Table 1. When the data are stratified by the type of investor, owner-managers (promoters) versus outsiders, we find no significant differences between the two groups, except for the interest coverage ratio. The firms in which the owner-managers hike their stakes through the preferential allotment are, on average, less leveraged than the others.

The above findings are important because some of the hypotheses being tested apply to the sub-sample of issues that are based either on group affiliation (Hypothesis H.8) or price path dynamics (Hypothesis H.2) or purchaser type (Hypothesis H.9). Overall, the results reported in Table 1 assure us that our empirical tests based on sub-samples are free from any obvious selection bias.

D. Announcement Period Returns

Table II reports announcement period returns in the form of *CARs* for three different windows [*CAR(-1, +1)*, *CAR(-5, +5)*and *CAR (-10, +10)*] around the announcement dates of preferen-

[22]The relevant date is itself 30 days (or 22 trading days) prior to the date of the Extra Ordinary General Meeting that seeks shareholder approval of the preferential allotment. This meeting occurs soon after the announcement date, but the exact date of the EGM is not readily available for our sample firms. We, therefore, make the assumption that the EGM date coincides with the announcement date. Thus, the relevant date is assumed to be one month (22 trading days) before the announcement date.

tial allotments.[23, 24] We study these three windows to take into account possible liquidity effects due to thin trading. To the extent that thin trading is an issue, the *CAR(-1,+1)* results are less reliable than the *CAR(-5,+5)* and the *CAR(-10,+10)* results. The table is divided into seven panels, the first one is related to the overall sample, and the other six are based on different classification criteria. The objective of this classification is to examine whether, at the univariate level, there are any significant differences in the announcement period returns across different groups based on Hypotheses H.1-H.5 and H.8-H.9.

Table II, Panel A reports the overall announcement period effects for the total sample of 164 preferential allotment announcements. Consistent with Hypothesis H.1, Panel A reports that the overall announcement period effect for preferential allotments is significantly positive for the 5- and 10-day windows around the announcement date, with the effect for the 1-day window being only marginally significant. This finding is consistent with those of other empirical studies of private placements.

We now turn to the announcement effects for various slices of the sample. Panel B and Figure 7 indicate that, while the announcement effects for the low-price path are significantly positive, the effects for the high price path are not significantly different from zero. Further, on average, low-price path issues have significantly higher positive abnormal return than high-price path issues in the case of the 10-day window. Both these results are consistent with Hypothesis H.2.

Panel C reports the announcement effect for sub-groups stratified by volatility into those that are below the median and those that are above the median. According to Hypothesis H.3, higher volatility of returns should imply greater announcement effects because (i) the market infers more good news from a preferential allotment when the uncertainty about the hidden value (asymmetric information) is high, and (ii) owner-managers follow a more cautious preferential allotment policy when the uncertainty in the value of assets-in-place is high. The announcement effects for the two sub-groups are significant in both cases for the 5- and 10-day windows, but

[23] As a robustness check, we also computed the CARs with alternative definitions of the windows for estimation of the slope coefficients in the market model regressions in Equation 11. In addition, we estimated the CARs with only an adjustment for the market return - in effect assuming that all the slope coefficients are one. These alternative estimations yielded qualitatively similar results, which are not reported here in the interest of brevity.

[24] We also examined longer windows to study the long-term wealth effects of the announcement [*CAR(-1, +480)*] and find, in contrast to Hertzel et al. (2002), that the long term announcement effects of Indian preferential allotments are also positive. Our results are consistent with Barclay et al. (2007), who argue that positive long term wealth effects are consistent with the Certification Hypothesis.

not as clear-cut for the 1-day window. However, we do not find any statistically significant differences between the sub-groups. The evidence at the univariate level seems to be inconsistent with Hypothesis H.3.

Panel D shows the announcement period returns for preferential allotments, where owner-managers hold a higher (lower) than median ownership stake in the firm prior to the announcement date. We can see that the announcement period returns are positive for each of the two sub-groups. This univariate result is inconsistent with Hypothesis H.4. Panel E reports the announcement effect for two sub-groups stratified by leverage, measured by the interest coverage ratio, into those that are below the median and those that are above the median. The interest coverage ratio is a better measure of leverage in our case due to the large variation in debt-equity ratios across the sample for firms in different industries. The announcement effects for the two sub-groups are significant in both cases for the 5- and 10-day windows, but not as clear-cut for the 1-day window. However, we do not find any statistically significant differences between the sub-groups in both cases. Our model suggests that higher interest coverage (lower leverage) should lead to greater announcement effects. The evidence at the univariate level seems to be inconsistent with Hypothesis H.5.

Panel F and Figure 8 report announcement period returns for group-affiliated firms and stand-alone firms. *CARs* for group-affiliated firms are significantly lower than that for stand-alone firms, for the 10-day window. The results for the other windows are in the same direction, but the differences between the two groups are statistically significant only for the *CAR (-10, +10)* window. This evidence at the univariate level is consistent with Hypothesis H.8. Finally, Panel G and Figure 9 report announcement period returns based on the type of investor, namely, promoter (controlling owner-managers), banks and private equity firms separately (Hypothesis H.9). The announcement period effect indicates that most of the significant positive news from preferential allotments comes from placements to owner-managers. The announcement effect for private equity investors is significant, but only for the 10-day window. Interestingly, the effect for banks is not significant. These results suggest, however, that there are no significant differences in the announcement effects between the investor types.

Overall, the univariate findings seem to support some of hypotheses that follow from our model; however, we require a more robust multivariate regression analysis that controls for other

factors before drawing any meaningful inferences.[25]

Multivariate regression results are reported in Table III.[26] All regressions use *CAR (-10, +10)* as the dependent variable, since this measure would be least affected by possible thin-trading effects. The explanatory variables are arranged by category - firm characteristics, issue characteristics, investor characteristics and owner-manager stake. Regressions 1-3 employ the entire sample, but Regression 4 uses a sub-sample of preferential allotments that follow after a low price path, as required under Hypothesis H.4.

Regressions 2 and 3 test Hypothesis H.2, which states that preferential allotments occurring after a low price path should lead to greater announcement effects. The coefficient on the high price path dummy is significantly negative, indicating that preferential allotments issued after a low price path experience higher abnormal returns. Regarding firm characteristics, the announcement date abnormal returns are inversely related to size, a control. As for volatility, Hypothesis H.3 suggests that higher volatility of prices (either due to a higher uncertainty in the assets-in-place or due to a higher degree of information asymmetry about the hidden value) leads to a greater announcement effect. This conjecture is confirmed in all four regressions.[27] In terms of economic significance, the results indicate that, for one standard deviation change in volatility, the CAR would rise by 0.957 percent.

As discussed earlier, the model suggests a more aggressive preferential allotment policy as leverage increases, and therefore, lower announcement period effects. However, announcement period returns can mechanically be positively related to leverage simply because expected returns are inversely related to the proportion of equity, which is decreasing in leverage. Despite this exogenous effect, the empirical results suggest that announcement returns are significantly negatively related to leverage (Hypothesis H.5). It can be seen that for a one standard deviation change in the interest coverage ratio, the CAR would rise by 0.06 percent, in the direction pre-

[25]To control for any bias in the estimates due to thin trading we also used a "trade-to-trade" returns approach that is based on multi-period event returns, as proposed by Maynes and Rumsey (1993) to address illiquidity effects. The results based on the thin trade-adjusted market model, although not reported, are similar to the results based on conventional market model as reported in the Equation 11. It turns out that only four stocks in the sample had any gaps in the data due to non-trading.

[26]To be consistent with our theoretical model, we also ran regressions using only those issues that were made exclusively to promoters (owner-managers). The number of such placements in our sample was 91. The results are qualitatively similar to the results reported in Table 3, which uses the full sample of 164 preferential allotments (with proper controls).

[27]We also used the volatility of market model residuals - an estimate of the idiosyncratic risk - rather than total volatility of returns and obtained similar results.

dicted by Hypothesis H.5. We also find that the coefficient on the group dummy is negative and insignificant in all the regressions. This result does not support Hypothesis H.8 that abnormal returns are lower for group firms than for stand-alone firms. This result is inconsistent with the Entrenchment Hypothesis posed in Baek, Kang, and Lee (2006).

According to Hypothesis H.9, the announcement effects associated with private equity investors should be stronger than those for banks or financial institutions. Regression 3 tests this hypothesis and shows that preferential allotments issued to owner-managers do not clearly experience higher positive reaction than private equity investors or banks. The signs and magnitudes of the coefficients on the private equity dummy and banks dummy are in the right direction, but statistically insignificant, i.e., they suggest that there is a rank ordering of announcement period returns with the highest returns occurring for owner-manager placements and the lowest for bank placements. While the evidence in Regression 3 is weak, the results in Regression 4 support our model strongly. The coefficient on the private equity dummy is negative and significant. Private equity investors are often assumed to have superior information (Certification Hypothesis) or assumed to provide an active role in monitoring the firm (Monitoring Hypothesis). Thus, after accounting for controls, there is no support for Hypothesis H.9, i.e., these findings do not support the Monitoring Hypothesis (Wruck, 1989) or the Certification Hypothesis (Hertzel and Smith, 1993). This evidence also goes against the Entrenchment Hypothesis, which states that private placements are typically made to acquire passive shareholders and should be accompanied by negative price reaction.

Regression 4 is specially designed to test Hypothesis H.4. The regression sample consists *only* of those issues that follow after a low price path.[28] The hypothesis states that the average announcement reaction should be inversely related to the pre-announcement holding of the owner manager. However, the results under Regression 4 column of Table III do not support the hypothesis relating to the owner-manager's stake. To summarize, the univariate tests confirm Hypothesis H.1, and the multivariate regressions suggest evidence in favor of Hypothesis H.2, H.3, and H.5. Hypothesis H.4 is not confirmed in the empirical tests.

[28] An alternative approach would be to introduce interactive effects between the path dummy and the explanatory variables. However, this would not be in line with the explicit hypothesis our model suggests. In any event, we tried this approach also and found that the results were somewhat weaker, as expected.

E. Testing Hypotheses related to Manipulation

As we discussed in the theoretical section on manipulation, owner-managers have incentives to manipulate the stock price level in the period prior to the announcement date of a preferential allotment. Such manipulation would be in the self-interest of owner-managers because they would be able to issue shares to themselves at lower than the fair market value. This empirical section examines the extent of managerial self-dealing. It is important to note that our empirical tests ought to control for the fact that manipulation of prices *prior to* the announcement date can affect announcement period returns. If the market believes that owner-managers manipulate prices downward prior to announcement of preferential allotments, there would be a positive announcement effect (manipulation revelation effect). On the other hand, as shown in our model, manipulation induces owner-managers to pursue an aggressive preferential allotment policy, which causes a reduction in the announcement effect. The manipulation revelation effect suggest a positive relationship between announcement period returns and manipulation proxies. In contrast, the aggressive preferential allotment policy effect suggests a negative relationship between announcement period returns and manipulation proxies. It is an empirical question as to which of these two effects dominates, which we will examine in this section.

The first manipulation proxy we consider is illiquidity of the firms' stock. We argue that the greater the illiquidity, the lower is the cost that owner-managers incur if they invest in manipulating the stock price in the period prior to the announcement of a preferential allotment. Thus, we should see a greater degree of manipulation in more illiquid stocks. To measure illiquidity, we use the Amihud measure of illiquidity (Amihud (2002)). If the manipulation revelation effect dominates, one would see a positive relationship between announcement period returns and illiquidity. On the other hand, if the model's predicted aggressive preferential allotment policy effect dominates, one should see a negative relationship between announcement period returns and illiquidity.

To probe the manipulation story more deeply, we also use information contained in the price and volume run up before the announcement period to build proxies for the effects of manipulation. The first proxy under this category is the cumulative abnormal volume (CAV) in the pre-announcement period. If there is price manipulation, it is likely to be accompanied by higher abnormal trading volume. The second proxy is cumulative abnormal return (CAR) in the pre-

announcement period, which is possibly a better indicator of manipulation.[29]

We use two different time windows to define the period prior to the announcement period. As discussed earlier, the SEBI-mandated issue price is based on the maximum of the average price in the two-week period prior to the relevant date and the average price in the six-month period prior to the relevant date. Thus, proxies to assess manipulation should examine these two trading windows prior to the relevant date. The two week period prior to the relevant date would then be (-22, -32) interval relative to the announcement date, assuming that 2 weeks is equivalent to 10 trading days. Hence, we define the two windows to be over the periods (-22, -32), (-22, -154).[30] The first window captures price manipulation that affects the most recent valuation and the second window captures price manipulation that affects the six-month average price.

The cumulative abnormal volume (CAV) and cumulative abnormal return (CAR) are computed for all three windows described above. Panel A of Table IV reports univariate results of these three windows for CAR, and CAV. We find that CAR for all the three windows is positive; *CAR (-22, -32)* and *CAR (-22, -250)* are both statistically significant. If price manipulation were rampant, one would expect to see negative *CARs* in the period prior to the announcement date. However, it could also be argued that *CARs* could possibly have been even higher. In other words, price manipulation does not necessarily imply negative *CARs*, rather it implies lower *CARs* than otherwise. One cannot therefore rule out manipulation on the basis of positive *CARs* in the period prior to the announcement period.[31] Panel B reports the correlation between CAR and CAV. As can be expected, there is some positive correlation between the same variables defined over different windows. However, the correlations are stronger only when there is significant overlap between the periods, i.e., the (-22, -154) and (-22, -250) windows.

Table V presents the results associated with the tests of Hypothesis H.6 and H.7. Essentially, these regressions extend the regression analysis of Table III by including the proxies of manipulation in Regression 3 of that table. Our first test (of Hypothesis H.6) is based on *market illiquidity*

[29] As a robustness check, we also computed an alternative proxy of action-based manipulation, the cumulative abnormal turnover (CAT), which is defined in a manner similar to CAV except that the volume is scaled by the number of shares outstanding.

[30] We also examined a third window (-22, -250), covering the entire year prior to the announcement date, to check the robustness of our specification, and find that the results are similar; hence, we do not report them here to conserve space.

[31] However, it is always possible that information-based or action-based manipulation was taking place; it is conceivable that such manipulative strategies may not be accompanied by abnormal volume. Thus, lack of abnormal volume is not sufficient evidence to preclude the occurrence of manipulation.

as a proxy for manipulation. The more illiquid the stock is, the easier it would be to push the price downwards even with a low trading volume. Hence, the greater the illiquidity, the greater is the ease of effective manipulation. Table V, Regression 1 (and all the remaining regressions in the table) show that announcement period returns are negatively related to the log of the Amihud measure of illiquidity. This result suggests that the aggressive preferential allotment policy, which reflects information asymmetry issues of our model, dominates the manipulation revelation effect. Overall, this evidence is consistent with the main thesis of our paper that information asymmetry is a key driver of the preferential allotment decision. This result also suggests that, for one standard deviation change in the metric of illiquidity, the CAR is reduced by 0.11 percent.

Hypothesis H.7 discusses the key empirical tests related to the prior period price and volume based proxies of the degree of manipulation. It says that announcement period returns should be positively related to the prior period *CAR* and negatively related to prior period *CAV*. In direct contrast, the manipulation revelation effect argues exactly the opposite: that announcement period returns should be negatively related to prior period *CAR* and positively related to prior period *CAV*.

Regressions 2-5 in Table V contain the manipulation variables *CAR (-22, -32), CAR (-22, -154), CAV (-22, -32), and CAV (-22, -154).*[32] These regressions show that the coefficients on the two *CAR* variables are positive and significant, although the *CAR(-22, -154)* variable is only marginally so. For instance, to understand the economic significance, the coefficient in Regression 2 implies that for one standard deviation change in the *CAR(-22, - 32)*, the contemporaneous CAR would increase by 2.42 percent. As with the illiquidity proxy of manipulation, these results are also consistent with the model's aggressive preferential allotment policy effect rather than the manipulation revelation effect. However, the two *CAV* variables do not have significant coefficients when added to the regression. One possibility is that manipulation may be based on avenues other than trade-based techniques, e.g., adverse information dissemination.

Interestingly, all the variables that were significantly related to announcement period returns (Table III) continue to retain their significance in Table V. These findings assure us that the conclusions drawn from Table III are robust to empirical specifications that account for

[32]We do not report results for the (-22, -250) window, since due to the substantial overlap with the (-22, -154) window, they are fairly similar. Also, we do not report the results for the *CAT* proxies because they are qualitatively similar to the results obtained with *CAV* proxies.

manipulation. Overall, our results also suggest the presence of manipulation. At first glance, these findings seem to provide some degree of support for the Entrenchment Hypothesis, which states that managers indulge in self-dealing behavior. However, the empirical evidence should be viewed more in terms of market efficiency rather than managerial entrenchment. The evidence only suggests that the market environment permits manipulation and is not a direct test of the Entrenchment Hypothesis. Rather, our results strongly suggest that manipulation is driven by information asymmetry issues, as captured in the model.

To summarize the conclusions of our empirical analysis, we find statistically significant support for the key empirical implications of the model presented in this paper. In particular, we find that the announcement period reaction to preferential allotments is positive (Hypothesis H.1), the announcement period reaction is more positive for preferential allotments that follow a low price path (Hypothesis H.2). We find that announcement period returns are positively related to volatility (Hypothesis H.3) but we find mixed evidence about the relationship between announcement period reactions and the owner-managers' stake prior to the announcement (Hypothesis H.4). Announcement period returns are negatively related to leverage (Hypothesis H.5). Overall, the evidence in H1.-H.5 is largely supportive of the Undervaluation Hypothesis presented in the model. We also develop model-specific hypotheses on manipulation (Hypothesis H.6 and H.7) and find evidence in support of the possibility of the model's predicted information asymmetry driven manipulative behavior. All our key findings are robust in the sense that they persist after controlling for manipulation. Our analysis also sheds light on the Monitoring Hypothesis, Certification Hypothesis and Entrenchment Hypothesis that have been proposed in the existing literature on private placements. Results based on tests of Hypothesis H.8 and H.9 show little support for the Monitoring Hypothesis, the Certification Hypothesis or the Entrenchment Hypothesis in the context of Indian capital markets.

IV Conclusion

The empirical literature on private placements of equity suggests managerial entrenchment is perhaps the most important driver of the private placement decision. One would imagine that entrenchment would be of even greater concern for private placements made to owner-managers. Yet, the popularity of private placements to owner-managers, particularly in emerging markets, suggests that there is more to the story than just managerial entrenchment.

In this paper, we propose an extension of the Myers and Majluf (1984) model to show that preferential allotments to owner-managers can resolve the underinvestment problem. This result seems intuitive - there is no information asymmetry problem when insiders finance the equity issue, and therefore, there is likely to be no underinvestment. It is likely that owner-managers are critical sources of capital in emerging markets and the benefits of resolving the underinvestment problem may outweigh qualms about managerial self-dealing (in the form of a lower issue price), especially given the buffer provided by the regulatory restrictions on the pricing of preferential allotments. Indeed, we find evidence supporting our model in a sample of preferential allotments in the Indian market. Our results are robust to the possibility of manipulation and support the Undervaluation Hypothesis, which follows from an application of the Myers and Majluf (1984) model to a market environment that has distinctly different institutional arrangements from those typically found in developed markets. Our model could also be extended to examine the general problem of optimal regulation of private placements.

Appendix 1: Proofs of Proposition 1 and Extensions

A.1.1 Proof of Proposition 1

Let N denote the number of original shares outstanding, n the number of new shares issued (either in the outside equity issue or in the preferential allotment), P the issue price, V_{0^-} (P_{0^-}) the pre-announcement market value (price per share) of the firm at date $\tau = 0^-$, and V_{0^+} (P_{0^+}) the post-announcement value (price per share) of the firm at date $\tau = 0^+$. Then, $P_{0^-} = \frac{V_{0^-}}{N}$ and $P_{0^+} = \frac{V_{0^+}}{(N+n)}$, where n new shares are issued at an issue price P to raise the capital (I) required to invest in the positive NPV investment opportunity.

The pre-announcement market value of the firm will be given by the sum of the market value of the assets-in-place (AIP) and the NPV of the investment opportunity (IO), which is equal to $\frac{x+y}{2} - I$. On this date, the market's expectation of the hidden value (HV) is zero.[33] Since the expected value of assets-in-place (AIP) is equal to $s/2$, it follows that $V_{0^-}(s = h) = \frac{h}{2} + \frac{x+y}{2} - I$ and $V_{0^-}(s = l) = \frac{l}{2} + \frac{x+y}{2} - I$. In general,

$$P_{0^-}(s) = \frac{V_{0^-}(s)}{N} = \frac{\frac{s}{2} + \frac{x+y}{2} - I}{N}, s = l, h \tag{1}$$

A.1.2 Fraction of shares "sold" in an outside equity issue

When n shares are issued at price P to raise a capital of I, $n = I/P$ and f, the fraction of the firm that has to be "sold" is given by

$$f(s) = \frac{n}{N+n} = \frac{\frac{I}{P}}{N + \frac{I}{P}} = \frac{I}{NP + I}, s = l, h \tag{2}$$

If capital is raised from outsiders (OE), the issue price, P, will be equal to $P_{0^-}(s)$. In a competitive market, outsiders would be unwilling to pay anything more than $P_{0^-}(s)$. Since owner-managers would want to issue shares to outsiders at the highest possible price, the issue

[33] Note that $V_{0^-}(s)$ should reflect the market's expectation of the Hidden Value (HV), conditional on owner-manager's investment-financing policy. In equilibrium, it will be shown that owner-managers always invest in the positive NPV project under the conditions stated in Proposition 1. The financing policy of owner-managers is characterized by a cutoff signal value ($t^*(s)$), below which outside equity (OE) is employed and above which preferential allotment (PA) is used. Given that t arises from a uniform distribution over $(-H, H)$, the market's expectation of the Hidden Value (HV) is equal to $(Prob(t < t^*(s))(E(t|OE) + (Prob(t \geq t^*(s))(E(t|PA)$. This implies that the market expectation of t conditional on owner-mangers' investment-financing policy is given by: $\frac{(H+t^*(s))}{2H}\frac{(-H+t^*(s))}{2} + \frac{(H-t^*(s))}{2H}\frac{(t^*(s)+H)}{2} = 0$. Thus, in either case ($s = h$ or $s = l$), the market's expectation of the Hidden Value (HV) is equal to zero.

price will be set at $P_{0^-}(s)$, and Equation 2 implies that

$$f^{OE}(s) = \frac{I}{NP_{0^-}(s) + I} = \frac{I}{\frac{s}{2} + \frac{x+y}{2}}, s = l, h \tag{3}$$

after using the result in Equation 1.

A.1.3 Fraction of shares "sold" in a preferential allotment

On the other hand, if n shares are issued in a preferential allotment, the issue price is not determined by a competitive process. If V_{-1} denotes the market value at time $\tau = -1$, the issue price will be constrained by the pricing formula as follows:

$$P \geq \frac{Max[V_{0^-}(s), \frac{V_{0^-}(s)+V_{-1}}{2}]}{N}, \tag{4}$$

Equation 4 states that the issue price should be greater than or equal to the higher of the current valuation, V_{0^-}, and the average price in the previous period from time τ = -1 to $\tau = 0^-$. Since the owner-managers would prefer to issue shares (to themselves) at the lowest possible price, the inequality in Equation 4 will be binding. Note that V_{-1} is given as follows (after using the result in Equation 1):

$$\begin{aligned} V_{-1} &= V_{0^-}(s = h)\pi(s = h) + V_{0^-}(s = l)\pi(s = l) \\ &= [\frac{h}{2} + \frac{x+y}{2} - I](\frac{1}{2}) + [\frac{l}{2} + \frac{x+y}{2} - I](\frac{1}{2}) \\ &= [\frac{h+l}{4} + \frac{x+y}{2} - I] \end{aligned} \tag{5}$$

It is easy to see that $V_{0^-}(s = l) < V_{-1} < V_{0^-}(s = h)$. When s=h, the average market value over the previous period will be lower than the current valuation. In this case, Equation 4 implies that the issue price is equal to $\frac{V_{0^-}(s=h)}{N} = \frac{[\frac{h}{2}+\frac{x+y}{2}-I]}{N}$. Equation 4 implies that

$$f^{PA}(s = h) = \frac{I}{\frac{N[\frac{h}{2}+\frac{x+y}{2}-I]}{N} + I} = \frac{I}{\frac{h}{2} + \frac{x+y}{2}} \tag{6}$$

If $s = l$, Equation 4 implies that the issue price will be equal to the average price, which (after using the result in Equation 5) is given by

$$P_{avg} = \frac{V_{0^-}(s=l) + V_{-1}}{2N} = (\frac{1}{2N})(\frac{l}{2} + \frac{x+y}{2} - I) + \frac{1}{2N}(\frac{h+l}{4} + \frac{x+y}{2} - I) = \frac{[\frac{h+3l}{8} + \frac{x+y}{2} - I]}{N} \quad (7)$$

Using this issue price in Equation 2, the fraction of shares issued in a preferential allotment will be given by

$$f^{PA}(s=l) = \frac{I}{\frac{N[\frac{h+3l}{8} + \frac{x+y}{2} - I]}{N} + I} = \frac{I}{\frac{h+3l}{8} + \frac{x+y}{2}} \quad (8)$$

In general, the fraction of shares "sold" in a preferential allotment is given by

$$f^{PA}(s) = \frac{I}{\frac{h+3s}{8} + \frac{x+y}{2}}, s = l, h \quad (9)$$

Note further that the SEBI-mandated issue price in a preferential allotment when $s = l$ is overvalued given the publicly available information. This overvaluation is given by the difference between V_{avg} and $V_{0^-}(s = l)$. Note that $V_{avg} = NP_{avg}$, where P_{avg} follows from Equation 7. Thus the SEBI regulations induced additional premium paid by buyers in a preferential allotment is given by

$$V_{avg} - V_{0^-}(s=l) = [\frac{h+3l}{8} + \frac{x+y}{2} - I] - [\frac{l}{2} + \frac{x+y}{2} - I] = \frac{(h-l)}{8} \quad (10)$$

A.1.4 Owner-managers' investment-financing decision

At date $\tau = 0^-$, the owner-managers (promoter) observe a private signal (t) of the hidden value. Let $W(t, s)$ denote the expectation (as of date $\tau = 0$) of the wealth of the owner-managers (promoters) on the liquidation date $\tau = +1$. Owner-managers have to choose among three alternatives: (i) No issue (*NI*): no shares are issued if the project is rejected, (ii) Outside Equity (*OE*): shares are issued to outsiders, and (iii) Preferential Allotment (*PA*): shares are issued to owner-managers.

Case A (No Issue: *NI*)

The expected wealth of the owner-managers is given by the expected value of the assets-in-place (*AIP*), expected hidden value (HV), and the expected cash flows on the investment opportunity. Since the project is not undertaken, its NPV is irrelevant in this alternative.

$$W^{NI}(t, s) = \alpha \left(\frac{s}{2} + \frac{t}{2} \right) \quad (11)$$

Case B (Outside Equity: *OE*)

The owner-managers issue a fraction, f^{OE}, to outsiders and their expected wealth is given by the expected value of the assets-in-place (AIP), expected hidden value (HV), and the expected cash flows on the investment opportunity. Once the fraction, f^{OE}, of the firm is "sold", the original shareholders are left with the fraction, (1-f^{OE}), of the firm. The owner-managers are entitled to a fraction α of this remaining part. It follows that

$$W^{OE}(t,s) = \alpha(1 - f^{OE}(s)) \left(\frac{s}{2} + \frac{x+y}{2} + \frac{t}{2} \right) \tag{12}$$

Case C (Preferential allotment: *PA*)

The owner-managers issue a fraction, $f^{PA}(s)$, to themselves. In return for this additional shareholding in the firm, the owner-managers have to supply the project's investment capital of I. Their original shareholding (α) entitles them to a fraction, $\alpha(1 - f^{PA}(s))$, of the total expected cash flows. In addition, they are also entitled to a fraction, $f^{PA}(s)$, of the firm's expected cash flows because of new shares issued to themselves in the preferential allotment. Finally, the owner-managers supply the investment capital (I) and this shows up as a negative cash flow:

$$W^{PA}(t,s) = \left[\alpha(1 - f^{PA}(s)) + f^{PA}(s)\right] \left[\frac{s}{2} + \frac{x+y}{2} + \frac{t}{2} \right] - I \tag{13}$$

As can be seen in Equations 11-13, the expected wealth depends on t, the private signal of the hidden value observed by the owner-managers. We compare the three equations in a pair-wise manner to determine the threshold cutoffs reported in Proposition 1.

To see the ordering in the cutoffs, note that $\widehat{t}^{NI-PA}(s) < \widehat{t}^{OE-PA}(s)$ if and only if $NPV(IO) >= \frac{(1-\alpha)\frac{(h-s)}{4}(\frac{x+y}{2})}{s+x+y+\frac{(h-s)}{4}}$. It turns out that the condition required for $\widehat{t}^{OE-PA}(s) < \widehat{t}^{OE-NI}(s)$ is also the same. Thus, given the NPV condition in Proposition 1, it follows that $\widehat{t}^{NI-PA}(s) < \widehat{t}^{OE-PA}(s) < \widehat{t}^{OE-NI}(s)$. Note that if the inequality constraint on NPV is reversed, the ordering of the threshold cutoffs also gets reversed, i.e., $\widehat{t}^{NI-PA}(s) > \widehat{t}^{OE-PA}(s) > \widehat{t}^{OE-NI}(s)$. In this case, there will be a range of values of t around $\widehat{t}^{OE-PA}(s)$ for which the owner-managers prefer the NI alternative, leading to some underinvestment, as shown in Figure 5.

A.1.5 Proof of Corollary 1

Corollary 1(i) follows upon differentiating the expression for $\widehat{t}^{OE-PA}(s)$. Given that t is drawn from a uniform distribution over $(-H, H)$, it follows that the expectation of hidden value

(HV), conditional on a preferential allotment, is given by $\frac{\widehat{t}^{OE-PA}(s)+H}{4}$. After substituting for $\widehat{t}^{OE-PA}(s)$, we get an explicit expression for the announcement period effect stated in Equation 6. Corollary 1(iii) follows immediately upon differentiation of the announcement period return.

A.1.6 Manipulation Model

Manipulation in the model is captured by a spurious dip in price level at $\tau = 0^-$ by an amount equal to w. This dip in price is assumed to arise because of strategic trading by the owner-managers in the period prior to the announcement date. Thus, prices at $\tau = 0^-$ would reflect the drop, w, in both the low price $(s = l)$ and the high price $(s = h)$ states of the world. The price is given by $V_{0^-}(s) = \frac{s}{2} + \frac{x+y}{2} - I - w$. Due to price manipulation, owner-managers will now be able to issue share to themselves at a lower price. Note that the expression for Equations 12-13 depend on f^{OE} and f^{PA}, as stated in Equations 3 and 9, respectively. These quantities change because of the dip in price by the amount w, as shown below.

$$f^{OE}(s) = \frac{I}{\frac{s}{2} + \frac{x+y}{2} - w} \tag{14}$$

$$f^{PA}(s) = \frac{I}{\frac{h+3s}{8} + \frac{x+y}{2} - w} \tag{15}$$

With the above modifications in $f^{PA}(s)$ and $f^{OE}(s)$, the cutoffs in a world of manipulation are determined in exactly the same way as before, namely, by comparing Equations 11-13 in a pair-wise manner. Equations 8-10 follow from this comparison.

To demonstrate the nature of the optimization exercise in the context of our model, note that manipulation prior to the announcement date is best captured by assuming that investments in manipulation are made at $\tau = -1$ and the benefits of manipulation are realized at $\tau = 0$ when the price level drops by an amount equal to w. At time $\tau = -1$, owner-managers are unaware of the realization of hidden value (t), which is revealed at time $\tau = 0^-$. *Ex-ante*, at $\tau = -1$, owner managers have to invest in manipulation activities without knowing the realization of t. *Ex-post*, (at $\tau = 0^-$), they would have liked to have set $w = 0$ for low realizations of t (when they would be issuing outside equity) and the maximum feasible value of w for sufficiently high realizations of t (when they would be going for a preferential allotment). Given these *ex-post* incentives, the *ex-ante* chosen value of $w = w^*$ would be some average of these two extreme situations. It can be determined by integrating the benefits of manipulation over all possible

realizations of t and then maximizing the expression with respect to w, shown in the equation below. The tradeoffs in this optimization exercise are obvious: Choosing a very high value of w would hurt owner-managers whenever they observe a low realization of the hidden value (t) because it would trigger an outside equity issue at a less than favorable price. The low issue price would benefit outsiders at the expense of insiders. On other hand, choosing a very low value of w could also hurt if insiders observe a high realization of t because it would trigger a preferential issue. Owner-managers would end up purchasing shares at higher prices than otherwise (i.e., if they had invested more in manipulation activities). Choosing an intermediate level of w would balance these tradeoffs (subject to the usual boundary conditions - in this case $w < l$ in order to ensure positive price levels.)

$$\begin{aligned} W(w^*) = \quad & Max_{[w]} \Bigg\{ Prob(s=h) \left[\int_{-H}^{0} W^{OE}(t, s=h; w)dt + \int_{0}^{H} W^{PA}(t, s=h; w)dt \right] \\ + \quad & Prob(s=l) \left[\int_{-H}^{\widehat{t}^{OE-PA}(s=l)} W^{OE}(t, s=l; w)dt + \int_{\widehat{t}^{OE-PA}(s=l)}^{H} W^{PA}(t, s=l; w)dt \right] \Bigg\} \end{aligned} \tag{16}$$

A.1.7 Information Asymmetry in both Assets-in-place and Investment Opportunity

We now consider the standard Myers and Majluf (1984) setup where information asymmetry applies to both assets-in-place a well as the new project. Let the hidden value associated with the NPV of the project be q, which is drawn from a distribution with an expected value of 0. We assume that the manager will invest only in positive NPV projects. Equation 11 stays unchanged, but Equations 12 and 13 get modified to the equations below:

$$W^{OE}(t, s) = \alpha(1 - f^{OE}(s)) \left[\frac{s}{2} + \frac{x+y}{2} + \frac{t}{2} + \frac{q}{2} \right] \tag{17}$$

$$W^{PA}(t, s) = \left[\alpha(1 - f^{PA}(s)) + f^{PA}(s) \right] \left[\frac{s}{2} + \frac{x+y}{2} + \frac{t}{2} + \frac{q}{2} \right] - I \tag{18}$$

Now, comparing Equation 17 with Equation 11 yields the following inequality, which has to be satisfied for the owner-managers to prefer an outside equity financing choice (OE) to the underinvestment choice (NI):

$$q > \frac{f^{OE}(s)}{1 - f^{OE}(s)} t + \left[\frac{f^{OE}(s)}{1 - f^{OE}(s)} s - (x + y) \right] \tag{19}$$

Note that the right hand side is a linear function of t with a positive slope and a negative intercept term, as shown in the figure below. This linear boundary defines the regions of (q, t) where the owner-managers prefer going for an outside equity issue (OE) rather than underinvesting in the project (NI) and vice versa.

Comparing Equation 11 with Equation 18, we can solve for the boundary that defines the regions of (q, t) where the owner-managers prefer the preferential allotment choice (PA) to the underinvestment choice (NI). The boundary is given by

$$q > \frac{1}{\alpha + f^{PA}(s)(1 - \alpha)} \left(-f^{PA}(s)(1 - \alpha)t + \left[2I - f^{PA}(s)(1 - \alpha)s \right] \right) - (x + y) \tag{20}$$

Again, the right hand side of Equation 20 is a linear function of t. However, both the slope and the intercept term are negative, as shown in the figure below. In similar vein, we compare Equation 17 with Equation 18 to determine the regions of (q, t) where preferential allotment alternative (PA) is preferred to outside equity (OE). It can be shown that the boundary is defined by

$$q > -t + \left[\frac{2I}{\alpha(f^{OE}(s) - f^{PA}(s)) + f^{PA}(s)} - (s + x + y) \right] \tag{21}$$

The right hand side of Inequality 21 is linear function of t. It has a slope of -1 and an intercept term that is greater than 0 when $s = l$ but exactly equal to 0 when $s = h$. We assume, as before, that $NPV(IO) >= \frac{(1-\alpha)\frac{(h-s)}{4}(\frac{x+y}{2})}{s+x+y+\frac{(h-s)}{4}}$. This ensures that the threshold cutoff values are such that $\widehat{t}^{NI-PA}(s) < \widehat{t}^{OE-PA}(s) < \widehat{t}^{OE-NI}(s)$. These cutoff values represent the intersection point of the three lines with the x-axis.

Equations 19, 20 and 21 are mapped in the figure below. It is interesting to note that the three equations have a common intersection point. A little bit of algebra can show that the common intersection point has the coordinates, $q^* = t^* = 2[I - (x + y)/2]$, which is negative of twice the NPV of the project. Thus, the intersection point will always lie below the dashed line ($q = I - (x + y)/2$), which defines the lower bound of the information asymmetry on the NPV of the project. (The lower bound ensures that the manager considers only positive NPV projects.) The underinvestment situation would arise only in the area spanned by the curved arrow shown in the graph. In this region of (q,t), the manager would prefer the "No Issue"

choice to both the preferential allotment and the outside equity alternatives. As can be seen in the graph, the underinvestment region lies completely in the infeasible range of (q,t). It follows that the manager will always accept all positive NPV projects (above a critical value, as stated in Proposition 1) and there will be no underinvestment in such projects!

Figure A 1.1: Asymmetry of information and the firm's financing decision

This figure shows how the regions of (q,t) – the combinations of information asymmetry about the NPV of the project (q) and the information asymmetry about the assets-in-place (t) - affect the financing decision. The feasible region of (q,t) lies above the dashed line parallel to (and below) the x-axis. The underinvestment region lies in the infeasible range of (q,t). (To generate the graph, we assume, $x = 6$, $y = 4$, $I = 4$, implying that the NPV $= 1$. Further, we assume that $H = 5$, $h = 10$, $l = 6$, and $= 0.25$.)

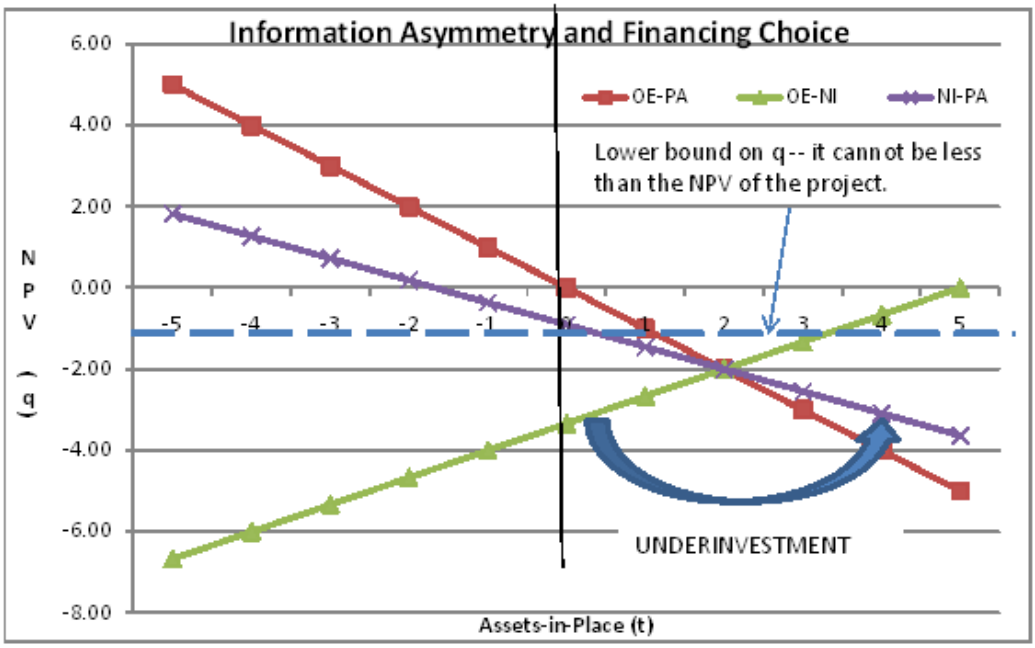


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Table I: Descriptive Statistics of Preferential Allotments of Equity in India

Firm Level Variables	All firms	Group Affiliated firms	Stand-Alone firms	Difference (t-value)	Low Price Path	High Price Path	Difference (t-value)	Owner-Manager	Non Owner-Manager	Difference (t-value)
N	164	107	57		102	62		91	73	
Panel A: Firm Characteristics										
Market Cap. (In Rupees Crore)	1956.35	2554.89	853	1701.89(3.00)***	1758.69	2275.16	-516.47(-0.77)	2200	1646	554.66(0.77)
Illiquidity x 10^{-4}(% Return/Rupee Volume)	6.18	3.52	11.10	-7.58(-3.70)***	6.72	5.32	1.41(0.66)	7.33	5.19	2.14(1.03)
Volatility (%)	4.01	4.05	3.94	0.106(0.38)	4.18	3.74	0.44 (1.63)	4.07	3.97	0.099(0.36)
Interest coverage ratio	6.03	2.10	15.13	-13.02(-3.19)***	7.26	3.99	3.26(0.22)	10.69	2.51	8.17(2.07)**
Debt-Equity ratio	0.93	1.01	0.78	0.22(0.48)	0.68	1.33	-0.648(-1.37)	0.47	1.13	-0.66(-1.46)
Panel B: Issue Characteristics										
Issue size to Owner-Manager equity(%)	60.00	72.00	35.00	37.19(0.82)	77.90	31.45	46.44(1.07)	32.44	82.77	-50.00(-1.15)
Issue size to outstanding shares(%)	16.00	15.60	16.82	-1.21(-0.43)	17.25	14.01	3.24(1.18)	15.04	16.84	-1.80(-0.66)
Panel C: Investor Characteristics										
Owner-Manager's subscription(%)	45.00	43.00	50.80	-7.80(0.19)	59.70	40.30	19.40(-2.07)			
Private Equity subscription(%)	44.70	49.50	35.20	14.30(2.10)**	65.00	35.00	30.00(0.30)			
Bank subscription(%)	10.30	7.50	14.00	-6.50(-0.71)	66.67	35.33	33.34(1.34)			
Panel D: Ownership Characteristics										
Owner-Manager's equity(%)	42.39	40.68	46.03	-5.35(-1.45)	42.83	41.70	1.13(0.32)	44.92	41.79	3.12(0.93)

This table reports the summary statistics relating to 164 firms that issued preferential allotments (private placements) of equity in India during the years 2001-2009. The statistics for the full sample are reported in the first column. The other columns report statistics based on three sets of sub-samples. The first set of sub-samples divides the sample based on whether a firm is affiliated to a business group (Group Affiliated firms) or not (Stand-Alone firms). The second set of sub-samples divides the sample based on whether the issue was made following a low price path or high price path. High Price Path (Low Price Path) represents the sub-sample of firms for which the average of high and low daily closing prices in the two-week period prior to the announcement date is higher (lower) than the average of the weekly high and low average price in the six months prior to the announcement date. The third set of sub-samples divides the total sample based on whether the owner-manager subscribed to the issue or not. The statistics for each set of sub-samples are followed by their respective mean differences along with t-values in parentheses. *Market Cap* represents the average market capitalization at the time of the issue. The amount is reported in crore of Indian Rupees. One US dollar is approximately 45 Indian rupees and one crore is equal to 10 million. *Illiquidity* is the average ratio of daily absolute return to rupee volume for a period between 10 days to 240 days before the announcement date. *Volatility* is the (non-annualized) standard deviation of daily returns for a period between 10 days to 240 days before the announcement date. *Interest coverage ratio* is the ratio of earnings before interest and taxes to interest expense. *Debt-Equity ratio* is the ratio of total borrowing to net worth. All these variables are winsorized at the 1% level. ***, **, and * represent significance at 1%, 5%, and 10% level respectively.

Table II: Announcement Effects of Preferential Allotments of Equity in India

Panel A: Overall Announcement Effects						
	All					
CAR (-1,+1) (%)	0.87(1.73)					
CAR (-5,+5) (%)	3.48(3.77)***					
CAR (-10,+10) (%)	6.18(4.19)***					
Panel B: Announcement Effect Based on the Formula Price						
	Low Price Path	**High Price Path**	**Difference(t-value)**			
CAR (-1,+1) (%)	1.53(2.39)**	-0.20(-0.25)	-1.73(-1.69)			
CAR (-5,+5) (%)	4.54(3.59)***	1.79(1.40)	-2.75(-1.53)			
CAR (-10,+10) (%)	9.06(4.58)***	1.58(0.77)	-7.47(-2.62)**			
Panel C: Announcement Effects based on the level of Volatility						
	Below Median	**Above Median**	**Difference(t-value)**			
CAR (-1,+1) (%)	0.29(0.49)	1.88(2.2)**	1.60(1.50)			
CAR (-5,+5) (%)	2.70(2.33)**	4.20(2.98)***	1.50(0.83)			
CAR (-10,+10) (%)	6.70(2.2)**	6.08(3.86)***	-0.61(-0.23)			
Panel D: Announcement Effects based On Ownership level						
	Below Median	**Above Median**	**Difference(t-value)**			
CAR (-1,+1) (%)	1.08(1.53)	0.63(0.87)	-0.45(-0.44)			
CAR (-5,+5) (%)	2.81(2.48)**	4.23(2.83)***	1.42(0.76)			
CAR (-10,+10) (%)	5.45(2.71)***	7.0(3.21)***	1.55(0.52)			
Panel E: Announcement Effects based on the Interest Coverage Ratio						
	Below Median	**Above Median**	**Difference(t-value)**			
CAR (-1,+1) (%)	0.80(0.69)	1.10(1.90)	0.30(1.50)			
CAR (-5,+5) (%)	2.74(2.98)***	3.92(2.33)**	1.18(0.64)			
CAR (-10,+10) (%)	7.03(2.20)**	5.11(3.86)***	-1.92(-0.66)			
Panel F: Announcement Effects based on the Issuer Type						
	Stand-Alone Firms	**Group Firms**	**Difference(t-value)**			
CAR (-1,+1) (%)	1.90(2.2)**	0.30(0.49)	-1.60(-1.50)			
CAR (-5,+5) (%)	4.31(2.33)**	3.02(2.98)***	-1.29(-0.61)			
CAR (-10,+10) (%)	10.87(3.86)***	3.61(2.20)**	-7.27(-2.23)**			

Panel G: Announcement Effects based on the Investor Type						
	Owner-Managers(OM)	**Private Equity Firms(PE)**	**Banks(B)**	**(PE-OM)**	**(B-OM)**	**(B-PE)**
CAR (-1,+1) (%)	0.93(1.31)	0.49(0.65)	1.61(1.13)	-0.44(-0.43)	0.68(0.43)	1.12(0.70)
CAR (-5,+5) (%)	4.20(3.29)***	2.10(1.37)	3.24(1.35)	-2.10(-1.05)	-0.96(-0.35)	1.14(0.40)
CAR (-10,+10) (%)	7.82(3.71)***	4.50(2.10)**	1.25(0.33)	-3.30(-1.11)	-6.58(-1.50)	-3.25(-0.74)

This table reports the cumulative average abnormal return (*CAR*) around the announcement date for 164 private placements that occurred in India during 2001-2009. Abnormal returns are based on the market model (on the BSE100 Index) over the period (*-31,-240*). *CAR's* are calculated for three windows, namely, (-1 to +1), (-5 to +5), and (-10 to +10). Panel A presents the statistics for the full sample. Panel B reports the *CAR's* based on whether the preferential allotment follows a low price path or a high price path. *High Price Path (Low Price Path)* represents the sub-sample of firms for which the average of high and low daily closing prices in the two-week period prior to the announcement date is higher (lower) than the average of the weekly high and low average price in the six months prior to the announcement date. Panel C reports results based on whether volatility, as measured by the standard deviation of daily returns over the period (-10, -240), is above or below the sample median volatility. Panel D reports results based on whether *owner-managers' ownership* prior to the announcement is above or below the sample median ownership level. Panel E reports results based on whether a firm's *interest coverage ratio* is above or below the sample median interest coverage ratio. Interest coverage ratio is the ratio of earnings before interest and taxes to interest expense. Panel F reports results based on whether a firm is affiliated to a business group (Group Affiliated firms) or not (Stand Alone firms). Panel G reports results based on whether the investor is the owner-manager, or a bank or a private equity firm. Each panel has the corresponding mean differences along with their *t*-values. ***, **, and * represent significance at 1%, 5%, and 10% level respectively.

Table III: Determinants of Announcements Effects of Preferential Allotments of Equity in India

Variable Name	Regression 1	Regression 2	Regression 3	Regression 4
Dependent Variable: CAR(-10,+10)				
	All firms	All firms	All firms	Low Formula Price firms
N	162	162	162	99
Intercept	19.81(3.21)***	17.94(2.50)***	17.95(2.49)***	22.22 (2.43)***
Panel A: Firm Characteristics				
ln(Market Cap)	-2.11(-2.26)**	-1.66(-1.61)	-1.42(-1.34)	-2.40(-1.71)
Group dummy	-2.34(-0.75)	-3.08(-0.97)	-3.61(-1.10)	-2.60(-0.61)
Volatility(%)	18.50(2.83)***	18.36(2.76)***	18.08(2.71)***	27.80(3.12)***
Interest coverage ratio	0.009(0.41)	0.010(2.48)***	0.001(2.35)**	0.020(3.35)***
Panel B: Issue Characteristics				
Issue size to Owner-Manager equity (%)		0.001(0.23)	0.002(0.46)	0.003(0.53)
Issue size to outstanding shares (%)		0.080(0.96)	0.083(0.98)	0.196(1.46)
Instrument type dummy		1.301(0.38)	0.660(0.19)	0.212(0.04)
High Price Path dummy		-5.65(-1.95)**	-5.78(-1.99)**	
Panel C: Investor Characteristics				
Owner-Manager dummy			–	–
Private Equity dummy			-1.87(-0.51)	-8.64(-1.96)**
Banks dummy			-4.81(-1.01)	-8.92(-1.50)
Panel D: Ownership Characteristics				
Owner-Manager's Equity				0.00(0.06)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Adj. R-squared(%)	13.01	14.49	13.95	27.04
p-value > F	0.000	0.000	0.000	0.000

This table reports regression results for 162 private placements in India during 2001-2009. The dependent variable is the cumulative abnormal return for the -10 to +10 days window (*CAR (-10, +10)*) around the announcement date. Abnormal returns are based on the market model (on the BSE100 Index) over the period (*-31,-240*). *High Price Path (Low Price Path)* represents firms for which the average of high and low daily closing prices in the two-week period prior to the announcement date is higher (lower) than the average of the weekly high and low average price in the six months prior to the announcement date. *Ln(Market cap)* represents the natural log of market capitalization of the firm. *Group dummy* takes the value 1 (0) if the firm is affiliated to an Indian business group (Stand Alone firm). *Volatility* is measured as the standard deviation of daily returns over the period (*-10,-240*). *Interest coverage ratio* is measured as the ratio of earnings before interest and taxes to interest expense. *Issue size to Owner-Manager's equity* is the ratio of number of shares issued through preferential allotment divided by the number of owner-manager shares. *Issue size to outstanding shares* refers to the number of shares issued through preferential allotment to the number of outstanding shares. *Instrument type dummy* takes the value 1(0) if the issue is made as plain equity (equity with warrants or convertibles). *Private Equity dummy* takes the value 1 if the investor is a private equity firm, else it is 0. *Bank dummy* takes the value 1 if the buyer of the equity is a bank, else it is 0. *Owner-Manager's equity* represents the percentage of equity held by the owner-managers of the firm. *Year dummies* are for years (one less) between 2001 to 2009. *Industry dummies* are based on 3-digit industry codes. ***, **, and * represent significance at 1%, 5%, and 10% level, respectively.

Table IV: Summary Statistics of Cumulative Abnormal Return and Volume in Pre-Announcement Period

Panel A: Prior Period Abnormal Returns and Volume							
Event Windows	Mean	t-value	Median	Event Windows	Mean	t-value	Median
CAR (-22,-32)	5.13	1.35	2.66**	*CAV (-22,-32)*	2783781	1.40	172445
CAR (-22,-154)	37.39	10.18***	32.24	*CAV (-22,-154)*	2366700	2.25**	1323750
CAR (-22,-250)	52.01	14.02***	47.17	*CAV (-22,-250)*	2468467	2.66	1108527

Panel B: Correlation Analysis						
	CAR(-22,-32)	*CAR(-22,-154)*	*CAR(-22,-250)*	*CAV(-22,-32)*	*CAV(-22,-154)*	*CAV(-22,-250)*
CAR(-22,-32)	1					
CAR(-22,-154)	0.3365	1				
CAR(-22,-250)	0.2924	0.7451	1			
CAV(-22,-32)	0.2369	0.1288	0.093	1		
CAV(-22,-154)	0.0425	0.0742	0.1019	0.6623	1	
CAV(-22,-250)	0.0072	0.0419	0.0962	0.5152	0.9721	1

This table reports the Cumulative Abnormal Return (CAR) and Cumulative Abnormal Volume (CAV) for a sample that comprises of 164 firms that raised equity in India through preferential allotments during 2001-2009. Panel A reports the CAR and CAV for three specific windows before the announcement date of the preferential allotments. In order to calculate the abnormal return, we estimate expected return using the market model between 240 to 31 days before the announcement date. We use the BSE100 index as the benchmark for the Indian market return. Abnormal volume is the difference between the actual volume and the expected volume of a given stock. Volume is measured as number of shares traded on a given day. Expected volume is calculated by regressing daily stock volume on the daily market volume using four years' daily data starting from day -300 going backwards. We use the top 1000 stocks of the Bombay Stock Exchange for calculating daily average market volume. The same procedure is applied, however, for different windows for *CAR(-22,-32)*,*CAR(-22,-154)*, *CAR(-22,-250)*, *CAV(-22,-32)*, *CAV(-22,-154)*and *CAV(-22,-250)*. We report t-values and the median in the next two columns. Panel B reports correlations of the CAR's and CAV's for the three specific windows.***, **, and * represent significance at 1%, 5%, and 10% level respectively.

Table V: Determinants of Announcement Effects of Preferential Allotments of Equity in India in the Presence of Manipulation

	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Dependent Variable:*CAR(-10,+10)*					
N	162	162	162	162	162
Intercept	27.02(2.71)***	25.05(2.46)***	22.63(1.95)**	27.51(2.73)***	27.10(2.70)***
Panel A: Firm Characteristics					
ln(Market cap)	-0.12(-0.10)	-0.37(-0.29)	-0.35(-0.27)	-0.12(-0.10)	-0.10(-0.08)
Group dummy	-6.67(-1.20)	-6.74(-1.26)	-5.94(-0.95)	-6.82(-1.23)	-6.71(-1.20)
Volatility	10.72(2.62)***	12.28(2.87)***	11.90(2.80)***	10.55(2.59)***	10.71(2.61)***
Interest coverage ratio	0.001(1.98)**	0.001(1.91)**	0.001(1.90)**	0.001(1.98)**	0.001(1.98)**
Panel B: Issue Characteristics					
Issue size to Owner-Manager equity	0.003(0.56)	0.003(0.74)	0.002(0.42)	0.002(0.55)	0.002(0.55)
Issue size to outstanding shares	0.056(0.68)	0.027(0.34)	0.020(0.24)	0.057(0.70)	0.056(0.68)
Instrument type dummy	0.29(0.18)	0.48(1.25)	0.64(1.01)	0.37(1.20)	0.27(1.17)
High Price Path dummy	-6.11(-2.15)**	-6.75(-2.40)**	-7.83(-2.62)***	-6.41(-2.20)**	-6.27(-2.17)**
Panel C: Purchaser Characteristics					
Owner-Manager dummy	-	-	-	-	-
Private equity dummy	-0.15(-0.05)	-0.78(-0.25)	-0.52(-0.16)	-1.16(-0.05)	-0.001(0.00)
Banks dummy	-5.48(-1.19)	-5.28(-1.17)	-4.01(-0.86)	-5.43(-1.18)	-5.40(-1.17)
Panel D: Manipulation Environment					
Ln(Illiquidity)	-1.36(-2.14)**	-1.37(-2.19)**	-0.88(-1.99)**	-1.39(-2.81)***	-1.35(-2.13)**
Panel E: Prior Period Abnormal Returns and Volume					
CAR(-22,-32)		0.21(2.30)**			
CAR(-22,-154)			0.006(1.73)*		
CAV(-22,-32)				0.000(0.49)	
CAV(-22,-154)					0.000(0.33)
Year dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes
Adj. R-squared (%)	14.93	17.51	16.14	14.45	14.38
p-value>F	0.000	0.000	0.000	0.000	0.000

This table reports regression results for 162 private placements in India during 2001-2009. The dependent variable is the cumulative abnormal return for the -10 to +10 days window (*CAR (-10, +10)*) around the announcement date. Abnormal returns are based on the market model (on the BSE100 Index) over the period (*-31,-240*). *High Price Path (Low Price Path)* represents firms for which the average of high and low daily closing prices in the two-week period prior to the announcement date is higher (lower) than the average of the weekly high and low average price in the six months prior to the announcement date. *Ln(Market cap)* represents the natural log of market capitalization of the firm. *Group dummy* takes the value 1 (0) if the firm is affiliated to an Indian business group (Stand Alone firm). *Volatility* is measured as the standard deviation of daily returns over the period (*-10,-240*). *Interest coverage ratio* is measured as the ratio of earnings before interest and taxes to interest expense. *Issue size to Owner-Manager's equity* is the ratio of number of shares issued through preferential allotment divided by the number of owner-manager shares. *Issue size to outstanding shares* refers to the number of shares issued through preferential allotment to the number of outstanding shares. *Instrument type dummy* takes the value 1(0) if the issue is made as plain equity (equity with warrants or convertibles). *Private Equity dummy* takes the value 1 if the investor is a private equity firm, else it is 0. *Bank dummy* takes the value 1 if the buyer of the equity is a bank, else it is 0. *Owner-Manager's equity* represents the percentage of equity held by the owner-managers of the firm. *Ln(Illiquidity)* is the natural logarithm value of average ratio of daily absolute return to rupee volume over the period *-10,-240)*). *CAR(-22,-32)*,*CAR(-22,-154)*, *CAV(-22,-32)*, and *CAV(-22,-154)* are the cumulative abnormal returns and cumulative abnormal volumes for the two-week and six-month windows prior to the announcement date. *Year dummies* are for years (one less) between 2001 to 2009. *Industry dummies* are based on 3-digit industry codes. ***, **, and * represent significance at 1%, 5%, and 10% level, respectively.

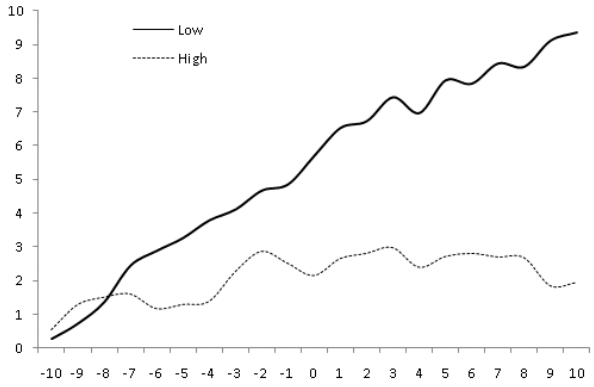

Figure 7: Cumulative average abnormal returns (CAARs) based on price path dynamics. The sample comprises of 164 firms that raised equity through preferential allotment during 2001-2009. In order to calculate the abnormal return, we estimate expected return using market model between -240 to -31 days before the announcement date. We use the BSE100 index as the benchmark for the Indian market return. The figure reports the number of days before and after the announcement date on the x-axis and the percentage of cumulative average abnormal return (CAAR) on the y-axis. The figure has two graphs to represent CAARs for "low" versus "high" issue prices. "High" price ("Low" Price) refers to those firms where the last two weeks average high and low daily closing prices is higher (lower) than last six months weekly high and low average price.

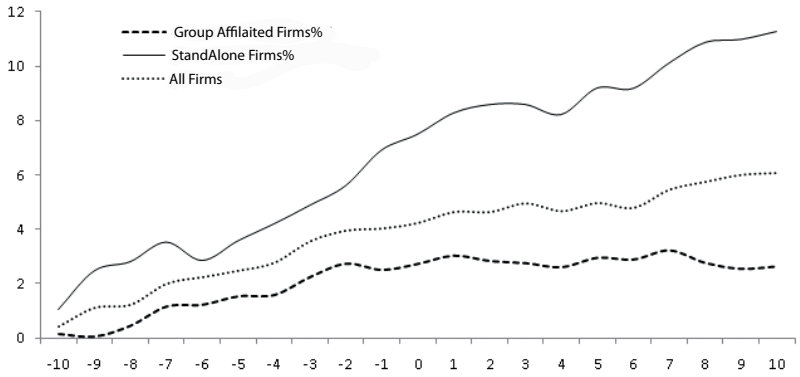

Figure 8: Cumulative average abnormal returns (CAARs) based on firm affiliation. The sample comprises of 164 firms that raised equity through preferential allotment during 2001-2009. In order to calculate the abnormal return, we estimate expected return using market model between -240 to -31 days before the announcement date. We use the BSE100 index as the benchmark for the Indian market return. The figure reports the number of days before and after the announcement date on the x-axis and the percentage of cumulative average abnormal return (CAAR) on the y-axis. The figure has three graphs to represent CAARs for preferential allotments made to all firms, Group Affiliated firms (Indian business groups) and Stand Alone firms.

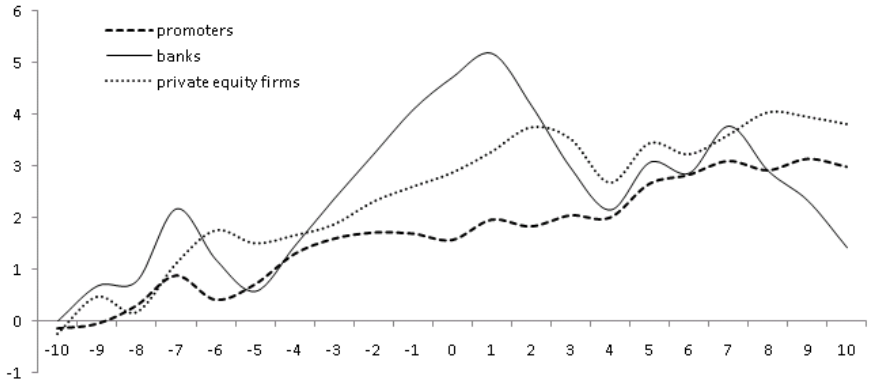

Figure 9: Cumulative average abnormal returns (CAARs) based on purchaser type. The sample comprises of 164 firms that raised equity through preferential allotment during 2001-2009. In order to calculate the abnormal return, we estimate expected return using market model between -240 to -31 days before the announcement date. We use the BSE100 index as the benchmark for the Indian market return. The figure reports the number of days before and after the announcement date on the x-axis and the percentage of cumulative average abnormal return (CAAR) on the y-axis. The figure has three graphs to represent CAARs for three types of buyers of preferential equity, namely, promoters, banks, and private equity firms respectively.