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IPOs with and without allocation discretion: Empirical evidence

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ABSTRACT

Bookbuilding, the dominant offering mechanism for IPOs, is controversial because of the power it gives underwriters over IPO allocations. Critics argue that allocations could be abused to generate kickbacks for underwriters while proponents hold that allocation power could improve pre-market price discovery. We examine underpricing, bidding, and allocations from two regimes in the Indian IPO market with varying underwriter allocation power. When underwriters control allocations, bookbuilding is associated with lesser underpricing, but the effect quickly dissipates when regulations withdraw allocation powers. Using proprietary datasets of IPO books in both regimes, we find that allocation powers are used quite extensively. Identical bids can receive significantly different allocations, which depend not only on the *bid* but also on the *bidder* identity. When allocation powers are withdrawn, we find evidence of bidder exit, new bidder entry, and altered bidding strategies with exit by both favored and unfavored bidders. Our evidence supports bookbuilding theories in which giving underwriters allocation powers assists in pre-market price discovery.

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1. Introduction

The decision to go public, or make an initial public offering (IPO) of equity, is an important landmark in a firm's life cycle. Investment banks act as partners of firms during the IPO process. They advise firms on how to structure the offering, how to market it to investors, organize the related road

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shows, and perhaps most crucially, help set the offer price for the issue. How the issue manager arrives at the IPO price depends on the offering mechanism. In "bookbuilding," the IPO manager solicits demand information from prospective investors and uses the information to price an IPO. A key feature – indeed, the defining feature – of bookbuilding is the power enjoyed by IPO managers over both IPO pricing and allocations.

Bookbuilding is the predominant mechanism in the US and tends to dominate most markets in which it is allowed. Even as bookbuilding continues to expand its reach, it is often criticized for the power it gives underwriters over the IPO allocations. Given that IPOs are underpriced, the power to allocate shares effectively grants IPO underwriters the ability to distribute large profits to investors. For instance, in the US, the money left on the table exceeds $116 billion for IPOs brought to the market between 1990 and 2007.[1] With such money at stake, power over allocations appears to be a recipe for cronyism and corruption. For instance, underwriters may engage in spinning, or trading allocations for inflated brokerage commissions.[2] On the other hand, bookbuilding proponents point out that giving underwriters power over allocations could improve pre-market price discovery. We review the theoretical literature on bookbuilding more fully in Section 2.

The Indian IPO market offers an interesting setting to analyze underwriter power over allocations. In India, regulators first granted underwriters of bookbuilt IPOs control over allocations. However, in November 2005, the regulations changed and underwriters no longer controlled allocations. We focus on this variation in allocation powers. Using a difference-in-difference approach, we examine IPO underpricing in 124 IPOs one year before and after this regime change. We also obtain proprietary datasets of 42 IPO books containing 6527 institutional bids and allocations from both regimes. We analyze the extent to which underwriters exercise their allocation powers, the direction in which they do so, and analyze how bidders respond in terms of entry, exit, and bidding when allocation powers are withdrawn.

We open with an analysis of IPO underpricing before and after the November 2005 regime change. We find that when underwriters control allocations, bookbuilding is associated with lower IPO underpricing relative to fixed price IPOs. However, this relation quickly dissipates when allocation powers are withdrawn from bookbuilding, which is then effectively like a dirty Dutch auction.[3] The basic result is robust to changes in specification and data. They suggest that giving allocation power to underwriters improves pre-market price discovery, consistent with bookbuilding theories. On the other hand, were underpricing mainly driven by cronyism, bookbuilt IPOs should be less underpriced after the elimination of allocation powers. We find no support for the hypothesis of cronyism-driven underpricing.

While the underpricing results suggest some benefits of giving underwriters allocation power, to what extent and in what direction is it used? We present evidence on these questions using two proprietary datasets of IPO books. In the IPO literature, data on IPO bids and allocations are relatively scarce because underwriters are not required to disclose bids and allocations. Thus, Ritter and Welch (2002) remark that share allocation issues are promising avenues for future research. Our study brings to the table fresh data on IPO books. One set of books comes from a regime where underwriters control allocations and another comes from a regime where underwriters have no allocation power. The two datasets include a total of 6527 institutional investor bids in 42 IPOs.

The first dataset on IPO books is from a regime where underwriters control allocations. This sample includes 4236 bids made by institutions from 323 fund families in 25 IPOs. In this sample, underwriters make significant use of their allocation powers. The pattern of share allocations deviates in significant ways from what a proportionate scheme would predict. The null hypothesis of no discrimination is rejected at 1% individually for every IPO in our sample. Empirically, we find that allocations do de-

[1] See Jay Ritter's website, http://bear.cba.ufl.edu/ritter/ipodata.htm; Money left on the table assumes that the first day aftermarket price is the true value and that it would have been the price at which one could have sold the entire offering without any offsetting costs or effects, using any other alternative mechanism.

[2] Smith and Pulliam (2000), Gasparino et al. (2000) present anecdotal evidence of spinning. Nimalendran et al. (2007) establish a link between underpricing and aggregate trading volume, which is quite suggestive of spinning. There has been little success in legally prosecuting such cases. For instance, the high profile case of Frank Quattrone has failed to result in a prosecution.

[3] In this auction, the auctioneer is free to set a price below market clearing but follows prorata allocations.

pend on the size of the bid. However, the relation is not linear and importantly, is not monotonic. In fact, the bid itself is *not* a sufficient statistic for allocation. Two investors presenting similar bids do *not* necessarily receive similar share allocations. The hallmark of bookbuilding is that it allows underwriters to condition allocations on information other than the bid. Our evidence suggests that underwriters use this discretion extensively.

We investigate the direction in which underwriters exercise their allocation powers. We find that bidder type is the most important determinant of underwriter allocation policy. The odds of receiving high IPO allocations are higher if the bidder is a participant in equity markets. Both domestic mutual funds and foreign institutional investors tend to get higher allocations at the expense of large financial institutions such as local banks and insurance companies. However, the latter institutions are less likely to face rationing provided they are frequent bidders in IPOs, so IPO managers seem to use non-equity investors to generate uninformed demand as insurance against adverse IPO demand from equity bidders or to provide for competition to informed equity market bidders. Other variables such as underwriter reputation have marginal or mixed significance. Unobservables are important, consistent with underwriters using soft information in setting IPO allocations. The main message, however, is that the *bidder identity* – rather than the bid itself – is an economically significant determinant of allocation. Its marginal effect is over three times that of the bid quantity, underlining the fact that IPO managers follow activist allocation policies to redistribute initial share ownership among institutions bidding for IPOs.

Our second dataset of IPO books covers issues offered after November 2005. In this regime, underwriters retain the pre-November 2005 pricing flexibility but now lose control over allocations. We find a shift in bidding in the new regime. There is significant bidder exit. Less than 50% of the fund families bidding in the pre-November 2005 regime continue to bid. Exit is not symmetric across bidder types. Frequent bidders, the large domestic mutual funds and foreign institutional investors, continue to bid. However, a significant number of moderate and occasional bidders exit the bidding process. We also find more disperse participation in the new regime. Less frequent bidders submit more bids and do so for greater quantities of shares, as do non-equity bidders. We test whether investors who receive favorable allocations in pre-November 2005 in the regime with allocation power are more likely to exit, which could be consistent with the view that favorable allocations are driven by cronyism. However, both favored and unfavored investors are very likely to exit. Finally, we consider additional tests to examine whether the data are consistent with the implications of specific models of bookbuilding. The results are qualitatively in line with the predictions of Sherman (2005), although some are not significant at conventional levels due to the lack of power. IPOs display partial adjustment to public information. Greater underpricing is associated with lower after-market volatility when underwriters control allocations and high returns appear to persist across families in the two regimes.

The paper proceeds as follows. Section 2 overviews the related IPO literature and positions our contributions relative to this work. Section 3 provides a brief description of the institutional aspects of the Indian IPO market and Section 4 describes the data. Section 5 is concerned with the analysis of underpricing. Section 6 examines books from the pre- and post-November 2005 regime. Section 7 conducts other tests of IPO theories. Section 8 concludes.

2. Literature

The IPO literature is quite extensive. Ritter and Welch (2002), Ljungqvist (2005) provide relatively recent and comprehensive surveys. Our work is related to several strands of the IPO literature, both theoretical and empirical, as discussed next.

From a theoretical perspective, Dasgputa and Hansen (2007) point out that bookbuilding, and more broadly IPO mechanism design, form part of the broader literature on auctions of divisible goods. Bookbuilding models can be classified further into two types of models. One class of models focuses on reporting or revelation of endowed information. Benveniste and Spindt (1989) is an early example of such a model and they show that allocation and pricing discretion allows underwriters to extract information held by investors. Biais and Faugeron-Crouzet (2002) extend the Benveniste and Spindt model to show that allocation discretion is unnecessary as long as underwriters enjoy pricing

discretion (see also Parlour and Rajan, 2005). This result relies on the somewhat extreme assumption that there are a few large investors endowed with information. With free entry or some competition among the informed, informational rents are dissipated and IPO underpricing is driven to zero.

Other bookbuilding models make the assumption that information is not endowed but must be acquired at a cost. Within this framework, Sherman and Titman (2002) rely on both pricing and allocation discretion to induce the optimal amount of information production. Sherman (2000) argues that repeated interaction between the investment bank and uninformed investors can explain allocation discretion. In her model, for a given level of information production, pricing and allocation powers lower underpricing, so allocation flexibility should be associated with lower underpricing. In Chemmanur and Liu (2003), issuers care about both the secondary price and not the IPO offer price alone. Fixed price IPOs are underpriced more than IPOs with price or allocation discretion because the (fixed) price does not reflect the information produced. Sherman (2005) extends Sherman and Titman (2002) to consider IPOs with allocation and pricing flexibility, in settings close to our paper. She shows that information production – hence underpricing – will occur even without allocation discretion but its level is decided by investors because underwriters do not control allocations. With bookbuilding, allocation powers permit underwriters to control the number of bidders and provide them incentives to generate information for pricing. In auctions, greater uncertainty about allocations and entry deters investor participation raising the likelihood of failure. We explore additional implications of Sherman (2005) in Section 7.

Empirical evidence on bookbuilding is less extensive. Bookbuilding dominates most markets into which it is introduced (Jagannathan et al., 2009), so there is limited variation that is necessary for empirical tests. Kutsuna and Smith (2004) offer longitudinal evidence from Japan, where the entry of bookbuilding drives out auctions. They argue that the net effect is redistributive because auctions are cheaper for small firms. Derrien and Womack (2003) report that in French IPOs, the greater lag between pricing and trading date required in sequential hybrid bookbuilt IPOs results in greater underpricing. Hauser et al. (2006) compare IPOs with and without a price band following a regulatory change in 1994 and find that underpricing is lower when there is no upper bound. Neither mechanism in their paper grants underwriters allocation flexibility. Ljungqvist et al. (2003) offer cross-sectional evidence across markets. They report that underpricing is lower for bookbuilt IPOs only when the issues are marketed in the US and when issuers use US lead managers.

Besides the pricing effects of alternative mechanisms, a separate research issue is the bidding and allocations in IPOs. Empirical research on books is relatively scarce, largely reflecting the lack of micro-level data on bids and allocations (Ritter and Welch, 2002). Our contribution is to introduce new data to the literature in two separate environments with different IPO mechanisms, one with and one without allocation discretion. Other research in this area includes Cornelli and Goldreich (2001, 2003) and Jenkinson and Jones (2004), who analyze European share offerings. These studies test whether institutions who submit limit order bids, which are more informative about prices compared to market orders, get greater share allocations. Cornelli and Goldreich (2001) analyze bids and allocations of 23 bookbuilt European IPOs (and 16 SEOs) from one investment bank. They find that limit-price bidders receive greater allocations while Jenkinson and Jones (2004) find no such relation in their sample of 27 European IPOs. Ljungqvist (2005) attributes the different results to the differences in the investment banks who provide the data to Cornelli and Goldreich and Jenkinson and Jones.

Like Cornelli and Goldreich (2001, 2003), Jenkinson and Jones (2004), we also examine bids and allocations in IPOs. However, the nature of our samples and the institutional setting are rather different. We offer two datasets drawn from regimes with varying allocation powers. Thus, we can characterize the differences in bidding under alternative allocation IPO mechanisms. We also have a sample of books from multiple bookrunners. On the institutional dimension, bids in our sample are legally enforceable contracts, not indications of interest. Furthermore, all bidders in our sample submit limit bids. Thus, unlike Cornelli and Goldreich or Jenkinson and Jones, underwriters in our sample cannot use the type of bid as an information signal and differentiate allocations on this basis. While our results support the Cornelli and Goldreich view that allocation powers aid in information gathering, the mechanism by which the powers are used is rather different. Their study focuses on the type of bids in underwriter books while our study isolates the effect of pre-market communication between underwriters and investors from the information contained in the nature of bids.

Our results also contribute to a separate literature on IPO allocations. In samples of US IPOs, Hanley and Wilhelm (1995), Aggarwal et al. (2002) find that institutions get more shares in more underpriced issues. In European IPOs, Ljungqvist and Wilhelm (2002) report that allocation constraints result in lower price updates. Chiang et al. (2010) find that institutions outperform retail investors in Taiwanese IPO auctions even when underwriters have no allocation powers, perhaps because institutions avoid the behavioral biases of individual investors (Chiang et al., 2009). All these papers rely on variation in share allocations *between* institutions and individuals. In contrast, underwriters in our sample enjoy far more limited allocation powers – powers to shift shares *within* the institutional bucket rather than between individuals and institutions. Our results show that this limited form of allocation discretion is also economically important. Finally, while our results support information-based bookbuilding theories, we do not suggest that the concerns of cronyism suggested in Loughran and Ritter (2002) or Nimalendran et al. (2007) are misplaced. We only conclude that there is a detectable upside to giving allocation powers to underwriters.

3. Institutional setting

3.1. IPO regulations

The Indian capital market is one of the oldest in the world. The first Indian stock exchange, the Bombay Stock Exchange (BSE), opened in 1875. Around the end of our sample period in 2006, BSE listed 4796 companies and its primary competitor, the National Stock Exchange (NSE) listed over 1500 companies. A number of regional stock exchanges also exist, but these account for a small fraction (less than 1%) of overall trading.

Prior to 1992, the IPO market (and the Indian economy) was heavily regulated with prices set formulaically by a government institution, the Controller of Capital Issues. Free market pricing was introduced in 1992 and a new regulatory authority, the Securities and Exchange Board of India (SEBI), roughly analogous to the US Securities and Exchange Commission, regulated capital raising activities and introduced market-based pricing of IPOs through fixed price offerings.

Bookbuilding was introduced to the Indian market in September 1999. Initially, it took the form of a sequential hybrid mechanism in which the institutional tranche fixed the price for subsequent bidding in the retail tranche. Between 1999 and 2004, India moved away from sequential to simultaneous hybrid auctions in which bidding for both tranches took place simultaneously. There were many other regulatory changes during this period such as tightened eligibility for going public, a limitation on capital raising during any calendar year, and restrictions on salability of pre-IPO venture capital holdings and the Green Shoe option. Appendix A provides further details on these changes. The regulatory environment was more stable after 2004. The samples for virtually all our tests are drawn from this time period.

3.2. The bookbuilding process

Before November 2005, bookbuilt IPOs in India followed a process that was similar in some respects to that in the US or Europe. An issuer interested in going public appoints an investment banker to manage the IPO process. The investment banker conducts extensive pre-market information gathering by sampling demands of potential institutional investors. The information is used to set a price band for the issue. Regulations cap the price band at 20% of the floor price, wider than the typical price range of $2 or 10% in the US IPO market.

After the IPO's price band is set, retail and institutional investors bid for the IPO. Bidding is open for at least three working days after which the bookrunner sets the final offer price. In India, the final offer price must lie within the price band. If a higher or lower price is desired, the price range can be reset though the process is a little onerous. The issuer decides the amended filing range and reopens the bidding for three more days subject to an overall cap of ten working days for the entire bidding period. If the filing range is revised, investors can amend or delete their prior bids and the fresh book is used to price the IPO. Few issuers make this choice and instead price the IPO at the top of the price band. The

reluctance to price above the filing range is also likely due to the simultaneous hybrid method followed in India with a large retail tranche. Retail investors need some assurance that the price will not be above the upper end of the filing range, and regulators are prone to taking actions to protect retail interest. Having a wider price band makes it more likely that the final offer price will lie within the band. Thus, Indian IPOs tend to be priced within the initial price band, a practice similar to the one used in the European IPO market (Ljungqvist et al., 2003).

With respect to bidding for IPOs, the type of bid allowed depends on investor category. Investors are categorized as small (or retail) and non-retail (including institutional investors). Retail investors have a cap on the value of their bids, currently at INR 100,000 (about $2000). Unlike retail investors who can submit either market or limit orders, non-retail bidders must place only limit bids. Valid bids are those that are at or above the final offer price and are eligible for allocation up to the amount sought by the bidder. An important aspect of the IPO process is that all bids are legally binding so bidders with valid bids are legally obliged to take up any allocations awarded by underwriters. In contrast, bids are only indicative expressions of interest in the US or the European markets. The quantity of shares available for allocation for retail investors and institutions is known before the offer. Fifty percent of the shares are reserved for institutional bidders.[4] Adjustments between categories can only be done if a category is undersubscribed. There are no such IPOs in our sample.

After the bidding phase ends, the allocation process begins. All individuals – small "retail" investors or high net worth individuals making big bids – must be treated on a non-discriminatory basis. Qualified institutional bidders (QIBs) are a different matter. Prior to November 2005, IPO managers had discretion in allocations to institutional investors. After November 2005, this power is withdrawn from underwriters, so what the Indian IPO market calls a bookbuilt IPO after November 2005 is a dirty Dutch auction in the parlance of the auction literature.[5]

To summarize, at any point of time, there were two mechanisms available for firms going public in the Indian IPO market. Prior to November 2005, issuers could choose between fixed price IPOs and bookbuilt IPOs. In fixed price IPOs, underwriters set the offer price and open the IPO for bidding and allocations are then proportional to bids. In bookbuilt IPOs, underwriters set an indicative price range and open the IPO for bidding. Underwriters enjoy flexibility over final price and share allocations. Thus, in the pre-November 2005 regime, the difference between fixed price and bookbuilt offerings reflects the value of both pricing and allocation flexibility. After November 2005, issuers chose between fixed price and a version of "bookbuilding" in which underwriters enjoy similar pricing flexibility as before but lose allocation powers. Thus, in the post-November 2005 period, the difference between fixed price and "bookbuilt" offerings reflects the value of pricing flexibility alone. The (across-regime) difference in difference should reflect the effect of varying allocation power in IPOs. For expositional convenience, we refer to the post November 2005 version of bookbuilding as "bookbuilding without allocation discretion."

4. Data

Prime database (henceforth, "Prime"), a major data provider for Indian capital markets, is our primary source of data for Indian IPOs. We obtain data on the aggregate bidding in each IPO by reading the "Key Response Data Summary" sheet in Prime. We use "Advanced Data Search" in Prime to obtain basic issue and issuer characteristics. The offer date is the date on which the offer opens for bidding. Offer "proceeds" equal the product of the number of shares and the issue price. Prime flags whether an IPO uses the fixed price or bookbuilding mechanism and identifies the lead managers. We use the lead manager data to establish a reputation variable. For every offering, we assign the proceeds raised per lead manager on a prorata basis to all managers who are identified as "lead managers." For each year, we rank managers based on the share of total proceeds in that year. We define "Reputed Lead

[4] After November 2005, a small 5% of the total issue size attributable to QIBs is available for allocation only to domestic mutual funds.

[5] While the regulatory change altering bookbuilding with discretionary QIB allocation to one with proportional QIB allocation was announced in September 2005, it did not affect firms that filed a draft document for an IPO prior to this date. AIA Engineering Ltd., which opened on November 17, 2005, was the first IPO under the new regime.

Managers" as a dummy variable that takes the value of one if the offering has a lead manager ranked in the top five in the offering year, and zero otherwise. Between 2004 and 2006, there are over 25 lead managers participating in IPOs, comprising local and foreign banks and ones with or without US affiliation. The Herfindahl index for the IPO market is less than 0.11 each year, indicating a competitive market.

Financial data for issuers are available from "Public Issues Pricing Parameters" in Prime. Many fields are not populated for large fractions of the sample. Prime separately provided us data on firm "size", which is the book value of equity of the issuer. We search Prime for information on whether an offering was refunded or devolved and delete these from the final database. We compute age as the year of the IPO minus the founding year of the firm, which is obtained from Prowess, a large database of Indian companies maintained by the Center for Monitoring the Indian Economy (CMIE). If we cannot construct the age variable from Prowess, we obtain the data from offer documents available on the website of the Indian stock market regulator (SEBI), which provides information on IPOs offered after 2002.

We collect information on the listing date, opening and closing prices as of the first day of trading for each IPO. Firms going public in India can list themselves on multiple exchanges simultaneously. Virtually all firms in India list on either the Bombay Stock Exchange (BSE) or the National Stock Exchange (NSE), which are the major stock exchanges in India today, roughly analogous to NYSE/AMEX and NASDAQ in the US, respectively. We also examine prices of issues traded on regional exchanges by calling the exchanges and obtaining the price data from print archives. The data turn out to be too unreliable for use.[6] Another feature of IPOs in India is that firms list on an exchange after varying periods of time from the opening date of the issue.[7] We also uncovered examples of firms that do not eventually list for trading although other records indicate that an offer has been completed.[8] We exclude these offerings from our sample.

For the remaining IPOs that we could identify on the NSE and/or the BSE, Prime provides the listing date and some stock price information. For offerings listed on both exchanges, if the listing date on the two exchanges is different, we choose the earlier listing date and the corresponding stock prices. If, on the other hand, the listing dates are the same, we use the data from the BSE. Based on the stock prices, we define underpricing as the difference between the price at the first day of trading and the issue price, as a percentage of the issue price. Given the lag between the offer date and list date, we market-adjust IPO underpricing by the return on the BSE SENSEX index. In the robustness test covering an extended time period, we exclude three IPOs with underpricing of above 1000%.

Table 1 presents descriptive statistics and a correlation matrix for the resulting sample, for November 2004–November 2006. In the Indian markets, IPOs are significantly underpriced. The median and mean underpricing in our sample are 22% and 31%, respectively. The underpricing exceeds the average of 3.7% reported by Cornelli and Goldreich (2001) for their sample. As in Cornelli and Goldreich, underpricing is positively correlated with oversubscription. Underpricing is negatively correlated with bookbuilding for the full period with a correlation coefficient of −0.23. The average correlation masks significant intra-sample variation in correlation before and after the allocation power shifts in November 2005. Underpricing is not significantly related to the other variables in the aggregate sample.

The median issue is oversubscribed 14 times while the mean oversubscription is 21 times. This indicates an active market with considerable interest in IPOs. While some of the excess orders for IPOs may reflect anticipated rationing, the high oversubscription and underpricing suggest that as in the US, underwriters price issues to leave something on the table. This is another form of the partial adjustment phenomenon analyzed by Hanley (1993). Whether the average underpricing of 30% is still

[6] In many cases, we do not have data on the stated start trading day for the IPO and the prices we obtained are of unknown and unverifiable quality. Ex-post, this is not surprising. The share of all regional stock exchanges in the total share volume traded in the country fell from about 8.8% in 2001–2002 to 0.2% by 2005–2006, by which time 14 of them had no stock trading (Table 19, SEBI, 2006).

[7] All firms in our main sample list within 45 days of offer date. The lag has been decreasing over time, trending towards the US practice of instant listing.

[8] These offerings include: Baid Mercantiles Ltd., Swal Computers Ltd., Weal Infotech Ltd., Array.com India, Oceana Software Solutions, Geekay Imaging, Ador Powertron, Globsyn Technologies, Blupast Industries, Vigneshwara Export and Shirdi Industries.

Table 1
Correlation matrix and averages – aggregate sample.

VARIABLE	UPRICING	OVRSUB	BBUILT	SIZE	PROCEEDS	AGE	Mean (median)
UPRICING	1						30.53% (21.99%)
OVRSUB	0.62 [a]	1					2.48 (2.66)
BBUILT	−0.23 [b]	0.25[a]	1				0.74 (1)
SIZE	−0.05	0.28[a]	0.39	1			19.10 (18.74)
PROCEEDS	−0.12	0.31[a]	0.64[a]	0.64[a]	1		20.44 (20.50)
AGE	0.03	0.15	−0.01	−0.15 [c]	−0.03	1	14.01 (12)
REPUTED	−0.15	0.22	0.46[a]	0.53[a]	0.59[a]	−0.12	0.42 (0)

Table 1 reports the correlation matrix and sample mean (median) of several characteristics. The data comprises 124 IPOs completed in India and listed on the Bombay Stock Exchange or National Stock Exchange between November 2004 and November 2006. UPRICING denotes the percentage difference between the issue offer price and the price at the close of the first trading day minus the return of the SENSEX index over the same period. OVRSUB is the natural logarithm of the issue oversubscription. BBUILT = 1 if an IPO is bookbuilt and BBUILT = 0 otherwise. SIZE denotes the natural logarithm of the book value of equity expressed in local currency. PROCEEDS is the natural logarithm of issue proceeds in local currency. AGE is the IPO year minus the year of incorporation of the issuing firm. REPUTED is 1 if the issue manager is top 5 ranked and is zero otherwise.
[a] Significance at 1% level.
[b] Significance at 5% level.
[c] Significance at 10% level.

"too much" or not is an empirical issue but it may be reasonable to expect higher underpricing in this emerging market compared to the US, where it is 22% on average between 1990 and 2009.

The key question in our paper is the (pre versus post November 2005) difference in difference of IPO underpricing (between bookbuilt and fixed price issues). Specifically, we ask whether there is a difference in underpricing between bookbuilt IPOs relative to fixed price IPOs and more critically, whether this difference depends on the availability of allocation discretion with underwriters. Table 2 reports indicative evidence on this issue. We report IPO underpricing classified by both the

Table 2
Descriptive statistics: by regime and mechanism.

VARIABLES	Mean	Median	Std. dev.	Mean	Median	Std. dev.
	Old regime: fixed price IPOs = 16			*Old regime*: Bookbuilt IPOs = 34		
UPRICING	86.1%	62.1%	84.6%	29.0%	26.0%	31.2%
OVRSUB	2.7	3.0	1.2	3.0	2.9	0.8
PROCEEDS	18.9	18.9	0.5	21.0	20.7	1.0
SIZE	18.4	18.1	0.5	19.5	19.3	1.2
AGE	18.2	11.5	11.5	12.1	10	10.7
REPUTED	0	0	0	0.59	1	0.5
	New regime: fixed price IPOs = 16			*New regime*: dirty Dutch IPOs = 58		
UPRICING	11.1%	1.4%	33.4%	21.5%	18.5%	31.3%
OVRSUB	1.3	0.9	1.0	2.5	2.6	1.1
PROCEEDS	19.2	19.2	0.5	20.9	20.8	1.2
SIZE	18.3	18.2	0.5	19.3	18.9	1.2
AGE	10.1	11	4.7	15.1	14	7.3
REPUTED	0.1	0	0.3	0.5	1	0.5

Table 2 reports descriptive statistics for the key variables in the sample of 124 IPOs completed in India and listed on the Bombay Stock Exchange or National Stock Exchange between November 2004 and November 2006. UPRICING denotes the percentage difference between the issue offer price and the price at the close of the first trading day, minus the return of the SENSEX index over the same period. OVRSUB is the natural logarithm of issue oversubscription. PROCEEDS is the natural logarithm of issue proceeds, in millions, in local currency. SIZE denotes the natural logarithm of book value of equity, in millions, expressed in local currency. AGE is the IPO year minus the year of incorporation of the issuing firm. REPUTED is 1 if the issue manager is top 5 ranked and is zero otherwise. Underwriters have allocation discretion in bookbuilt IPOs in the old regime but not in the bookbuilds in the new regime, which are thus dirty Dutch auctions. The mechanism for fixed price IPOs is invariant across the regimes.

mechanism used and by whether the IPO was made before or after November 2005. Before November 2005, the median underpricing of fixed price offerings exceeds that of bookbuilt offerings by close to 36% but the difference reverses to −17.5% after November 2005. The initial evidence is consistent with the view that the underpricing benefits of bookbuilt IPOs are lost when allocation flexibility is decoupled from pricing flexibility. We investigate these univariate results in a multivariate context that controls for other characteristics of the IPOs brought to the market in each regime.

5. Allocation power and IPO underpricing

This section examines the effect of allocation power on IPO underpricing using a difference-in-difference method by comparing the difference in underpricing between bookbuilt IPOs with fixed price IPOs before and after the November 2005 regime shift in allocation powers. An empirical question is the length of time that the pre- and post-November 2005 periods should cover. This is a familiar problem in regime shift studies and presents familiar tradeoffs. Shorter time periods capture the impact of the regime change more sharply but result in samples with fewer IPOs. Longer windows of time bring in more data but also introduce noise due to other regulatory changes and fluctuations due to IPO market cycles. Given the relatively stable regulatory environment after 2004 and the boom-bust cycle in IPOs between 1999 and 2003, we use data from one year before and after November 2005. As a robustness check, we also estimate the models for the sample of all IPOs since the inception of bookbuilding in 1999. We obtain similar findings.

5.1. Main regression results

Table 3 presents regression results. The main dependent variable is IPO underpricing, or the IPO return from the issue offer price to the price at the close of bidding on the first day of trading minus market-wide return, the return on the BSE Sensex Index for the same period. Regressors include BBUILT, a dummy for whether an issue is offered by the bookbuilding mechanism or not. NEW REGIME

Table 3
Underpricing and variance: difference-in-difference.

Dependent variable:	Underpricing		Variance
Specification #	(1)	(2)	(3)
OVRSUB		0.29 (8.83) [a]	0.36 (1.73)[c]
BBUILT	−0.63 (−2.72)[a]	−0.55 (−3.51)[a]	−2.26 (−3.12)[a]
NEW REGIME	−0.79 (−3.29)[a]	−0.37 (−2.16)[b]	−1.52 (−1.76)[c]
BBUILT*NEW REGIME	0.72 (2.80)[a]	0.45 (2.50)[b]	1.78 (1.71)[c]
REPUTED	−0.09 (−1.27)	−0.12 (−2.52)[b]	0.77 (1.57)
PROCEEDS	0.04 (1.45)	−0.03 (−1.10)	−0.34 (−1.78)[c]
AGE	−0.00(−0.74)	−0.01 (−2.23)[b]	0.02 (0.88)
INTCPT	0.13 (0.20)	0.78 (1.41)	3.08 (0.91)
# Observations	124	124	124
Adj. R^2	19.39%	58.70%	11.44%

Table 3 reports estimates of underpricing regressions (specifications 1 and 2) and variance of underpricing (specification 3) for two samples of 124 IPOs that list on the National Stock Exchange or the Bombay Stock Exchange between November 2004 and November 2006. In specifications (1) and (2), the dependent variable is IPO underpricing, the percentage difference between the IPO offer price and the price at the close of the first trading day minus the market return of the SENSEX index over the same period. In specification (3), the dependent variable is the natural logarithm of the squared residual from the regression in specification (2). BBUILT is a 0/1 dummy, which is 0 if the IPO is fixed price and 1 otherwise (i.e., if the IPO is bookbuilt in the old regime or auction in the new regime). NEW REGIME is 0 if the issue is offered pre-November 2005 and 1 otherwise. OVRSUB is the natural logarithm of issue oversubscription, REPUTED is 1 if the issue manager is top 5 ranked and 0 otherwise, PROCEEDS is the natural logarithm of issue proceeds in local currency, AGE is the IPO year minus the year of incorporation of the issuing firm. Robust *t*-statistics are reported in parentheses.

[a] 1% level.
[b] 5% significance.
[c] 10% significance.

is zero if the issue is offered prior to November 2005, when underwriters control allocations, and 1 otherwise. The difference in IPO underpricing with and without allocation power and across the two regimes is captured in the interaction term NEW REGIME*BBUILT. If bookbuilding is effective in lowering underpricing, BBUILT should have a negative coefficient, but if this beneficial effect occurs primarily when underwriters control allocations, the coefficient for BBUILT*NEW REGIME should be positive, effectively reversing the lowered underpricing due to BBUILT in the post-November 2005 regime.

Specifications (1) and (2) in Table 3 report the primary regression results. One specification controls for oversubscription while the other reports estimates without this control. Common control variables in both models include IPO manager reputation, log issue proceeds, and the age of the firm going public. In both specifications, the coefficient for the key variable, BBUILT*NEW REGIME is positive and significant, and the point estimates suggest that the interaction term eliminates much of the lowered underpricing due to BBUILT. For instance, in specification (1), the coefficient for BBUILT is −0.63 while that for BBUILT*NEW REGIME is +0.72, so the beneficial effect of making a bookbuilt offering is essentially eliminated in the new regime when underwriters are stripped of allocation powers. The results indicate that beneficial underpricing effects are more pronounced when allocation flexibility is bundled with pricing flexibility.

Among the control variables, issue proceeds is insignificant. More reputed underwriters are associated with lower underpricing in specification (2). Firm age is significant in specification (2) and has the familiar negative sign. Older firms are less underpriced, consistent with lesser information asymmetry in old-firm IPOs. Oversubscription is significant and has a positive coefficient as in Cornelli and Goldreich (2003). Underwriters do not price IPOs to clear excess demand, consistent with models of IPO information production such as Sherman (2005). The relation is a form of the partial adjustment phenomenon (see Hanley (1993), Loughran and Ritter (2002), and Lowry and Schwert (2004)).

Specification (3) of Table 3 focuses on the variance rather than the level of underpricing. The dependent variable is the log variance of the residuals estimated from the underpricing level specification. If IPO prices are more informative when underpricing is closer to zero, underpricing variance should be lower for bookbuilt IPOs, and this reduction in variance should be lower when underwriters control allocations. Because these tests are essentially tests of the functional form of heteroskedasticity, we first test whether the errors are heteroskedastic. The Bresuch–Pagan test rejects the null of homoskedastic standard errors at the 1% level. The main results for underpricing variance parallel those for underpricing levels. BBUILT is negative and significant at 1% and the interaction term BBUILT*NEW REGIME has a positive coefficient that is significant at 10%. Among the control variables, PROCEEDS has a negative coefficient and is significant at 10%, so larger issues appear to have lower underpricing variance. Interestingly, underwriter reputation has a *positive* coefficient with a *p*-value of close to 10%, indicating that more reputed managers are associated with less accurately priced issues. This result parallels that reported by Beatty and Welch (2006) for US data.

5.2. Robustness

We next investigate the robustness of the results in Section 5.1 to variations in specification and sample. While we omit many of the detailed tables, these details are available from the authors upon request.

We conduct three robustness tests. In one set of tests, we expand the pre-November 2005 time period to incorporate all IPOs from 2000 to November 2005. This sample brings in more data but also introduces noise due to IPO cyclicality, other regulatory changes, and any learning effects when an unfamiliar mechanism such as bookbuilding is introduced to the Indian IPO market. In the second tests, we re-estimate the underpricing and underpricing variance regressions controlling for firm size using the log of the book value of equity. We also experiment with an industry dummy for whether the IPO is by a technology firm or not. None of these variations in specification alter the flavor of the basic results in Table 3: BBUILT is negative and the interaction term BBUILT*NEW REGIME is positive. Allocation flexibility seems to be the key for realizing beneficial pricing effects.

It is worth pointing out that in our study, allocation powers have beneficial effects despite having rather limited scope compared to the other markets studied in the literature. Underwriters only reallocate shares between institutions but not between individuals and institutions. Even this more limited form of allocation power helps in IPO price discovery process. Finally, it is also worth highlighting that our setting is that of an emerging market with relatively high levels of underpricing. The setting seems to offer ample opportunity for abuse and quid pro quo, diverting underwriter attention away from the basic price discovery function. Were these abuses the primary effects at work, we would expect that price discovery in bookbuilt offerings is reliably worse before November 2005 than after. Little in our results thus far supports this viewpoint.

6. IPO books

In this section, we analyze proprietary datasets on IPO books. The unit of analysis in this section is an IPO bid and its corresponding allocation. We observe 4236 valid bids eligible for allocation in 25 bookbuilt IPOs offered in the pre-November 2005 regime and the corresponding allocations.[9] Section 6.1 describes bidding in our dataset. Section 6.2 discusses the aggregate reconfiguration due to underwriter power over allocations. Section 6.3 analyzes the direction in which allocation powers are exercised using a vector of bid, bidder and IPO characteristics. We find that two bidders presenting similar bids do not get similar allocations: the type of a bidder presenting a bid is as important – or more important – in determining IPO allocations. Section 6.4 analyzes post-November 2005 books. Here, allocations are of little interest, being proportionate, so we focus on bids received by the underwriters. We focus on the entry and exit of bidders and its cross-sectional variation, especially in relation to the types of bidders who were favored or unfavored in the pre-November 2005 regime.

6.1. Bids

Due to confidentiality restrictions, we cannot disclose the IPO firms or the bidders in our sample. However, the sample characteristics mirror those of the universe of bookbuilt IPOs.

Table 4 presents aggregate statistics for the pre-November 2005 book sample. The sample includes 4236 bids by institutions for INR 3286 billion (about $70 billion) for 25 issues, which is roughly 18 times the aggregate proceeds of INR 189 billion (about $4 billion) raised in the IPOs. Underwriters have considerable leeway to exercise their allocation powers. The median (mean) number of bids equals 91 (169). Fig. 1 visually depicts the histogram and a smoothed kernel density for a sample IPO, with the bid size expressed as a percentage of the total shares bid in the IPO. The distribution of bids is very skewed. There are several bids for relatively small numbers of shares and also a non-trivial right tail density with a few big bids, with a dozen bidders demanding at least 25% of all shares offered. This pattern is seen in the larger sample of books for all IPOs. The median bid represents 2.5% of an issue and 25% of the bids represent orders for 10% or more of shares offered. The distribution is right-skewed and leptokurtic, with skewness and kurtosis of 2.4 and 8.05, respectively.

Our dataset contains a brief identification of bidder type. Virtually all the sample bidders fall into one of three categories: a domestic mutual fund (MF), a foreign institutional investor (FII), or a domestic financial institution (FI). The first two, MFs and FIIs, are buy-side funds with significant trading and investing operations in equity markets. MFs are locally domiciled, local currency mutual funds owned by domestic or foreign parents. FIIs are equity investors domiciled abroad and FIs are mostly domestic banks or insurance companies, large players in the domestic local currency lending market with significant influence with the government and regulators. Most bids are from MFs or FIIs, who together account for 3617 (85%) of the 4236 bids in our sample. We term these as "EQUITY" bidders. The median (mean) number of bids per issue by equity investors is 77 (145), of which 27 (69) are from foreign institutional investors and 46 (75) are from domestic mutual funds. Financial institutions (FIs) contribute a median (mean) of 14 (19) bids per issue. Equity investors bid for an average of 15 times the shares offered in IPOs, two-thirds of which comes from FIIs and one third comes from MFs. Thus,

[9] We do not observe the full price-quantity demand curve but only have data on the bid quantities eligible for allocation.

Table 4
Bidders, bids and allocation pre-November 2005: descriptive statistics.

Investors	# Bids			Quantities – median (mean)		
	Total	Median # (Mean #)	Median % (Mean %)	Oversubscription	% of Total bidding	% of Allocation
(1)	(2)	(3)	(4)	(5)	(6)	(7)
By category						
EQUITY	3617	77 (144.7)	84.3% (83.8%)	14.8 (19.4)	87.7% (86.0%)	91.1% (87.8%)
FII	1731	27 (69.2)	35.2% (32.2%)	11.0 (14.8)	64.0% (59.9%)	64.0% (54.8%)
MF	1886	46 (75.4)	48.1% (51.6%)	3.3 (4.7)	22.8% (26.1%)	28.5% (33.1%)
NonEQUITY	619	17 (24.8)	15.7% (16.2%)	2.2 (2.8)	12.3% (14.0%)	8.9% (12.2%)
FI	486	14 (19.4)	13.4% (13.3%)	1.6 (2.2)	9.2% (10.1%)	4.7% (8.4%)
All	4236	91 (169.4)	–	17.5 (22.2)	–	
By family: frequency of IPO participation						
Frequent	3105	75 (124.2)	88.9% (84.9%)	15.3 (19.2)	92.0% (89.2%)	93.6% (88.4%)
Non-frequent	1131	8 (45.2)	11.1% (15.1%)	1.5 (3.0)	8.0% (10.8%)	6.4% (11.6%)
By family: frequency of applications in IPOs						
Frequent	3287	84 (131.5)	85.7% (82.5%)	15.5 (18.8)	88.4% (87.4%)	90.1% (87.2%)
Non-frequent	949	11 (38.0)	11% (38.0%)	1.5(3.4)	11.6% (12.6%)	9.9% (12.8%)

Table 4 provides descriptive statistics on bids and allocations for institutional investors in a proprietary sample of 25 bookbuilt Indian IPOs with discretionary allocation for which IPO books were made available to us. Column 1 in the table identifies the type of bidder. Bidders are classified as equity investors if they are domestic mutual funds (MFs) or foreign institutional investors (FIIs). Other investors are NONEQUITY investors, of which financial institutions (FIs) form the largest category. Funds are assigned to the families they belong to and are identified by the frequency of participation of the family in our sample. Frequent bidders belong to a family that participates in the top quartile of participation frequency, while the remaining bidders are classified as Non-frequent. Columns 2–4 provide statistics for the number of bids by investor category while columns 5 and 7 provide statistics for the number of shares normalized by the total number of shares offered in the issue. Column 6 provides statistics on the number of shares bid for as a percentage of total institutional bids.

FIIs dominate in terms of *quantities* bid although there is a more even split between the two in terms of the *number* of bids.

A key limitation of our dataset is that we *cannot* track individual bidders across IPOs. Bidders are coded using subjective acronyms that are neither consistent nor informative across IPOs. However, the acronyms are informative enough that we can read the names manually and assign the bidders

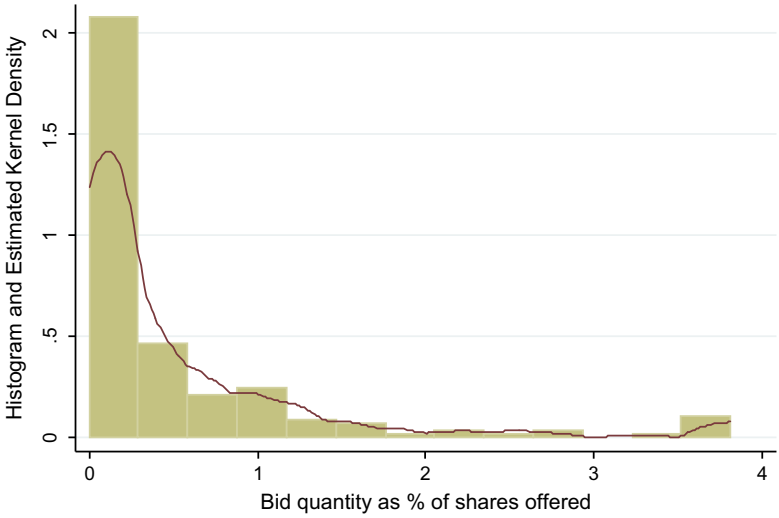

Fig. 1. Bid quantity in sample IPO.

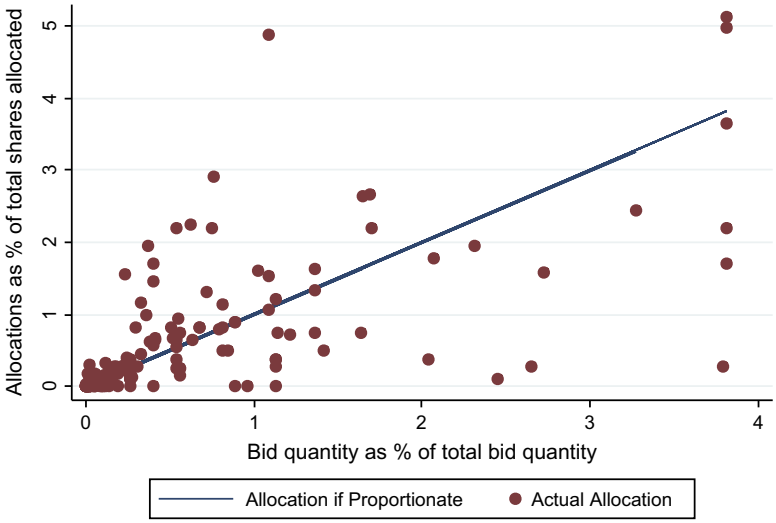

Fig. 2. Allocations in sample IPO.

to fund families. Our sample includes 323 fund families. The median family participates in 3 IPOs and the 75th percentile bids in 7 IPOs. We define frequent bidders as those that belong to families that bid in at least 7 issues. Frequent bidders account for a median of 75 bids per IPO and 90% of the amount bid. The sample statistics suggest that frequent bidders – and equity bidders – dominate the institutional investor landscape in Indian IPOs.

6.2. Allocations

In the aggregate, our sample IPOs receive bids equal to 18 times proceeds, so underwriters have ample discretion to exercise their allocation powers.[10] We analyze the extent to which underwriters deviate from a passive pro-rata policy and the variables that explain these deviations. The robust insight that emerges is that allocations depend at least as much on the *bidder* identity as the *bid*.

To visually depict the use of allocation powers, Fig. 2 plots the bids and allocations for an IPO in our sample. The *X*-axis is the number of shares bid and the *Y*-axis is the number of shares allocated, both normalized so they sum to 100%. Thus, the 45-degree line in Fig. 2 depicts share allocations if IPO managers passively made allocations proportional to bids. Points above the 45-degree line represent favorable treatment by underwriters with more than proportionate allocations while points below represent less than proportionate allocations. It is evident from Fig. 2 that underwriters exercise their allocation powers quite extensively. Several allocations lie above and below the 45-degree line. Two bidders presenting the same bid need not receive the same allocation. For instance the points to the extreme right in Fig. 2 represent bids by six institutions for an identical number of shares. Yet, the six bidders do not receive the same share allocations. We next quantify and statistically test whether this discrimination is significant in the aggregate.

If underwriters followed passive proportional allocation policies, the ratio of allocations to bids should be constant for all bidders in a given IPO. It should be equal to the reciprocal of the aggregate oversubscription in the IPO. In statistical terms, the ratio of allocations to bids should follow a uniform distribution. This hypothesis is easily rejected for every single IPO in our sample using a Kolmogorov–Smirnov test. To assess the economic magnitude of the redistribution, we compute the fraction of an IPO that is reallocated due to the exercise of underwriter allocation powers. The basic approach is to

[10] Each bid with positive allocation has a limit price equal to or greater than the offer price.

sum the absolute value of all deviations above (or below) the 45-degree line in Fig. 2 across all IPOs. Because the sum of the deviations summed across all investors is zero for any given IPO, we measure the overall excess allocation as two times the sum of all the positive (or the negative) individual bidder excess allocations.

$$q_{xs} = 2 \times \sum_i q_{xs,i} I_{q_{xs,i}>0} = 2 \times \sum_i \left\{ q_{a,i} - \frac{q_{b,i}}{\sum_i q_{b,i}} Q \right\} I_{q_{xs,i}>0}$$

where $q_{b,i}$, $q_{a,i}$, $q_{xs,i}$, are the bid, actual allocation and excess allocation, respectively, for investor i, and Q is the offer size. We find that the median and mean reallocation in IPOs equals 67% and 69.6%, respectively. The share reallocation due to underwriter discretion is economically significant.

Do different types of investors benefit or lose differently from allocation discretion? In terms of Fig. 2, the question is whether there are particular types of investors that tend to lie above or below the 45-degree line. Fig. 3 presents informal evidence of one form of discrimination. The figure presents a scatter plot of allocations and bids with a kernel weighted polynomial regression fitted to the data. Large bids tend to lie below the fitted line, suggesting that underwriters treat large bids with less than proportionate allocations. Fig. 4 presents a scatter plot with markers indicating the type of bidder. Financial institutions (FIs), marked by triangles in Fig. 4, tend to be below the 45-degree line, suggesting that they receive less than proportionate allocations. Domestic mutual funds (MFs) tend to lie above the 45-degree line, suggesting that they are more likely to be beneficiaries of the allocation powers. The evidence is less clear cut for foreign institutional investors, who tend to be both above and below the proportional allocation line. The data for FIIs are confounded by the fact that they tend to place larger than normal bids, which are less likely to receive favorable allocations, as Fig. 4 shows.

The evidence in Figs. 2–4 suggests that the pattern of allocations is not straightforward. In particular, allocations do not seem to be proportionate to or a simple function of bid strength alone. Besides the bid, the identity of the bidder also seems to matter in determining allocations. These complex patterns are certainly consistent with underwriters gaining and using hard and soft information in the IPO process to make allocations, perhaps favoring investors who provide underwriters more useful information for price discovery. We next characterize the allocation policies more fully using a multinomial logit model.

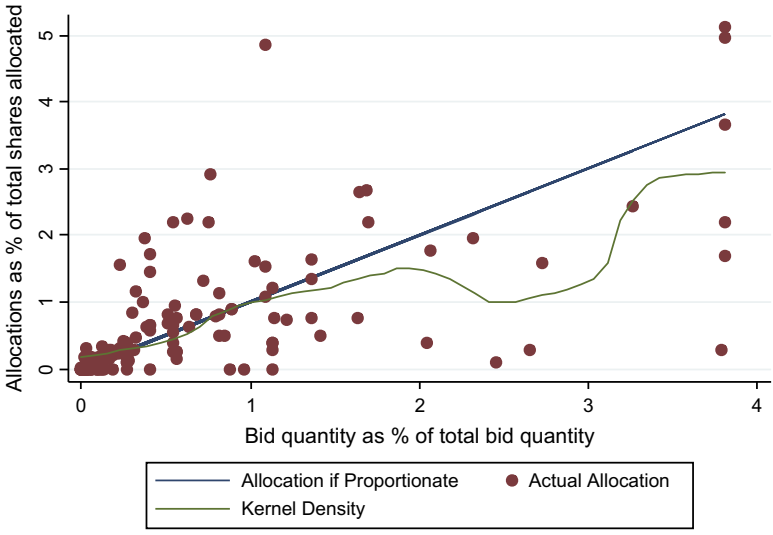

Fig. 3. Allocations in sample IPO with kernel density.

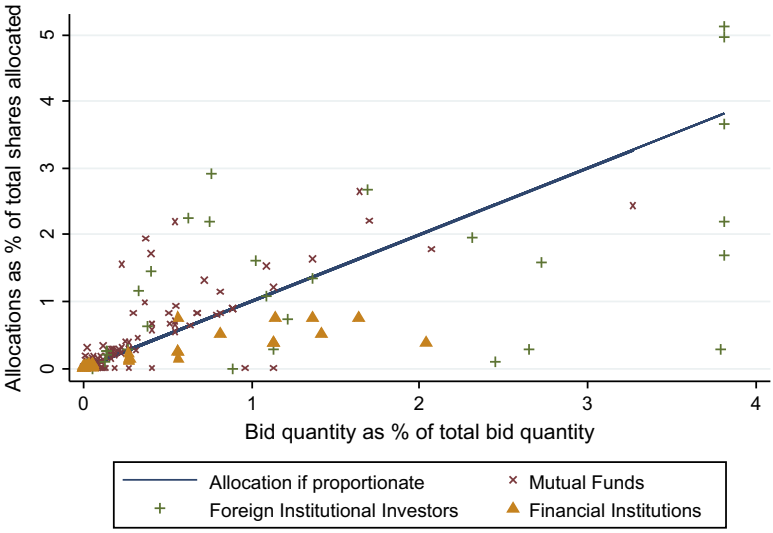

Fig. 4. Allocations in sample IPO: by bidder types.

6.3. Multinomial logit

The dependent variable in this section is whether an investor receives favorable or unfavorable treatment in IPO allocations. Fig. 2 suggests one approach of specifying the dependent variable. We could identify favored investors as those lying above the 45-degree passive allocation line and "unfavored" investors as the ones below. This classification is reasonable but blunt because it would pool investors close to the 45-degree line with those far above or far below the line, who receive far more favorable or unfavorable treatment in IPO allocations. To capture investors lying well above or well below the passive allocation line, we follow Cornelli and Goldreich (2001) and compute the "rationing" function, which is the ratio of the shares allocated to the shares bid and rank investors *within* an IPO by their rationing functions. We identify investors in the top and bottom rationing quartiles and call them "favored" and "unfavored" investors, respectively.[11]

We estimate multinomial logit models in which the explanatory variables include bid, bidder, IPO, and underwriter characteristics. Table 5 reports estimates of four specifications that vary according to the independent variables included in the multinomial logit specification while Table 6 reports the corresponding marginal effects. In either table, the top Panel A corresponds to rationing functions in the top quartile, or favored investors within an IPO for whom the dependent variable is +1. The lower Panel B corresponds to rationing functions in the lowest quartile, or "unfavored" investors for whom the dependent variable is −1. For investors who are neither favored nor unfavored, the dependent variable is zero so the logistic odds are computed relative to this category.

6.3.1. Bid size

Specification (1) in Table 5 reports a baseline model that controls for bid size alone. We considered two specifications for bid size. One specifies it as a continuous variable in terms of shares bid normalized by total shares on offer. However, from Fig. 2, allocations appear to be far from linear in bid size, so we elect to use a more flexible specification of bid size. For each IPO, we compute the distribution of bid sizes and classify each bid based on the quartile to which it belongs. We include dummies for the

[11] Thus, if there are 100 available shares in an IPO, four bidders bid 100 shares each, and the allocations are 40-30-20-10, the investor receiving 40 shares is favored while the one receiving 10 shares is unfavored. We later consider alternative ways of specifying favored investors and report similar results.

Table 5
Multinomial logit.

	(1)	(2)	(3)	(4)
Panel A: Outcome = top quartile allocation				
BIDQTILE2	−0.39 (−4.16)[a]	−0.43 (−4.48)[a]	−0.47 (−4.57)[a]	−0.47 (−4.56)[a]
BIDQTILE3	−0.56 (−4.08)[a]	−0.61 (−3.70)[a]	−0.66 (−4.13)[a]	−0.67 (−4.09)[a]
BIDQTILE4	−0.77 (−4.28)[a]	−0.94 (−4.13)[a]	−−1.05 (−4.78)[a]	−1.06 (−4.72)[a]
MF		1.22 (4.05)[a]	1.36 (3.99)[a]	1.37 (4.03)[a]
FII		1.50 (4.89)[a]	1.95 (4.72)[a]	1.97 (4.67)[a]
FREQUENT			0.18 (1.12)	0.16 (0.84)
NONEQ*FREQ			0.13 (0.30)	0.14 (0.32)
QUALITY			1.00 (2.57)[b]	1.02 (2.54)[b]
OVERSUB				0.01 (0.17)
PROCEEDS				−0.03 (−0.91)
USMGR				0.07 (1.74)[c]
REPUTED				0.02 (0.26)
Constant	−0.30 (−3.82)[a]	−1.46 (−5.44)[a]	−1.95 (−5.05)[a]	−1.24 (−1.25)
Panel B: Outcome = bottom quartile allocation				
BIDQTILE2	−0.25 (−1.57)	−0.26 (−1.60)[c]	−0.23 (−1.39)	−0.23 (−1.38)
BIDQTILE3	−0.43 (−2.49)[b]	−0.45 (−2.56)[a]	−0.42 (−2.49)[b]	−0.42 (−2.48)[a]
BIDQTILE4	−0.15 (−0.58)	−0.21 (−0.77)	−0.22 (−0.79)	−0.22 (−0.77)
MF		−0.35 (−0.99)	−1.45 (−3.34)[a]	−1.45 (−3.32)[a]
FII		−0.16 (−0.47)	−1.04 (−2.24)[b]	−1.06 (−2.21)[b]
FREQUENT			0.39 (3.65)[a]	0.39 (3.33)[a]
NONEQ*FREQ			−1.52 (−5.43)[a]	−1.52 (−5.33)[a]
QUALITY			0.27 (0.83)	0.27 (0.84)
OVERSUB				0.04 (1.98)[b]
PROCEEDS				0.00 (0.11)
USMGR				−0.02 (−0.76)
REPUTED				0.01 (0.34)
Constant	−0.50 (−3.51)[a]	−0.26 (−0.85)	0.40 (1.16)	0.22 (0.48)
Pseudo-R^2	0.77%	2.42%	3.82%	3.85%

The dependent variable is −1 (+1) if IPO allocation is in the lowest (highest) quartile and zero otherwise. BIDQTILE2 (3,4) is a dummy for whether the bid is in quartile 2 (3,4) of an IPO's bids. MF and FII are dummies for domestic mutual funds and foreign institutional investors, respectively. FREQUENT is 1 if a bidder's fund family bids in 7 or more IPOs and zero otherwise. NONEQ*FREQ = FREQUENT × (1 − max (FII, MF)). QUALITY is 1 (0) if the family's coefficient in a regression of underpricing on bids is (is not) in the top quartile. USMGR and REPUTED are dummies for IPO managers with US affiliation and a top-5 market share, respectively. OVERSUB is log oversubscription. PROCEEDS is log issue proceeds. The data comprise a proprietary sample of 25 IPO books. Robust *t*-statistics in parentheses.

[a] 1% significance.
[b] 5% significance.
[c] 10% significance.

quartiles as explanatory variables with the lowest bid quartile as the omitted category. Table 5 suggests that larger bids are less likely to be rewarded with higher allocations. Especially large bids are more likely to face rationing, being 12% less likely to be in the top quartile of allocation functions compared to bids in the smallest bid quartile, as seen in the marginal effects in Table 6. Bid quartile 2 and 3 are 5% and 8% less likely to be in the highest allocation quartile. Bid size is essentially insignificant in the lower panel, indicating that the odds of receiving less-than-proportionate allocations are unrelated to bid size.

6.3.2. Bidder type

Specification (2) in Table 5 focuses on the nature of the *bidder* type rather than the quantity of shares bid. Following the discussion in Section 6.1, we consider two variables, one indicating whether a bidder is a MF or not, and the other indicating whether a bidder is a FII or not. Both types of bidders are equity market investors who invest in Indian capital markets. The remaining investors, who represent the omitted class, are largely domestic financial institutions.

The importance of bidder identity is readily evident from the significance and the marginal effects reported in Table 6, which in fact outstrip those for bid size. The quantitative estimates in Table 6

Table 6
Multinomial logit: marginal effects.

	(1)	(2)	(3)	(4)
Panel A: Outcome = top quartile allocation				
BIDQTILE2	−0.05 (−3.13)[a]	−0.06 (−3.61)[a]	−0.07 (−4.01)[a]	−0.07 (−4.04)[a]
BIDQTILE3	−0.08 (−2.99)[a]	−0.08 (−2.85)[a]	−0.09 (−3.22)[a]	−0.09 (−3.31)[a]
BIDQTILE4	−0.12 (−4.21)[a]	−0.14 (−3.97)[a]	−0.15 (−4.93)[a]	−0.15 (−4.94)[a]
MF		0.24 (4.80)[a]	0.33 (5.56)[a]	0.33 (5.54)[a]
FII		0.29 (5.47)[a]	0.42 (5.85)[a]	0.43 (5.76)[a]
FREQUENT			0.01 (0.41)	0.01 (0.19)
NONEQ*FREQ			0.09 (1.03)	0.09 (1.03)
QUALITY			0.19 (2.75)[b]	0.19 (2.70)[b]
OVERSUB				−0.00 (−0.13)
PROCEEDS				−0.01 (−0.99)
USMGR				0.01 (1.64)[c]
REPUTED				0.00 (0.20)
Panel B: Outcome = bottom quartile allocation				
BIDQTILE2	−0.02 (−0.85)	−0.03 (−0.87)	−0.02 (−0.59)	−0.02 (−0.59)
BIDQTILE3	−0.05 (−1.48)	−0.05 (−1.54)	−0.04 (−1.34)	−0.04 (−1.33)
BIDQTILE4	0.01 (0.27)	0.01 (0.14)	0.01 (0.17)	0.01 (0.18)
MF		−0.14 (−2.36)[b]	−0.33 (−5.00)[a]	−0.33 (−4.93)[a]
FII		−0.12 (−2.19)[b]	−0.28 (−4.29)[a]	−0.29 (−4.20)[a]
FREQUENT			0.06 (3.53)[a]	0.06 (3.24)[a]
NONEQ*FREQ			−0.21 (−8.79)[a]	−0.21 (−8.52)[a]
QUALITY			−0.02 (−0.66)	−0.02 (−0.71)
OVERSUB				0.01 (1.91)[c]
PROCEEDS				0.00 (0.74)
USMGR				−0.01 (−1.14)
REPUTED				0.00 (0.15)

Table 6 reports marginal effects of the logit model estimated in Table 5. BIDQTILE2 (3,4) is a dummy for whether the bid is in quartile 2 (3,4) of an IPO's bids. MF and FII are dummies for domestic mutual funds and foreign institutional investors, respectively. FREQUENT is 1 if a bidder's fund family bids in 7 or more IPOs and zero otherwise. NONEQ*FREQ = FREQUENT × (1 − max (FII, MF)). QUALITY is 1 (0) if the family's coefficient in a regression of underpricing on bids is (is not) in the top quartile. USMGR and REPUTED are dummies for IPO managers with US affiliation and a top-5 market share, respectively. OVERSUB is log oversubscription. PROCEEDS is log issue proceeds. The data comprise a proprietary sample of 25 IPO books. Robust *t*-statistics in parentheses.

[a] 1% significance.
[b] 5% significance.
[c] 10% significance.

suggest that both types of equity market investors are 24–29% more likely to receive favorable allocations, well over double the marginal effects for bid size. In the lower panel, we analyze unfavorable allocations that are rationed with the lowest quartile allocation rationing functions. Here, equity market investors, MFs and FIIs, are 14% and 12% less likely to receive unfavorable rationing of allocations. These results are interesting because in the textbook auction mechanisms bidder identity is essentially irrelevant, the stress being on a bid presented rather than who makes the bid. However, our data suggest that IPO managers of bookbuilt IPOs stress the opposite – who presents a bid, or bidder identity, matters at least as much as what bid is presented.

Specification 3 in Table 5 includes other bidder variables. One variable is FREQUENT, or the frequency with which a bidder's fund family participates. Frequent participants interact more with issue underwriters and are likely to possess more soft information or provide more fertile ground for quid pro quo in trading allocations for commissions. It is also possible that frequent bidders provide insurance against the lack of sufficient interest in an IPO. Interestingly, FREQUENT is *not* a significant determinant of being in the highest quartile rationing function. The data suggest that underwriters attach little incremental value to frequent participation in IPOs for favorable allocation. However, FREQUENT has a positive sign in determining the lowest quartile allocations.

An interesting test comes from the interaction of the frequent bidder variable with the investor type. Opportunities for quid pro quo, such as swapping allocations for trading commissions, are greater when the frequent bidder is an equity market participant. Likewise, soft information flow relating to

bookbuilding may be greater if frequent bidders are equity market participants. On the other hand, frequent bidders who are not equity investors may matter in allocations if they provide insurance against inadequate bidding in IPOs or offer uninformed competition to equity investors involved in bookbuilding information flows. To test these hypotheses, we interact FREQUENT bidders with whether the bidder is a non-equity bidder. We find that the coefficient for the interaction is significant with a negative sign in the lowest quartile allocation equation. Thus, frequent bidders are less likely to be discriminated against in terms of IPO rationing if they are *not* equity market investors. This is consistent with the notion that these uninformed investors provide an insurance function for underwriters. Section 7 conducts further tests of this hypothesis.

We also consider a proxy for the quality of the investor presenting a bid. We consider all families that bid for at least 10 IPOs in our sample. For each qualifying fund family, we construct a sample of all the IPOs that the family invested in. For each IPO, we compute the total number of shares bid by all funds belonging to the family and normalize this quantity by the shares offered in the IPO. We run a cross-sectional regression of IPO underpricing on the size of the family's bid. We identify a family as a high quality bidder if its regression coefficient falls into the top quartile of the regression coefficients of all qualifying families. We set the variable QUALITY equal to 1 for high quality bidding families and set it to zero for all other families. Intuitively, our quality measure classifies families as having high quality if two conditions are met. One condition for a high quality family is that its bidding behavior more closely explains IPO underpricing. The other condition is that the family should participate in a sufficient number of IPOs in our sample. Both the tracking of IPO underpricing and the frequency of participation are based on our sample of IPOs rather than the universe of all IPOs, so our measure is potentially noisy, which creates a bias towards not finding a significant result. We expect that quality bidders should be rewarded with high allocations and less likely to belong to the lowest quartile allocations. Table 5 shows that one of these predictions is supported. The coefficient for QUALITY is positive and significant in Panel A. Bidders ranked highly on the quality measure are more likely to receive favorable rationing in IPO allocations.

6.3.3. IPO characteristics

For the final specification in Tables 5 and 6, we include issue-specific variables in the logit model. There are two approaches towards handling issue-specific variables. One is to include characteristics whose coefficients we are interested in testing hypotheses about. The other approach is to include issuer fixed effects. Both approaches give similar results. While the fixed effects approach is more encompassing, the approach of specifying characteristics yields coefficients of economic interest, so we report estimates based on these in specification (4) in Tables 5 and 6.

We include log oversubscription in an IPO as an explanatory variable. Mechanically, greater levels of oversubscription make more shares available to the underwriter for reallocation, so discrimination should be more likely both on the negative and the positive side in more oversubscribed issues. This relation is also likely if underwriters use allocations as a tool to dispense more favors to their preferred investors, which is more useful in more oversubscribed issues. There is mild or no support for this view. Oversubscription is insignificant in explaining favorable rationing and is marginally significant ($t = 1.91$, marginal effect = 1%) in explaining unfavorable rationing.

Following the IPO underpricing literature, we include log proceeds as a second control. If greater proceeds are associated with less pricing uncertainty, then there is less to learn in larger issues, so discrimination should be lower for large IPOs. There is no support for this hypothesis. We also consider two proxies for underwriter quality. We include REPUTED, defined earlier, to test whether reputed underwriters engage in more discrimination but find it not to be significant in either panel. The second proxy for underwriter quality, following Ljungqvist et al. (2003), is whether the managing syndicate includes an underwriter with a US affiliation. This allows us to test whether a US affiliation results in greater discrimination given the parents' greater experience in bookbuilding. These underwriter variables are also of interest given the differences in the results from the single underwriter datasets of Cornelli and Goldreich (2001) and Jenkinson and Jones (2004). In our sample, the underwriter variables have rather mild economic and statistical significance. We find that the US affiliation variable matters in the favorable rationing equation at 10% with a 1% marginal effect. The underwriters are not significant elsewhere.

6.3.4. Alternative to logit

The multinomial logit models underwriter rationing as being in the highest or lowest quartiles. The specification has two limitations. One is that it does not use the actual level of rationing. A second problem is that the dependent variable is constructed on a *within*-IPO basis. Thus, different IPOs may have different levels of rationing that come into the top or lowest quartiles, which could limit the comparability of rationing across IPOs.[12] For instance, consider two IPOs offering 100 shares each that are oversubscribed two times. In one IPO, an underwriter may give 51 shares to one investor and 49 to the other, while in the other IPO, the underwriter may give 75 shares to one investor and 25 to the other, resulting in greater discrimination, but the difference would not be captured in the multinomial logit model. Accordingly, as a robustness check, we also consider a more continuous version of the rationing variable.

Following Cornelli and Goldreich (2001), we use the variable "normalized rationing," which equals raw rationing times the total oversubscription for an issue. Thus, if an institution bids for 50 shares and gets 20 shares, the percentage allocated equals 40%. If this issue is oversubscribed 10 times, the normalized rationing is $40\% \times 10 = 4$ while an issue oversubscribed two times will have normalized rationing equal to $40\% \times 2 = 0.8$. We run specifications (1)–(4) in Tables 5 and 6 with normalized rationing as the dependent variable. Using this raises two other issues. One is statistical. The normalized rationing is prone to outliers, given the high level of oversubscription in Indian IPOs. We account for this by winsorizing normalized rationing. The kurtosis of raw normalized rationing is 104 and this drops to 8 (4) when we winsorize at the 2.5% (5%) level. Another issue is that using normalized rationing as the LHS does not consider the asymmetry between the decisions to make high or low allocations. This is, of course, naturally accounted for in the multinomial logit. In any event, the main results with normalized rationing are similar to those in Tables 5 and 6.[13]

To summarize, our sample IPOs are highly oversubscribed, so underwriters in our sample enjoy enormous discretion in share allocations. Our results suggest that they use this power quite extensively to redistribute close to 70% of IPO shares. The direction of the reallocation is related to several variables. By far the most important effects are with respect to bidder identity, which matters at least as much as – and often far more – than the size of the bid. More broadly, the odds of receiving favorable or unfavorable allocations depend not just on bids but also on hard and soft information relating to bidder type and the issue being offered.

6.4. Post-November 2005 books

In the post-November 2005 regime, allocations are of little interest because they are required to be proportionate. Thus, we focus these tests on the bidding. We focus on the entry and exit of bidders, and its cross-sectional variation, especially by the types of bidders who were favored or unfavored in the pre-November 2005 regime.

The dataset comprises 2291 institutional bids in 17 bookbuilt IPOs offered between November 2005 and November 2006. Table 7 describes the characteristics of the IPO bidders.The substantial institutional interest in IPOs continues in the new regime. On average, 135 institutions bid in an IPO leading to 20X oversubscription of the institutional bucket in IPOs. Equity bidders dominate, accounting for 82% of the number of bids and shares demanded, although the numbers are slightly lower than the 87% recorded in the prior regime. Less frequent bidders are more active in the new regime, accounting for a median of 30% of number and 24% of the quantities bid, over double the pre-November 2005 figures.

As pointed out earlier, we cannot track individual bidders because of inconsistent coding across IPOs. However, we can reliably track the institutional family to which bidders belong. Accordingly all tests in this section are at the level of the bidder's parent family. Table 8 classifies the fund families from the pre-November 2005 regime by whether they participate in the post-November 2005 regime or not. There is considerable bidder exit in our sample. Of the 323 families in the old regime, 145, or

[12] We thank François Derrien for pointing out this issue and suggesting potential fixes.

[13] In the specifications with no winsorization, the only change is that frequent bidders are significant and are more likely to receive favorable allocations. None of the other results has any material change.

Table 7
Bidder characteristics – new regime.

	# Bids			Quantities – median (mean)	
Investors	Total	Median # (mean #)	Median % (mean %)	Oversubcription	% of Total bidding
By category					
EQUITY	1895	97 (111.5)	82.2% (80.0%)	16.09 (23.58)	82.24% (82.60%)
FII	831	32 (48.9)	34.9% (37.2%)	10.50 (18.35)	61.94% (64.14%)
MF	1064	61 (62.6)	44.4% (42.8%)	4.45 (5.23)	17.39% (18.46%)
NonEQUITY	396	22 (23.3)	17.8% (20.0%)	3.91 (4.49)	17.76% (17.40%)
FI	300	19 (17.6)	13.4% (15.0%)	2.56 (2.96)	11.15% (10.93%)
All	2291	111 (134.8)	–	19.63 (28.07)	–
By family: frequency of IPO participation					
Frequent	1426	82 (83.9)	70.34% (69.02%)	18.42 (21.19)	76.37% (77.55%)
Moderate	721	33 (42.4)	27.59% (27.05%)	3.67 (5.62)	19.65% (19.21%)
Rare	144	3 (8.5)	2.07% (3.92%)	0.36 (1.26)	1.37% (3.23%)
By family: frequency of applications in IPOs					
Frequent	1767	102 (103.9)	79.22% (78.17%)	16.16 (20.99)	74.89% (74.10%)
Moderate	426	18 (25.1)	18.06% (18.87%)	4.4 (6.15)	21.69% (23.28%)
Rare	98	2 (5.8)	1.39% (2.96%)	0.27 (0.93)	0.81% (2.62%)

Table 7 provides descriptive statistics on the bids and allocations by different types of investors. Bidders are classified as equity investors if they are domestic mutual funds (MFs) or foreign institutional investors (FIIs), while others are classified as non-equity bidders. Most non-equity bidders are domestic financial institutions (FIs). Frequent bidders belong to a family that enters bids in more than 75% of the IPOs in our sample, rare bidders belong to fund families that bid in only one IPO, while the remaining bidders are classified as being of moderate frequency. The data comprises a sample of 17 Indian IPOs offered through the book-building method in the post-November 2005 period.

Table 8
Bidders who do not exit: characteristics

	Total, of which:	Survivors (% of total)
Panel A: Aggregate sample		
# of Bidder families:	323	178 (55%)
Panel B: By Bid Size		
BIDQTILE1_family	73	25 (34%)
BIDQTILE2_family	88	44 (50%)
BIDQTILE3_family	81	48 (59%)
BIDQTILE4_family	81	61 (75%)
Panel C: By Category		
EQUITY_family	221	120 (54%)
NONEQUITY_family	101	57 (56%)
Panel D: By frequency of participation		
FREQ_family	87	87 (100%)
MODERATE_family	143	76 (53%)
RARE_family	93	15 (16%)
Panel E: By allocation preference		
FAVORED_family	26	6 (23%)
UNFAVORED_family	55	7 (13%)

Table 8 describes the characteristics of families of bidders in the old regime who also participated in the new regime (i.e., SURVIVOR = 1). This is based on two proprietary samples of bookbuilt IPOs – 25 IPOs from the old regime and 17 from the new regime. Based on the old regime sample, funds are assigned to the families they belong to, and are classified along four dimensions. Along the frequency of participation dimension, Frequent bidders belong to a family that participates in the top quartile of participation frequency, Rare bidders belong to families that lie in the bottom quartile, and the remaining bidders are classified as Moderate bidders. Along the allocation preference dimension, a fund is categorized as Favored or Unfavored if its allocation function is in the top or bottom quartile, respectively, of the IPO's allocation functions. In this table, Family is categorized as being Favored (Unfavored) if at least 75% of the funds in the family were Favored (Unfavored) across all IPOs in the old regime. Along the bid size dimension, BIDQTILE1 (2, 3, 4) are bidders in the first (second, third, fourth, respectively) quartile of the distribution of bids for the IPO. A family is considered to be in BIDQTILE1 (2, 3, 4) if at least 50% of the funds in the family are in BIDQTILE1 (2, 3, 4) across all IPOs. Family is EQUITY (NONEQUITY) family if atleast 75% of the funds in the family are either MF or FII. We use the new regime information to identify families common to both the old and the new regimes.

about 45%, exit IPO bidding. There are only 22 new entrants in the new regime, who account for 54 (2%) of all bids in the new regime. Pre-November 2005 bidders dominate bidding in the post-November 2005 sample.

We examine what types of bidders exit across the two regime. As in Tables 5 and 6, we begin by focusing on bid size. A family's bid size is the bid size quartile of the 50th percentile of all the family's bids. Panel B in Table 8 classifies bidding families by the size of the bids they place in the pre-November 2005 regime. We find that families that place the highest quartile bids continue to participate in the new regime. 75% of all families whose median bid is in quartile 4 continue to bid in the new regime, while only 34% with median bids in quartile 1 remain. As seen in Tables 5 and 6, bidders placing high quantity bids prior to November 2005 are less likely to receive favorable allocation treatment. These bidders are, however, more likely to bid in the new regime.

Equity bidders receive more favorable allocations than non-equity bidders in the pre-November 2005 regime. Accordingly, Panel C in Table 8 reports exits based on the equity/non-equity classification. We classify families as being comprised of equity or non-equity bidders. An equity family is defined as one in which at least 75% of bidders are either domestic mutual funds or foreign institutional investors. Both categories of bidders are equally likely to remain active in the post-November 2005 regime. Panel D considers classification by bidding frequency. As before, we define frequent bidder families as families that participate in at least 7 IPOs (the 75th percentile) in the old regime. We find that all 87 families who were frequent bidders in the old regime continue to participate in the new regime. If bidding frequency were driven by favorable treatment by underwriters and quid pro quo, we would find that frequent bidders are more likely to exit the IPO after allocations become proportionate. Instead, exit (and entry) are confined to infrequent bidders.

We next examine exit by investors favored or "unfavored" by underwriters in the pre-November 2005 regime. We define a family as being favored (FAVORED FAMILY = 1) if at least 75% of the bids made by funds in the family have the top quartile rationing function in IPOs. Likewise, UNFAVORED FAMILY takes the value one if at least 75% of the bidders in the family have the lowest quartile rationing function. We analyze whether being favored or unfavored predicts exit. Panel E in Table 8 suggests that there is exit by both family types. 23% of families most favored in allocations and 13% of the families least favored in allocations continue to participate in the new regime. These relations are more fully explored in Table 9, which presents multinomial logit estimates where the dependent variable is 1 if a family continues to participate post-November 2005 and zero if not. The independent variables are FAVORED, UNFAVORED, controls for a family's bid size and whether the family has equity or non-equity bidders. Because the variables FAVORED FAMILY and UNFAVORED FAMILY are not collectively exhaustive, we include both variables in our specification, using the remaining families as the baseline.

Specification (1) of Table 9 reports a baseline logit with only FAVORED and UNFAVORED families as explanatory variables. Both family types are less likely to remain in the post-November 2005 regime relative to baseline. The coefficient for UNFAVORED is not significantly different from that for FAVORED. Specification (2) introduces bid size as a control and as before, the lowest bid quartile is the omitted group. Aggressive bidders are more likely to remain in the new regime. In specification 3, we include the type of market participants. Equity families are *less* likely to continue to bid in the new regime. Neither variable alters the coefficients for FAVORED or UNFAVORED. We also consider a proxy for favored bidders based on the dollar profits from excess IPO allocations. Favored has an insignificant coefficient in this model. Investors receiving large dollar profits are not especially likely to exit when allocation discretion is eliminated.

7. Testing other theoretical predictions

Thus far, our evidence supports bookbuilding theories where allocation powers aid price discovery. There is little support for the alternate cronyism view, which predicts that bookbuilt IPOs should be less underpriced when allocation powers are withdrawn. An interesting question is whether the data are consistent with other implications predicted by specific models of bookbuilding in the literature. In conducting these tests, one issue is that the mapping from the specific models in the literature to

Table 9
Multinomial logit for bidder exit

	(1)	(2)	(3)	(4)
Panel A: Dependent variable: survivor = 1				
FAVORED_family	−1.42 (−2.84)[a]	−1.43 (−2.45)[b]	−1.26 (−2.08)[b]	−1.27 (−3.84)[a]
UNFAVORED_family	−2.12 (−2.86)[a]	−2.22 (−3.26)[a]	−2.44 (−3.09) [a]	−2.44 (−3.09)[a]
BIDQTILE2_family		−0.24 (−0.64)	−0.10 (−0.30)	−0.11 (−0.32)
BIDQTILE3_family		−0.01 (−0.03)	0.13 (0.33)	0.13 (0.32)
BIDQTILE4_family		1.22 (5.10)[a]	1.50 (7.55)[a]	1.51 (7.53)[a]
EQUITY_family			−0.79 (−2.64)[a]	
NONEQUITY_family				0.77 (2.51)[b]
Pseudo-R^2	10.94%	15.70%	17.13%	17.03%
Panel B: Marginal effects				
FAVORED_family	−0.26 (−5.21)[a]	−0.26 (−4.27)[a]	−0.23 (−3.34)[a]	−0.23 (−3.38)[a]
UNFAVORED_family	−0.37 (−4.75)[a]	−0.38 (−5.00)[a]	−0.41 (−5.40) [a]	−0.41 (−5.38)[a]
BIDQTILE2_family		−0.05 (−0.64)	−0.02 (−0.31)	−0.02 (−0.32)
BIDQTILE3_family		−0.00 (−0.03)	0.03 (0.33)	0.03 (0.32)
BIDQTILE4_family		0.29 (5.60)[a]	0.36 (8.30)[a]	0.36 (8.31)[a]
EQUITY_family			−0.19 (−2.67)[a]	
NONEQUITY_family				0.18 (2.53)[b]
# Observations	236	236	236	236

Table 9 reports the coefficients of four multinomial logit models in Panel A and their marginal effects in Panel B. In each specification of the multinomial logit model, the dependent variable (SURVIVOR) is 1 if the family participates in both the old and the new regimes, and zero if it participates only in the old regime. Favored_family (Unfavored_family) is 1 if the allocation function of at least 75% of the funds in that family lie in the top (bottom) quartile of the IPO's allocation functions. BIDQTILE1_family (2,3,4) = 1 if at least 50% of the funds in the family are in the first (second, third, fourth, respectively) quartile of the distribution of bids for the IPO. EQUITY_family (NONEQUITY_family) is one in which at least 75% of the funds of that family are either MF or FII (MF = 0 and FII = 0 for NONEQUITY_family). Figures in parentheses are the *t*-statistics where [a], [b], and [c], denote 1%, 5% and 10% significance, respectively.

the particular mechanism used in Indian IPOs is less than exact. Nevertheless, we can examine implications from the available models that extend to our setting.[14]

As discussed in Section 2, information reporting models of IPO mechanisms implicitly assume restrictions on investor entry. Given the relative openness of Indian IPO markets to bidders, information reporting models seem less apt for our setting. We consider implications of models with costly information production and endogenous entry of investors. Sherman (2005) models bookbuilding in a setting where investors incur information production costs and bid based on whether the expected payoff from participating exceeds their information costs. Some implications of the model are tested by Chiang et al. (2010) on a dataset of 84 Taiwanese auctions between 1995 and 2000. These tests exploit the fact that Taiwanese IPO auctions are discriminatory, so each investor earns a different return on investment. Indian IPOs have uniform pricing, as in the US and Europe, so their tests cannot be replicated here. We test other implications of Sherman (2005) for IPO pricing and returns and then turn to tests that rely on the IPO book subsample.

The Sherman (2005) model with costly information production implies that greater IPO underpricing should be accompanied by lower after-market volatility. The basic intuition is that when investors incur more information production costs, pre-market uncertainty is reduced. In a setting with fixed buckets for institutional and individual investors with uniform pricing, underpricing is the – rather blunt – vehicle through which the compensation is conveyed. Thus, underpricing should be greater when there is greater ex-ante information production. Furthermore greater pre-market information production leaves less for the after-market to do, so the after-market volatility, a proxy for ex-post information production, should be lower. If information production is greater during the pre-November 2005 period when underwriters control allocation and underwriters compensate investors for this through underpricing, the relation is more pronounced prior to November 2005.

We test the relation between after-market volatility and IPO underpricing by regressing the volatility of daily returns over a one month period after the IPO on IPO underpricing for bookbuilt IPOs.

[14] We are grateful to the two referees for help in developing this section.

Table 10
Underpricing and aftermarket volatility.

	(1)	(2)
SENSEX VOLATILITY	2.24 (1.45)	2.11 (1.35)
UPRICING	0.00 (0.2)	0.01 (0.93)
OLD REGIME		−0.00 (−0.2)
UPRICING*OLD REGIME		−0.01 (−1.54)
INTCPT	0.01 (2.24)[b]	0.01 (1.82)[c]
# Observations	92	92
Adj. R^2	5.3%	4.5%

Table 10 provides regression results for 92 IPOs that used either bookbuilding or auction mechanism among the 124 IPOs that list on the National Stock Exchange or the Bombay Stock Exchange between November 2004 and November 2006. The dependent variable is the variance of the daily returns of the stock over 1 month. SENSEX VOLATILITY is the variance of the daily return on SENSEX index over the same period. UPRICING is the percentage difference between the IPO offer price and the price at the close of the first trading day minus the market return of the SENSEX index over the same period. OLD REGIME takes values 0/1 if the IPO is post-November 2005 or pre-November 2005, respectively. Robust t-statistics are reported in parentheses.

[a] 1% significance.
[b] 5% significance.
[c] 10% significance.

Part of an IPO's ex-post volatility may simply reflect market-wide price movements so we include the volatility of the SENSEX market index as a control in the regressions. Table 10 reports the results. Specification (1) includes both the pre and post-November 2005 samples. The coefficient for market-wide volatility is positive but insignificant at conventional levels while that for underpricing is essentially indistinguishable from zero. Specification (2) distinguishes between the pre and post-November 2005 periods. Underpricing interacted with the pre-November has a negative coefficient with $p = 12\%$, which is however short of being significant at conventional levels.

Our second return tests focus on partial adjustment. Sherman (2005) argues that partial adjustment to public information studied by Loughran and Ritter (2002) or Lowry and Schwert (2004) can arise in models in which investors face costs of information production. The basic idea is that in bull markets, when investors have robust outside investment options, it is especially costly for investors to spend the time and effort in information production for pricing IPOs. Thus, the partial adjustment phenomenon should be especially pronounced in an environment where underwriters gather information from investors who incur information production costs. We test this proposition by regressing underpricing on market wide returns on the SENSEX index over a month (20 trading days) prior to the IPO opening date. The empirical prediction is that underpricing should be related to pre-IPO market returns. Once again, the relation should be pronounced for bookbuilt IPOs offered prior to November 2005.

The results of the partial adjustment tests are reported in six specifications in Table 11. In specifications (1a) and (1b), we report univariate regressions of underpricing on the SENSEX return for bookbuilt IPOs in the pre-November 2005 period and the "bookbuilt" auction IPOs in the post-November 2005 period, respectively. In both cases, the coefficient for the past SENSEX returns is positive, consistent with the joint hypothesis that (1) investors incur costs of information production; and (2) past market-wide returns are proxies for the (opportunity) costs of information production. Although the coefficient for the pre-November 2005 period is about 50% greater, there is not enough precision for a Wald test to decisively differentiate between the point estimates. Specifications (2a) and (2b) add issue-specific controls used to predict underpricing in Section 5. The results for the SENSEX index remain qualitatively similar. Finally, specifications (3a) and (3b) control for oversubscription. SENSEX is not significant and is subsumed by oversubscription. This is not surprising. As discussed before in Section 5, the coefficient for the oversubscription is also a manifestation of the same partial adjustment phenomenon in which underwriters do not increase IPO prices to eliminate all excess demand. As before, the point estimates of the coefficients are greater in the pre-November 2005 period. The difference in coefficients is significant with a t-statistic of 2.47 and a p-value of close to 1%.

Table 11
Partial adjustment to public information.

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
SENSEX RETURN	1.96 (2.42)[b]	1.34 (2.44)[b]	1.48(2.02)[b]	1.10 (1.65)[c]	−0.51(−0.78)	−0.32(−0.59)
PROCEEDS			0.05 (0.78)	0.07 (2.07)[b]	−0.00 (−0.03)	−0.00 (−0.11)
AGE			0.01 (2.54)[b]	−0.00 (−0.79)	0.00 (0.68)	−0.01 (−1.77)[c]
REPUTED			−0.15 (−1.57)[c]	−0.11 (−1.16)	0.01 (0.14)	−0.17 (−2.84)[a]
OVERSUB					0.33 (7.22)[a]	0.24 (8.12)[a]
INTCPT	−1.74 (−2.08)[b]	−1.2 (−2.09)[b]	−2.39 (−1.74)[c]	−2.25 (−2.48)[b]	−0.15 (−0.17)	0.20 (0.31)
OLD REGIME	YES	NO	YES	NO	YES	NO
NEW REGIME	NO	YES	NO	YES	NO	YES
# Observations	34	58	34	58	34	58
Adj. R^2	8.3%	1.8%	21.5%	3.0%	64.7%	59.7%

Table 11 provides regression results for IPOs that used either bookbuilding or auction mechanism among the 124 IPOs that list on the National Stock Exchange or the Bombay Stock Exchange between November 2004 and November 2006. The dependent variable is IPO underpricing, the percentage difference between the IPO offer price and the price at the close of the first trading day minus the market return of the SENSEX index over the same period. SENSEX RETURN is the market return on the SENSEX index over 1 month prior to the IPO offer date, REPUTED is a 0/1 dummy for IPO manager reputation, PROCEEDS is the natural logarithm of issue proceeds in local currency, AGE is the IPO year minus the year of incorporation of the issuing firm, OVERSUB is the natural logarithm of issue oversubscription, OLD (NEW) REGIME takes value 0/1 if the IPO is post- or pre-November 2005 (and vice versa), respectively. Robust *t*-statistics are reported in parentheses.

[a] 1% significance.
[b] 5% significance.
[c] 10% significance.

Table 12
Underpricing and bidder entry.

	1(a)	1(b)	2(a)	2(b)
EQUITY APPS	0.05 (0.54)	0.24 (4.26)[a]	−0.07 (−0.75)	−0.12 (−0.57)
NONEQUITY APPS	0.11 (1.37)	−0.06 (−0.92)	0.13 (1.41)	0.01 (0.18)
OVERSUB			0.27 (4.11)[a]	0.28 (1.98)[b]
INTCPT	−0.22 (−0.88)	−0.68 (−3.31)[a]	−0.53 (−3.07)[a]	−0.10 (−0.26)
OLD REGIME	Yes	No	Yes	No
NEW REGIME	No	Yes	No	Yes
# Observations	25	17	25	17
Adj. R^2	26.9%	40.9%	54.5%	52.8%

Table 12 uses book data for a sample of Indian IPOs before (25 IPOs) and after (17 IPOs) the regime change in November 2005. The dependent variable is IPO underpricing, the percentage difference between the IPO offer price and the price at the close of the first trading day minus the market return of the SENSEX index over the same period. EQUITY APPS (NONEQUITY APPS) is the natural logarithm of the total applications received from equity (nonequity) bidders. Equity bidders include foreign institutional investors and domestic mutual funds, while nonequity bidders include the remaining institutional bidders such as banks and insurance companies. OVERSUB is the natural logarithm of issue oversubscription. OLD (NEW) REGIME takes value 0/1 if the IPO is post- or pre-November 2005 (and vice versa), respectively. Robust *t*-statistics are reported in parentheses.

[c] 10% significance.
[a] 1% significance.
[b] 5% significance.

We conduct three other tests that use the subsample for which we have IPO book data. The first test examines performance persistence between the pre and post November 2005 period by favored and unfavored investors. While we cannot track specific bidders across IPOs or regimes, we can track them at the level of their fund families. We define a "favored" family as a fund family within which at least 50% of the funds are FAVORED in the pre-November 2005 regime. Likewise, we defined an "unfavored" family as a family of funds of which at least 50% of the funds are classified as UNFAVORED in the pre-November 2005 regime. Of the 178 surviving bidder families in the new regime, 23 are classified as being favored in the pre-November 2005 regime, 18 are classified as unfavored. While nothing in our definition precludes favored *families* from also being unfavored, it is interesting that the two categories have no overlap.

Table 13
Multinomial logits: hot and cold IPOs.

	Cold (1)	Hot (2)
Panel A: Outcome = top quartile allocation		
BIDQTILE2	0.11 (0.67)	−0.62 (−9.60)[a]
BIDQTILE3	−0.12 (−0.46)	−0.84 (−4.64)[a]
BIDQTILE4	−0.17 (−0.54)	−1.36 (−6.31)[a]
MF	0.46 (0.67)	1.65 (4.37)[a]
FII	0.61 (0.99)	2.41 (4.37)[a]
FREQUENT	0.25 (0.65)	0.15 (0.77)
NONEQ*FREQ	0.48 (0.66)	−0.23 (−0.42)
QUALITY	0.58 (0.86)	1.19 (2.43)[b]
OVERSUB	0.40 (1.05)	−0.01 (−0.20)
PROCEEDS	0.04 (0.38)	−0.09 (−1.78)[c]
USMGR	−0.02 (−0.08)	0.03 (0.44)
REPUTED	0.11 (0.75)	0.11 (1.25)
Constant	−3.30 (−1.16)	−0.20 (−0.15)
Panel B: Outcome = bottom quartile allocation		
BIDQTILE2	0.21 (0.54)	−0.34 (−1.78)[c]
BIDQTILE3	−0.16 (−0.39)	−0.51 (−2.53)[a]
BIDQTILE4	0.09 (0.20)	−0.31 (−0.90)
MF	−2.93 (−7.04)[a]	−0.97 (−1.99)[b]
FII	−2.69 (−9.45)[a]	−0.54 (−1.12)
FREQUENT	0.87 (3.13)[a]	0.31 (2.40)[b]
NONEQ*FREQ	−1.89 (−3.06)[a]	−1.39 (−3.79)[a]
QUALITY	−0.54 (−0.77)	0.51 (1.69)[c]
OVERSUB	0.32 (2.73)[a]	−0.00 (−0.02)
PROCEEDS	0.02 (0.24)	−0.02 (−1.05)
USMGR	0.09 (0.52)	−0.00 (−0.16)
REPUTED	0.05 (0.46)	0.00 (0.14)
Constant	0.07 (1.17)	0.49 (0.91)
Pseudo-R^2	5.67%	4.77%

The dependent variable is −1 (+1) if IPO allocation is in the lowest (highest) quartile and zero otherwise. BIDQTILE2 (3,4) is a dummy for whether the bid is in quartile 2 (3,4) of an IPO's bids. MF and FII are dummies for domestic mutual funds and foreign institutional investors, respectively. FREQUENT is 1 if a bidder's fund family bids in 7 or more IPOs and zero otherwise. NONEQ*FREQ = FREQUENT × (1 − max (FII, MF)). QUALITY is 1 (0) if the family's coefficient in a regression of underpricing on bids is (is not) in the top quartile. USMGR and REPUTED are dummies for IPO managers with US affiliation and a top-5 market share, respectively. OVERSUB is log oversubscription. PROCEEDS is log issue proceeds. Hot (cold) IPOs are issues with above (below) median oversubscription in the sample of 25 IPO books. Robust *t*-statistics in parentheses.

[a] 1% significance.
[b] 5% significance.
[c] 10% significance.

To estimate the excess returns from bidding in the post-November 2005 regime for each family, we subtract the actual profits that the funds received minus the profits that the funds would have received had they followed a market-mimicking bidding pattern.[15] We compute excess return as the excess profit divided by the total capital invested, which is 10% of the bid amount in the Indian market.[16]

[15] We compute the aggregate amount bid in each IPO and define the market mimicking fraction allocated to IPO i as $f_i = \frac{d_i}{\sum_{i=1}^{n} d_i}$ where d_i denotes the total dollars bid by the market in IPO i and n denotes the number of IPOs. The total dollars bid by each family across the IPOs is reallocated according to the fraction f_i in IPO i and its dollar profit is computed as the sum of the profits for the family from the market mimicking pattern of bids.

[16] Subtracting the cost of locking in these funds for 15 days, the period of time between the IPO launch and allocation dates, does not change the results.

Table 14
Marginal effects for bottom quartile allocation logit.

BIDQTILE2	0.03 (0.41)	−0.03 (−0.95)
BIDQTILE3	−0.02 (−0.30)	−0.05 (−1.37)
BIDQTILE4	0.02 (0.32)	0.00 (0.04)
MF	−0.52 (−9.98)[a]	−0.27 (−3.22)[a]
FII	−0.39 (−14.55)[a]	−0.23 (−2.74)[a]
FREQUENT	0.12 (2.71)[a]	0.05 (2.10)[b]
NONEQ*FREQ	−0.23 (−6.30)[a]	−0.19 (−5.04)[a]
QUALITY	−0.11 (−1.97)[b]	0.01 (0.14)
OVERSUB	0.03 (2.41)[a]	0.00 (0.12)
PROCEEDS	−0.00 (0.01)	0.00 (0.46)
USMGR	0.01 (0.58)	−0.00 (−0.44)
REPUTED	0.00 (0.16)	−0.01 (−0.81)

Table 14 reports marginal effects of a logit model when the allocation is in the lowest quartile. Hot (cold) IPOs are those that have above (below) median QIB oversubscription in our sample of IPOs. The dependent variable is −1 (+1) if allocation is in the lowest (top) quartile, and zero otherwise. BIDQTILE2 (3,4) equal 1 if a bid is in the quartile 2 (3,4) of the distribution of bids for the IPO and zero otherwise. MF = 1 (0) if a bidder is (is not) a domestic mutual fund. FII is 1 (0) if an investor is (is not) a foreign institutional investor. FREQUENT is 1 if a bidder's fund familiies is in the top quartile of participation frequency. NONEQ*FREQ is FREQUENT times NONEQ where NONEQ is 1 if MF = 0 and FII = 0 and is zero otherwise. QUALITY is 1 (0) if the family's coefficient in a regression of underpricing on bids is (is not) in the top quartile. OVERSUB is the natural logarithm of QIB oversubscription in the IPO. PROCEEDS denotes log issue proceeds. USMGR is 1 (0) if the lead manageris (is not) US affiliated. REPUTED is 1 (0) if the IPO manager is (is not) ranked among the top 5. The data comprise a proprietary sample of bids and allocations in 25 bookbuilt IPOs. Robust *t*-statistics are reported in parentheses.

[a] 1% significance.
[b] 5% significance.
[c] 10% significance.

The 23 families favored in the pre-November 2005 regime that also bid in the new regime with prorata allocations earn a mean excess return of 1.55% on capital deployed versus 1.07% for unfavored families in the new regime. The results provide some support for the view that favored investors in the earlier regime are smart, since their orders in the new regime appear to identify better quality offerings. The difference is not statistically significant. The absence of power likely reflects the small number of IPOs and the fact that we work at the family rather than investor level.

In the next test, we consider entry by uninformed and informed bidders. Greater entry by informed bidders should lead to higher returns when underwriters do not control allocations but the relation should be attenuated when underwriters control allocations because underwriters can make price adjustments in response to bidder quality. Unlike Chiang et al. (2010), we cannot conduct these tests at the bidder level because all bidders pay the same (uniform) price, so the test must necessarily be across IPOs. While the book sample – 25 IPOs in the pre-November 2005 period and 17 IPOs in the post-November 2005 period – is comparable to prior studies of IPO books, the sample size is modest in cross-sectional regressions that must be conducted across IPOs.

If we identify equity investors as informed and non-equity investors as uninformed, the testable implication is that returns – in our case, underpricing – is lower when there is more entry by uninformed investors when underwriters *do not* control allocations. Table 12 reports the results. In specifications (1a) and (1b), we regress underpricing on the logarithm of the number of equity and non-equity investors for the pre-November 2005 and post-November 2005 period, respectively. The coefficient for the number of equity investors is significant in the post-November 2005 period

but not in the pre-November 2005 period. These relations are as predicted by Sherman (2005). However, when we control for oversubscription in specifications (2a) and (2b) in Table 12, the coefficients for log number of investors become insignificant. Given the small sample, we interpret the results as modest and indicative complements to the other analyses conducted here and in Chiang et al. (2010).

A final test is based on the differential effect of hot and cold IPOs in allocation. Section 6 suggests that frequent bidders are less likely to be discriminated against in allocation if they are not equity investors, consistent with the view that these bidders play an insurance role. An additional test of this proposition stems from the allocations to these bidders in hot versus cold IPOs. If the rationale for less discrimination is that there is a quid pro quo relationship between the underwriters and bidders, such bidders should experience lesser discrimination in hot IPOs, which are desirable, than in cold IPOs. On the other hand, the allocation response towards bidders who serve an insurance role would be similar in hot and cold IPOs. We split our sample of 25 IPOs in the pre-November 2005 regime into hot and cold IPOs based on the level of oversubscription. IPOs with oversubscription above (below) the median in the sample of IPOs are classified as hot (cold). The median hot IPO is oversubscribed 31 times as against 8 times for cold IPOs, with a total of 3262 bids in hot versus only 974 bids in cold IPOs. The median underpricing for hot IPOs is 39% versus 17% for cold IPOs, so the sample, while small, does seem to do a good job of separating hot and cold IPOs. We run the final logit specifications of Table 5 separately for hot and cold IPOs. Tables 13 and 14 present the logit coefficients and their marginal effects, respectively. As before, frequent bidders who are not equity investors are less likely to receive low allocations. This result, however, holds for both hot and cold IPOs and the marginal effects are about equal in both cases. This result provides a sharper test and support in favor of the insurance hypothesis.

8. Conclusion

Bookbuilding is the dominant method of offering IPOs in the US and has come to dominate many markets into which it is introduced. Bookbuilding is controversial, mainly because of the power it gives underwriters over the IPO process. Unlike other mechanisms that prescribe fairly tight rules according to which shares are allocated as a function of the bid, bookbuilding prescribes no preset rules as to how shares should be allocated to bidders – or even how bids should be mapped to offer prices. These decisions are left to the subjective judgment of underwriters, who thus enjoy considerable power over IPO pricing and, more controversially, over IPO allocations.

Our paper develops empirical evidence on the use of underwriter allocation power and its effect on IPO pricing, exploiting natural variation in allocation power in the Indian IPO market. Our results suggest that giving underwriters control over IPO allocations has beneficial pricing effects. Our results also shed light on the mechanism by which these benefits percolate to issuers. Given our institutional setting, the channel through which these effects occur is better pre-market price discovery before the issue rather than price setting in response to bids received when the IPO opens for bidding and through the power to discriminate *between* institutions than between institutions and retail investors. There is little support for the view that underpricing is driven by cronyism. Were this the case, bookbuilt IPOs should experience lower underpricing when allocation powers are withdrawn, but we find no evidence to this effect.

We also present evidence on IPO bidding and allocations based on a proprietary dataset of bids and allocations in IPOs. We find that underwriters use their allocation powers quite extensively to reconfigure initial allocations away from what a passive proportional scheme would achieve. Allocation is a function not only of the particular bid presented but also depends on the nature and identity of the bidder presenting a bid. Issue characteristics, underwriter characteristics, and other soft information possessed by the issue manager also affect allocations.

Our results have other implications. The empirical literature on IPO allocations focusing on the aggregate allocations to institutional investors, specifically considers the ability of underwriters to reward institutions in the aggregate at the expense of retail investors. In the institutional environment

of our study, institutional and individual share quotas are essentially fixed. Yet, allocation discretion matters. Thus, our results suggest that the ability to discriminate in IPO allocations *within* the institutional investor category is also important for effective bookbuilding.

The results are also relevant to the debate on the appropriate mechanisms for IPO offerings. The literature on auctions, e.g., Dasgputa and Hansen (2007), points out that auction-like mechanisms are often used in economics and finance. However, conventional auctions have not gained traction as a mechanism for going public. Our results point to one reason why traditionally designed auctions may not be popular in IPOs: the inability of these mechanisms to differentially weight identical bids but submitted by different bidders. In contrast, in bookbuilding, underwriters can use non-bid and subjective information to vary allocation patterns in more complex ways than feasible under conventional auction settings. This is perhaps one explanation for the popularity of bookbuilding in IPOs compared to other mechanisms that constrain pricing and allocation policies blind to non-bid information.

Our results have implications for regulatory policy. Granting allocation powers unconditionally to underwriters can certainly result in its abuse. It is probably naive to think that there are no such instances of abuse, or to believe that incentives for kickbacks would never be abused by underwriters (Nimalendran et al., 2007). The point underlined by our evidence is that there is a detectable positive side to allocation powers as well. The benefits probably come from the flexibility that bookbuilding gives IPO managers to use not just the bid but also other hard and soft non-bid information in the IPO process. This discretion to use non-bid information, unique to bookbuilding, is used positively in the Indian IPO market. We concur with Jagannathan and Sherman (2005), who offer similar policy recommendations for reforming the bookbuilding process for IPOs that permit use of bidder identity in allocation decisions, albeit with greater transparency.

As a closing note, it is also apt to point out that non-discretionary allocation schemes such as the proportional schemes are not without their own hazards. There have been allegations of abuses and objections to the IPO process in the Indian market with rigged bidding under false names to corner allocations.[17] However, these abuses arise in the portion of issues with proportionate allocations to retail investors who open several accounts in order to place multiple small bids, rather than the portions where underwriters control allocations. In balance, our evidence supports the view that the IPO process could become more effective by allowing IPO managers to incorporate non-bid information in their allocation policies, coupled with more transparency in allocations to mitigate the incentives for rigging, kickbacks, and quid pro quo.

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[17] The incentive problems caused by proportionate allocations are discussed in the local financial press, see, e.g., http://www.thehindubusinessline.com/2005/12/18/stories/2005121802380100. htm on the Yes Bank IPO, where accused investors opened thousands of accounts in different names in IPOs where allocations were constrained to be proportionate.

Appendix A. Key amendments to DIP Guidelines affecting IPOs in India between 2000 and 2006

RULES:	Rules as of 2000	Rules as of 2004	Changes between 2004 and 2006?
(A) Eligibility criteria for IPO: sufficient conditions			
(i) Net tangible assets	–	>Rs. 3 crores in last 3 years, and limited monetary assets	No
(ii) Distributable profits and positive for 3 out of last 5 years	Same	No	
(iii) Pre-issue net worth (NW)	>Rs. 1 crore in 3 out of last 5 years,and also in last 2 years	>Rs. 1 crore in each of last 3 years	No
(iv) Issue size	IPO issue <5 times pre-issue NW	Aggregate of ALL issues in same financial year <5 times pre-issue NW	No
(v) Project financing	–	Pre-arranged, 75% funds for project, excl. IPO amt	No
(vi) If post-issue capital <Rs. 5 crores	Appoint market maker for >18 months, AND – If <Rs. 3 crores, only list on OTC – If Rs. [3, 5] crores and <2 years experience, list only on exchange with screen-based trading	No special consideration	No
If these eligibility criteria are violated, sufficient conditions for IPO:			
	Must use bookbuilding (BB), but allocate ⩾60% to QIBs	(i) Must use BB with ⩾50% to QIBs (or, ⩾15% FI project funding with ⩾10% to QIBs), AND	No
		(ii) Post-issue capital ⩾Rs. 10 crores (or, market making for ⩾2 years from listing)	No
(B) Minimum participation requirements			
(i) Number of allottees	–	⩾1000	No
(ii) Subscription	⩾90% (inclu. underwriter contribution)	Same	No
(C) Lead Bankei:'s role			
(i) If underwritten	Min (Rs. 25 lakhs, 5% of total underwriting commitments)	Same	No.
(ii) Outstanding	<20 times lead banker's NW	Same	No

Appendix A (*continued*)

RULES:	Rules as of 2000	Rules as of 2004	Changes between 2004 and 2006?
commitment			
(D) Greenshoe option (amendments on May 28, 2004)			
(i) Condition for use	–	BB IPOs	Yes – ALL IPOs
(ii) Max. borrowing	–	15% of issue from pre-IPO shareholders	Yes – from those with $\geqslant$5% shares
(iii) Allocation	–	Proportional to all applicants	No
(iv) Stabilization period	–	$\leqslant$30 days from trading permission date	No
(E) Pricing constraints			
(i) For firm allotment category (inclu. employees, FIs, FIIs, etc.)	Price $\geqslant$ price offered to public	Same	No
(ii) Price band before final offer doc	$\leqslant$20% above floor	Same	No
(F) Promoter's contribution and lock-in			
(i) Min. promoter contribution	20% of post-issue capital	Same	No
(ii) Lock-in of min. contribution	3 years	Same	No
(iii) Lock-in of excess contribution	l year	Same	No
(iv) Lock-in of non-promoters	1 year for ALL pre-issue capital (except promoter's or those held for $\geqslant$1 year and offered to public through offer for sale)	Same	No
(v) Lock-in of VC/FVC	3 years if, either equity issues from asset revaluation, etc. in last 3 years, or if offered in last 1 year at price < IPO offer price	No DIP lock-in if held for >1 year	No
(G) Other amendments			
(i) IPO grading	Optional	Optional	Yes – since April 2006: Disclosure required if graded

(*continued on next page*)

Appendix A (*continued*)

RULES:	Rules as of 2000	Rules as of 2004	Changes between 2004 and 2006?
(ii) QIB list expanded to include		Insurance companies; provident and pension funds with corpus >Rs. 25 crores	No

Source: SEBI disclosure and investor protection (DIP) guidelines, 2007.

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