Restrictions on Allocation Discretion: Evidence from Clawbacks in Hong Kong IPOs*

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Abstract

The presence of both restricted and unrestricted, U.S.-style, bookbuilt IPOs in Hong Kong provides an ideal environment to test numerous underpricing models by simultaneously measuring the effects of allocation restrictions on the investment bankers' price discovery, underwriting, and distribution functions. While clawbacks, a set of restrictions favoring retail investors not participating in the roadshow, result in diminished and more expensive price discovery, they reduce the investment bankers' dependence on institutional investors to dispose of IPO shares, resulting in lower underpricing. This favors models that highlight the importance of the underwriting function on underpricing, showing that allocation restrictions impact more that just price discovery.

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1. Introduction

When Jiwa Bio-Pharm Holdings, Ltd. went public in the Hong Kong Stock Exchange (HKEx) in October of 2003, the prospectus established that 90% of the offer (135 million shares) was to be placed with institutional investors via bookbuilding and the remaining 10% (15 million shares) was to be offered to retail investors by means of a public offer. However, since the public offer tranche was subscribed roughly 175 times, a reallocation provision, or clawback as these restrictions are usually called, was automatically activated, and institutional investors saw their ration reduced by 60 million shares. In the end, the bookbuilt tranche received only 50% (75 million) of the offered shares rather than the expected 90%.

While clawbacks in Hong Kong (HK) epitomize how significantly restricted investment bankers (IBs) outside the U.S. can be in their discretion to allocate shares freely after the roadshow, a large number of bookbuilt Initial Pubic Offerings (IPOs) in HK are conducted with the same allocation discretion enjoyed in the U.S. Thus, when coupled with its unusually high disclosure standards, HK offers an ideal environment to test the implication of some of the leading bookbuilding models in the literature, most of which regard full allocation discretion as a necessary condition for efficient price discovery.

Using demand and allocation data from 159 bookbuilt IPOs conducted in HK from 1999 to 2007, this study tests those model's contentions by looking at how clawbacks affect underpricing and price discovery (i.e. the extent to which final offer prices deviate from the mid-point of the prospectus pricing range). Moreover, by recognizing that allocation restrictions can influence the fulfillment of the IB's share distribution and underwriting functions, this study is able to look beyond the IB's price discovery functions and simultaneously explore alternative channels through which allocation restrictions can affect underpricing. Since the empirical literature has typically tested the influence these three IB functions exert on underpricing separately, making its inference vulnerable to omitted-variable bias, the broader scope of this study is able to advance not only the literature on allocation discretion, but the greater underpricing literature.

To the extent that clawbacks limit IBs' discretion to allot shares to the roadshow investors revealing the most useful pricing information, most bookbuilding models would agree that the level of information that can be extracted from these investors will diminish and that the indirect costs of the offering (underpricing) will increase.[1] However, if as Subrahmanyam and Titman (1999) suggest, individual investors possess serendipitous information easily discernible from their overall interest in the offering, clawbacks may result not only in lower underpricing, but in enhanced price discovery. Similarly conflicting predictions for underpricing obtain within the context of models that regard the IB's share distribution[2] and underwriting functions [Benveniste and Spindt (1989), Rock (1986)] as major determinants of underpricing.

To add to this controversy, the scant empirical literature on allocation restrictions has yielded mixed evidence. While Loughran at al. (1994) find no discernible differences in underpricing between countries where price discovery is conducted with full discretion and countries where the process is restricted, Ljungqvist and Wilhelm (2002) find that allocation restrictions affect the price discovery associated with bookbuilding and indirectly associate them with higher underpricing. By recognizing that restrictions on allocation discretion can influence underpricing independently from price discovery considerations and capitalizing on HK's high disclosure standards, this study is able to put to test a more comprehensive structural specification of the phenomenon, exploring alternative ways to reconcile these differences.

Consistent with the predictions of the cited bookbuilding models and the findings of Ljungqvist and Wilhelm, I find that restricting IBs' allocation discretion significantly modifies the nature of the bookbuilding mechanism, reducing the information IBs are able to extract from the roadshow and making it more expensive in terms of underpricing. However, I also find that IBs are able to partially offset this information loss with information from individuals participating in the public offer. This finding counters most bookbuilding models' assumption that IBs are unable to extract meaningful pricing information from investors not included in their list of roadshow regulars, either because they are uninformed or because it is impractical to do so.[3] To be more precise, my findings suggest that by simply comparing individual demand in the public offer with typical (median) individual demand levels for this tranche, IBs are able to extract

[1] See Benveniste and Spindt (1989), Benveniste and Wilhelm (1990), Spatt and Srivastava (1991), Sherman (2000, 2002), Sherman and Titman (2002), Biais and Faugeron-Crouzet (2002), and Busaba and Chang (2005).

[2] Booth and Chua (1996), Brennan and Franks (1997), Stoughton and Zechner (1998), and Mello and Parson (1998).

[3] While most of the cited bookbuilding models assume retail investors are uninformed, Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990) recognize the possibility of these investors' possessing pricing information. However, they argue that, due to how this information is distributed, retail investors' atomistic nature or their irregular participation in IPOs, IBs are unable to incorporate it into prices.

usable pricing information from individuals outside the roadshow. This information however, does not appear to be serendipitous in nature as Subrahmanyam and Titman suggest. Rather, the evidence suggests that individuals in HK may have some research capabilities or that they may be able to benefit from information spillovers from institutional investors.

With respect to underpricing, in spite of clawbacks' resulting in more expensive price discovery, restricted IPOs are on average less underpriced. Supporting the notion of the IB's underwriting function as a significant driver of underpricing, clawbacks seem to motivate enough individual participation to secure the success of an offering without resorting to higher underpricing. The documented decline in underpricing in restricted IPOs can be traced to the IBs' reduced dependence on roadshow institutional demand, countering Benveniste and Spindt's arguments defending the practice of favoring this type of investors offer after offer. Rather, these findings favor Rock's perception of retail investors as instrumental to IBs' disposing of low-quality IPOs inexpensively. That clawbacks ultimately result in lower underpricing adds to the already mixed evidence in the empirical literature. I attribute these differences to the bias that stems from failing to recognize the significance of the underwriting function on underpricing, leading to omitted controls that can capture the effect of allocation restrictions on the fulfillment of the underwriting function. In contrast, when tested concurrently with the other two IB functions, whether the share distribution function plays a major role in underpricing proves inconclusive.

Since this study's results are robust to selectivity bias and are not spuriously driven by U.S. IB or U.S. investor involvement, they suggest the literature should pay more attention to the value issuers place on the IB's underwriting function, rather than focus solely on price discovery. By the same token, the role individuals can play in price discovery should be reconsidered.

2. Allocation practices in HK

IPOs in HK involve either a Pure Placing (PP) or a Double Tranched (DT) mechanism, with both a placing and a public offer tranche. Since its introduction in November of 1994 for global offerings, bookbuilding has been increasingly used in HK for IPOs that do not involve multinational listings.[4] Whenever bookbuilding is used in PPs, full allocation discretion is used to extract pricing information from both institutional and individual investors, but in DT IPOs, bookbuilding is only used with the institutions participating in the placing tranche.[5] Individuals in DT IPOs are required to take part in the public offer, submitting strike bids electronically or in sealed collection boxes placed in the underwriting syndicate's offices. These boxes are opened once the bookbuilding process is over, but prior to setting the offer price. Along with their bids, individuals must submit a check for the desired shares, priced at the high end of the prospectus price-range. If the IPO price is set below that level, or if a bidder gets less than the requested shares, the IB will issue a refund, without interest. On the other hand, if IBs believe that the offer price should be set above the upper price end, they must issue an amended prospectus and give everyone the option to withdraw or resubmit their applications. These requirements do not exist for IPOs in which the final offer price is set below the low end of the pricing range.

Public offer shares are distributed following strict allocation rules that force IBs to subject investors with orders of the same size to the same allocation basis. That is, if everyone with bids of a given size (say, for 1,000 shares) receives an allocation, then everyone with a bid of that size should receive the same allocation. When oversubscription levels are so high that not even straight rationing can guarantee shares for all, a lottery is held, giving bids of a given size equal chances to a rationed allocation. Note that these rules do not guarantee equal treatment for all. In fact, larger bids are usually associated with lower allocations as a percentage of requested shares, but are also associated with lower chances of being subject to lottery rationing.

It is notable that, although DT IPOs have restrictions to prevent the participation of individuals in the placing tranche, none exists to prevent participation of institutions in the public offer. That is, institutions can submit bids in the placing, in the public offer, or in both tranches. They are only limited by the fact that, at the IB's discretion, they can only be allotted shares from one of the tranches. Thus, an institution that believes it stands a better chance of receiving a higher allocation in the public offer, may decide to stay away from the placing tranche and only participate in the public offer; a phenomenon referred to in this study as "migration."

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[4] The distribution of IPOs conducted via a fixed-price mechanism and bookbuilding over the sample period is roughly 50-50.

[5] As detailed in Section 5, roughly 29% of PP IPOs in the sample preclude individual investor participation.

Criticism about the preferential treatment of institutional investors resulted in the introduction of clawbacks in mid-1997. Clawbacks are provisions whereby shares in the placing tranche are transferred to the public offer when public offer demand is high. Since their activation depends only on public offer demand, they are meant to safeguard retail investors' interests. Along with clawbacks, a set of rationing rules was also instituted. All the shares in the public offer tranche (even those reallocated by clawbacks) must be equally divided into two pools. Shares in Pool A are reserved for investors who apply for HK$5,000,000 (US$642,500) or less in shares.[6] Securities in Pool B are reserved for larger applications, provided they do not exceed the total value of the pool. Since the HKEx reserves the right to waive these requirements to issuers who request it, some public offers are not divided in this fashion.

In 1998 it was decreed that the public offer was to be initially reserved 10% of the total IPO shares and that clawbacks would automatically increase this number to: 30% when the public offer tranche is between 15 and 50 times subscribed; 40% when it is between 50 and 100 times subscribed; and 50% when it is 100 times subscribed or more. In case of insufficient demand to absorb the initial 10% allowance, shares may be transferred from the public offer to the placing tranche. Although not a frequent practice, the HKEx maintains the right to waive any of these requirements to those issuers who request it, or to empower them with discretion as to the amount and conditions under which clawbacks are to be activated. Also, when the issuer has granted the IBs an over-allotment option, such shares can be divided between the public offer and placing tranches, at the IB's discretion, but typically go completely to the placing.

3. Theoretical framework and hypotheses

While the financial literature [Mandelker and Raviv (1977) and Baron (1982)] recognizes price discovery, share distribution, and underwriting as three of the main functions of an IB, for tractability reasons, theoretical studies model at most two (but typically one) of these functions at a time. This piecemeal treatment has prompted empirical tests that assess their significance individually, when all of them may influence IPO outcomes simultaneously.[7] Trying to assess the effect of allocation restrictions on primary market efficiency, Loughran et al. (1994) compare

[6] All HK Dollar to U.S. Dollars conversions given in this study to give the reader a better sense of the value of all the reported HK Dollar figures, are conducted at an assumed exchange rate of 0.1285 US$/HK$.
[7] See Ritter and Welch (2002) for an exhaustive review of the theoretical and empirical IPO literature.

underpricing in five countries where price discovery is conducted with full allocation discretion with underpricing in five countries where the process is restricted, and find no discernible differences between them.[8] Ljungqvist and Wilhelm (2002), on the other hand, using IPO allocation data from four countries, take a multivariate approach to the question. They find that a diverse set of French and U.K. allocation restrictions on bookbuilding result in lower price discovery relative to Germany and the U.S., where full discretion is used, and that these constraints reduce institutional allocations. Since they also show that underpricing is inversely related to institutional allocations, they indirectly show that allocation restrictions result in higher underpricing. Due to HK's high disclosure standards, this study is not only able to assess the effect of allocation restrictions on price discovery within one country, reducing comparability concerns, but to simultaneously test the role the other two IB functions play on underpricing, exploring ways to reconcile the mixed evidence in the empirical literature so far.

3.1. Clawbacks and price discovery

If allocation restrictions interfere with roadshow price discovery as most bookbuilding models suggest,[1] IBs should be able to extract more information from roadshow investors in PPs than in restricted DT IPOs. So, I test whether roadshow price discovery in PPs exceeds that of DT IPOs with clawbacks.[9] On the other hand, if contrary to what most of these models assume, public offer investors possess valuable pricing information revealed by their overall interest in the offering, then IBs may be able to offset some of the loss of roadshow information with public offer information. Thus, I also test whether IBs use public offer information to set offer prices. Given the possibility of institutional investor migration into the public offer, if this hypothesis cannot be rejected, it will be necessary to disentangle public offer demand to see whether this information comes from migrating institutions or individuals. If information is shown to come from individuals, more tests will have to be conducted to see whether individuals' information is serendipitous, as Subrahmanyam and Titman (1999) propose, or of different nature.

Since allocation restrictions interfere with the IBs' ability to direct underpriced shares to the investors revealing the most valuable information, the cited bookbuilding models also imply

[8] The countries in the first group include Canada, Chile, Japan, the U.K., and the U.S. The countries in the restricted group are Belgium, France, the Netherlands, Portugal, and the UK, and involved for the most part auctions.

that price discovery, if not fully compromised, will be more costly in terms of underpricing in the presence of clawbacks. To test this prediction I check whether underpricing in DT IPOs is more pronounced than for PPs in response to price discovery considerations. This test not only represents an alternative way to gauge the effects of clawbacks on primary market efficiency, but also tests for the significance of the price discovery function on IPO underpricing itself.

3.2. Clawbacks and the underwriting function

When, due to funding or divesting needs, ensuring that a firm can float its shares successfully is one of the issuer's and IB's main concerns, pricing and allocation practices may be explicitly designed to stimulate demand from a specific group of investors considered crucial to that end. Benveniste and Spindt (1989) argue that such key group is comprised of a select set of roadshow institutional investors and that the IBs' ability to repeatedly favor them with large allocations of underpriced shares gives them the necessary leverage to induce them to absorb low-quality, overpriced offerings from time to time. Since clawbacks can interfere with that essential leverage, their model implies that higher underpricing may be needed in DT IPOs for IBs to secure the continued support of institutional investors in low quality offerings. Rock (1986), on the other hand, argues that uninformed retail investors make up that critical investor group. Since the prospects of more favorable allocations may induce retail investors to provide IBs with their unconditional support at lower underpricing levels, clawbacks may have a negative effect on underpricing. Thus, I test for the significance of the underwriting function in IPOs by gauging how clawbacks affect the way IBs compensate institutional and retail investor demand.

3.3. Clawbacks and the share distribution function

If issuers believe that the initial makeup of the shareholder base can have a long-lasting impact on firm value, they may grant IBs some latitude to use pricing and allocation discretion to attract the most beneficial investors. Since clawbacks, by design, make retail participation more attractive, within the context of models that argue that issuers value a broad shareholder base [Booth and Chua (1996) and Brennan and Franks (1997)], clawbacks may be expected to reduce IBs' reliance on underpricing to secure diversity. Alternatively, if as Stoughton and Zechner

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[9] Building on the work of Hanley (1993), I measure price discovery by looking at the absolute difference between the

(1998) and Mello and Parsons (1998) suggest, it is large institutional investors who enhance firm value due to the monitoring role they can play, clawbacks' interference with IBs' ability to attract them may result in higher underpricing, as IBs resort to reduced prices to compensate. Thus, provided clawbacks' effect on the price discovery and underwriting functions is controlled for, I can also test for both the significance of the IB's share distribution function and the nature (sign) of its sway on underpricing by looking at the direct effect of clawbacks on underpricing.

4. Methodology

I initially gauge the effects of clawbacks on bookbuilding by conducting a univariate comparison of key variables in the PP and restricted DT IPOs in the sample. However, to isolate the effect of clawbacks on the three main IB functions of interest, I perform a series of multivariate regressions in which price discovery and underpricing are regressed on clawback-specific variables and on a set of market, issuer, and issue-specific controls. The choice of the mentioned controls is based on theoretical predictions and empirical regularities found throughout the IPO literature. The base regressions are handled by the following simultaneous system.

$$|Revision| = f\,(Constant,\ DT,\ AbnOSPlac,\ DTxAbnOSPlac,\ AbnOSPO,\ Firm\text{-}Size,\ GEM,\ HighTech,\ Int'l,\ Price\text{-}Range,\ OAO\%,\ Days\_BB,\ TopTier,\ SDMkt\_Pre\text{-}Price,\ Av\_ContRev,\ StdDev\_ContRev,\ Av\_InitRet\_BB)) \quad (1)$$

$$Underpricing = f(Constant,\ DT,\ UnstDemPlac,\ DTxUnstDemPlac,\ UnstDemPO,\ OAO\%,\ TopTier,\ Firm\text{-}Size,\ GEM,\ HighTech,\ H\text{-}Share,\ Int'l,\ Age,\ Price\text{-}Range,\ IPOVol,\ MktRet\_Post\text{-}Price,\ SDMkt\_Post\text{-}Price,\ Av\_IR\_Post\text{-}Price,\ Revision+,\ Ln[1+|Fit.Rev.|],\ DTxLn[1+|Fit.Rev.|]) \quad (2)$$

A detailed description of all the involved variables is given in Table 1. Clawbacks' effect on price discovery is studied in Equation 1 through variables *DT*, *DTxAbnOSPlac,* and *AbnOSPO*, which help distinguish between clawbacks' effects on the qualitative and quantitative sources of information at the IB's disposal. That is, if clawbacks affect investors' willingness to provide indications of interest in the roadshow or submit strike bids in the public offer, both quantitative cues about the offer's prospects, then the two last variables should capture it. On the other hand, *DT* should capture clawbacks' effects on the roadshow's qualitative information exchange (about industry prospects, about competitors, about new technologies and regulation, etc.). Since no interpersonal communication occurs in the public offer tranche, no qualitative

final offer price and the mid-point of the prospectus pricing range, normalized by the mid-point itself.

information can be obtained there. Moreover, *DT* and *DTxAbnOSPlac* should capture the effect of these restrictions on the price discovery associated with the bookbuilding mechanism, and *AbnOSPO* should be able to say whether price discovery is complemented with quantitative information from the public offer. Variables *Firm-Size* and *High-Tech* are added to Equation 1 as firm-specific controls. *Int'l, Price-Range, OAO%, Days_BB,* and *TopTier* are added as issue-specific controls. *GEM* is added to disentangle the effects of clawbacks and market segment on price discovery. *|MktRet_Pre-Prc|, SDMkt_Pre-Price, Av_ContRev, StdDev_ContRev*, and *Av_InitRet_BB* are added to capture any information spillovers from the stock and IPO markets.

Equation 2 studies clawbacks' effect on underpricing through variables *DT*, *DTxUnstDemPlac, UnstDemPO,* and *DTxLn[1+|Fit.Rev.|].* If allocation restrictions make price discovery more expensive in terms of underpricing, the interaction of dummy *DT* with price revision variable *Ln[1+|Fit.Rev.|]* should show it. Whether clawbacks can say anything about the role the IBs' underwriting function plays on underpricing should be reflected on the loading of *DTxUnstDemPlac and UnstDemPO.* That is, if clawbacks affect the way IBs compensate investors for guaranteeing the successful placement of all shares in investors' hands, it should be reflected on the extent to which investors' unsatisfied demand is compensated for with higher underpricing.[10] Finally, since clawbacks, by design, can result in a significant reallocation of shares from large institutional to small individual investors, the loading of *DT* in Equation 2 should say something about the nature of the IBs' share distribution function within the IPO process. A negative loading on *DT* would show that clawbacks can substitute for underpricing as a means to attract retail investors, supporting Booth and Chua (1996) and Brennan and Franks' (1997) models. On the other hand, a positive loading on *DT* would show that more underpricing is necessary to entice institutional investors to participate in the offering when clawbacks are in place, supporting the implications of Stoughton and Zechner (1998) and Mello and Parsons' (1998) models. Variables *Firm-Size, HighTech*, *H-Share*, and *Age* are included as firm-specific controls. *OAO%*, *Int'l*, and *Price-Range* are included as issue-specific controls. Dummy *GEM* is added to disentangle the effects of clawbacks and market segment on underpricing. *MktRet_Post-Price* and *Av_IR_Post-Price* control for information spillovers from the stock and

[10] Although not tabulated, I also used plain demand of the placing and public offer tranches, as measured by the natural logarithm of the number of shares applied for by investors in the two tranches, divided by number of shares allocated in their respective tranches. The results were practically identical to those reported with unsatisfied demand. This last measure was preferred to account for the possibility that, faced with the inability to fully satisfy their demand in the premarket, IBs may opt to compensate investor support with larger underpricing.

the IPO markets, respectively. Variable *IPOVol* controls for any reduction in information-gathering costs associated with IPO bundling. *SDMkt_Post-Price* controls for overall market risk and *Revision+* attempts to correct for the effects of upward censoring in offer price revision.

It is important to note that while price discovery can be reasonably expected to be unaffected by observed underpricing after the IPO has ended, the same cannot be said about the effect of price discovery on underpricing. If, as theory suggest, underpricing is payment for information, there should be a positive causal relation between the information obtained during the IPO process and observed underpricing. Thus, to accommodate for the endogeneity of price discovery on underpricing, the mentioned regressions are handled as a simultaneous, fully recursive system, in which the fitted value of absolute revision (the dependent variable in Equation 1) is used as an explanatory variable in Equation 2 (*Ln[1+|Fit.Rev.|]*). While, typically, OLS estimation of simultaneous equations is biased and inconsistent because the endogenous variables are usually correlated with the disturbance terms, that is not true for a fully recursive system. That is, for a triangular system (like the one in this study) with uncorrelated errors, OLS is unbiased and consistent [See Greene (1997), pp. 730-732]. I exploit this fact in my estimations.

It is also important to note that, through out the study, I regard the implicit restriction in DT IPOs that 10% of the offer has to be pre-assigned to the public offer tranche as negligible. Considering how small this percentage is in relation to the 20%, 30%, or even 40% transfer that clawbacks can force from the institutional-investor to the retail-investor tranche, this assumption seems sensible. It is possible, however, that this study's tests are capturing the joint effect of these two restrictions. This possibility does not change the significance of my results. Unfortunately, the small frequency of DT IPOs without clawbacks in the sample period (only three) precludes undertaking any tests that may help disentangle their effects.

5. Data

The data in this study have been hand-collected from 505 prospectuses and 571 allocation reports obtained digitally from the HKEx, spanning the 7-year window from November 1999 to February 2007. Allocation reports are documents disclosing IPO outcomes and must be published in the HK popular business media prior to the first trading day. They disclose the offer price, the by-tranche interest in the IPO (i.e. number of applications and shares requested), the number of shares transferred between tranches (as it may apply), the allocation of the top placing investors, the basis of allotment in the public offer, as well as official identification numbers of successful bidders in the public offer, with their respective allocation. Thus, thanks to this high detail, this study is able to work not only with allocation data, but with the underlying demand behind observed prices and allocations, avoiding any potential inference limitations of prior empirical research due to the use of allocation data alone.[11]

Availability of prospectuses and allocation reports in electronic form from the HKEx coincided with the birth of the Growth Enterprise Market (GEM) in November 1999, which opened the door for firms that do not meet the profitability, market capitalization, revenue, cash flow, or track-record requirements of the Main Board (MB) to list their shares in the HKEx. From the outset, GEM listing rules required aspiring firms to provide the exchange a digital copy of their prospectuses and allocation reports, in addition to publishing allocation reports in the popular business media. The requirement of submitting digital versions of allocation reports to the HKEx also extended to MB IPOs, but not so the requirement of submitting digital copies of prospectuses; hard copies sufficed. As Table 2A shows, the proportion of IPOs for which both a prospectus and allocation report were obtained improved from 18% (7/38) in 1999, to 95% (109/115) in 2002, and became complete thereafter, as MB firms adopted the standard practice of providing the HKEx a digital copy of their prospectuses. It is important to note that, early in the sample, prospectuses in traditional printed form were publicly and readily available to both investors and the HKEx at the time of a MB IPO. The fact that they were not submitted electronically at first was probably only to avoid the inconvenience of digitalizing the document, rather than trying to hide important information from the public. In total, the sample begins with 493 IPOs for which a prospectus and an allocation report are available, representing 82% (493/598) of all officially reported IPOs in the HKEx. After filtering out fixed-price offerings (255), global offers (76), and three DT IPOs without clawback provisions, the final sample includes offer structure, financial information, bidding, and allocation data for 159 bookbuilt IPOs. Global offers are eliminated because they involve simultaneous listings in multiple markets for which I do not have data. The final sample still includes a sizeable number of IPOs for which international marketing of the offering is explicitly allowed (but not multiple listings),

[11] See Lee et al. (1999) for a thorough discussion on the subject.

with 102 IPOs cleared for marketing in countries like Taiwan, Japan, Singapore, the Cayman Islands, Bermuda, the U.K., the U.S., and Mainland China. DT IPOs without clawbacks are eliminated because their low frequency does not provide for any meaningful inference. The sample is merged with daily stock closing prices obtained from the HKEx monthly price tapes. As a proxy of the overall performance of the HKEx, the Hang Seng Index (HSI) is used.

Table 2 also presents frequency figures for a number of sample subgroups. As Panel B shows, the DT mechanism is more extensively used than the PP mechanism during the sample period (with 101 DT offerings vs. 58 PP IPOs). Similarly, when it comes to technological sophistication, there are more low-tech firms in the sample than high-tech firms, with 107 low-tech IPOs vs. 52 high-tech IPOs. In contrast, the sample is roughly evenly divided between MB and GEM IPOs, with 80 and 79 IPOs, respectively. While all of the MB IPOs use the DT mechanism, the fact that 21 GEM IPOs also use the DT mechanism allows this study to disentangle the effects of clawbacks and market segment on price discovery and underpricing.

To get a better sense of the distribution of the sample's DT and PP IPOs throughout the sample period, Figure 1 shows the yearly frequency of IPOs by mechanism, along with their corresponding average five-day initial returns. It is clear that, starting in 2002, the DT mechanism's popularity began to escalate, while PP's popularity started to wane. These trends, explain the larger incidence of DT IPOs in the sample, as reported in Table 2B. With respect to initial returns, however, no clear long-term pattern emerges throughout the sample period for either subsample. Moreover, there is no statistical relation between IPO frequency and initial returns for either subsample, as the Pearson correlation coefficient between these two variables turns out insignificant for both DT and PP IPOs.

With respect to industry membership, the sample spans 35 of the 48 Fama-French broad-industry classifications.[12] Although not tabulated, business-service IPOs are the most frequent, with 39 out of 159. While this number seems high, by construction this category is quite broad, as it involves consulting services in a wide set of industries, from marketing and entertainment, to manufacturing and communications. Pharmaceutical companies account for 14 IPOs,

[12] Each of the 159 companies in the sample was manually assigned a Standard Industrial Classification (SIC) from the 1987 U.S. Department of Labor SIC manual, based on the detailed description of the firm's main line of business

followed by computers, with 11 IPOs, and by the retail industry, with eight IPOs. The next two most popular industries are heavy machinery manufacturing and the wholesale industry, with seven IPOs each. The rest of the industries do not see many IPOs, with the remaining 48 IPOs scattered across 24 different industries.

Table 2C shows the constitution of PPs in the sample. Forty-one of the 58 PP IPOs explicitly allow individual participation in the offering, whereas the prospectus of the other 17 explicitly disallow or discourage it. Although not tabulated, PPs have a larger concentration of high-tech firms, with 34 in this group and 24 in the low-tech category. PPs also exhibit a higher number of offerings for which the final offer price represents a downward revision with respect to mid-point of the pricing range, with 35 IPOs in this category, three with no revision, and 20 with upward revisions. Out of the 101 DT IPOs in the sample, as Table 2D shows, 89 had non-discretionary clawbacks in place and 12 had discretionary clawbacks. In addition, 31 IPOs were downward revised, seven experienced no revision, and 63 experienced an upward revision. It is important to note that, in contrast with Ljungqvist and Wilhelm, I do not regard PP IPOs in which individuals are not allowed as restricted. Heterogeneity and competition amongst institutional investors should suffice in giving IB's the leverage Benveniste and Spindt consider essential for truthful revelation. By the same token, I believe the mere presence of clawbacks (discretionary or not) poses enough of a threat to roadshow investor allocations to grant considering an IPO restricted. My findings seem to support both of these notions.

Although not tabulated, it is also important to note that the sample is mostly composed of firm commitment agreements. Only five of the 159 IPOs in the sample were conducted on a best-effort basis. While this lack of variability limits this study's ability to ascertain the effects of (and control for) underwriting contract choice on the three IB functions of interest, these are not difficult to anticipate: under firm-commitment contracts IBs have a vested interest in pre-selling the offer in its totality to avoid having to keep any unsold shares in their inventories. Thus, price discovery is likely to benefit from these extended marketing efforts and the underwriting function, as described in Section 3.3, is more likely to play a significant role in underpricing. The findings of this study should be qualified by these considerations.

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found in the prospectus. The assigned SIC Codes were used to match each firm in the sample to one of the 48 Fama-French Industry classifications, made publicly available by these scholars in their online data library.

6. Results

6.1. On the IB's price discovery, underwriting, and share distribution functions

Table 3A presents some key statistics on the final sample, including expected net proceeds and book value of assets as measures of offer and firm size, price range as a measure of ex ante price uncertainty,[13] overall oversubscription level as a proxy of the interest in the offering, absolute revision as a proxy for price discovery, 5-day initial returns as a measure of underpricing, and 5-day initial returns divided by absolute revision to measure the unitary cost of price discovery. The difference between the mean and median values of some of the reported variables suggests the sample is somewhat skewed. In light of this skewness, all univariate inference is based on the results of difference-in-median tests between key subsamples, unless otherwise noted.

Table 3B presents the results of difference-in-mean and median tests between the PP and DT IPOs in the sample. They show that DT IPOs enjoy the same level of price discovery as PPs, as proxied by *Absolute Revision*. By itself, this result could be read as a rejection of the notion that clawbacks hinder price discovery. However, it coincides with a significantly larger level of oversubscription for DT IPOs (8.25x vs. 1.68x in PPs), suggesting that even though DT IPOs exhibit significantly more interest from the investing community, they are still revised by the same magnitude as PPs. Together, these results may be construed as evidence that DT IPOs are associated with less informative subscription levels or that price discovery is somewhat dampened for DT IPOs, supporting Benveniste and Spindt's predictions about the effects of allocation restrictions on price discovery. However, if underpricing is to be regarded as payment for the information investors share with IBs during the roadshow, one would expect restricted IPOs to require higher levels of underpricing than unrestricted offerings, conditional on equal levels of price discovery. Given the comparable revision levels observed in the two subsamples, underpricing in DT IPOs should be higher than in PPs. This prediction of Benveniste and Spindt's model, however, is not supported by univariate tests. As Table 3B shows, median underpricing for these subsamples, as proxied by *5-Day Return*, is not statistically different from one another and mean underpricing is actually significantly higher for PPs that for DT

[13] Unlike in the U.S., where the difference between the high- and low-end of the prospectus pricing range is $2.00 for over 90% of IPOs, the difference between these two price levels in HK is more diverse. With a mean (median) difference of HK$0.42 (HK$0.25) in the sample, only 10% of IPOs have a difference equal to the mode of HK$0.20.

IPOs (38.36% vs. 12.44%). Moreover, median (mean) unitary costs of price discovery, as measured by *5-Day Returns* normalized by *Absolute Revision,* are significantly higher for PPs than for DT IPOs, with median (mean) underpricing of 1.76% and 0.91% (12.24% and 2.65%), respectively; the opposite of what Benveniste and Spindt predict. Although not reported, first-day, 10-day, and 20-day returns (and their normalized versions) were also evaluated, with similar conclusions. Consequently, either clawback restrictions translate into cheaper price discovery, or there are other confounding factors driving average underpricing down in DT IPOs. The marked differences in offer- and firm-size between PP and DT IPOs suggest controlling for offer- and issuer-specific factors through multivariate analysis is necessary.

Such analysis is conducted through the system of equations in Section 4. Since, as described earlier, IBs have to distribute an amended prospectus and give investors the option to withdraw or resubmit their applications whenever the offer price is set above the upper-end of the range, IPO prices in HK are seldom set above that level. In fact, while pricing exactly at the upper end is not uncommon (34 IPOs in the sample are priced that way), there are no IPOs priced above the pricing range in the sample.[14] Thus, |*Revision*|, the dependent variable in Equation 1, appears to be effectively censored from above. To correct for any bias in estimation this censoring may cause when using OLS, Tobit methodology is also used. Column (a) in Table 4 shows the results of OLS and Column (b) shows the results of Tobit estimation. Since censoring appears to have some impact on the significance of three of the control variables in Equation 1 (*Int'l*, *TopTier*, and *SDMkt_Pre-Price*), only the Tobit results are referenced henceforth.

As Column (b) shows, the restriction dummy *DT* loads significantly negative (–.047), suggesting clawbacks have a negative effect on the qualitative information exchange that occurs during the roadshow, affecting price discovery. However, while the abnormal oversubscription of the placing tranche (*AbnOSPlac)* loads insignificantly, its interaction with the restriction dummy (*DTxAbnOSPlac*) loads significantly positive (0.028). These results are quite telling and represent an interesting corollary to this study. In an unrestricted setting (like a PP IPO), IBs seem to rely merely on qualitative information to price IPOs and disregard any quantitative information coming from roadshow demand. However, when faced with allocation restrictions (like in a DT IPO), they tend to rely less on qualitative information and turn to quantitative

[14] As shown in Jenkinson et al. (2003) and Ljungqvist et al. (2003), this pattern is consistent with IPO pricing practices outside the U.S.

cues from roadshow investors for information. The more the oversubscription level of the placing tranche deviates from HK's typical (median) oversubscription levels for this tranche, the more IPO prices are adjusted, compensating for some of the lost qualitative information.

Do IBs use information from public offer demand to adjust prices? The significantly positive (0.017) coefficient on *AbnOSPO* suggests they do. Although no direct contact between IBs and public offer investors is possible, IBs seem to use abnormal oversubscription levels in the public offer to adjust offer prices. The more the oversubscription of the public offer differs from typical (median) oversubscription levels for this tranche, the more IPO prices are adjusted. In spite of this information, the net effect of clawbacks on price discovery is still negative, resulting in 2.80 revision-points less than for PPs, once all significant regressors are valued at the sample means. Considering that, on average, PP IPOs are revised 9.30% with respect to the mid-point of the prospectus range (See Table 3B), the effect of clawbacks is economically significant.

In all, these results support theory's predictions about the adverse effect of allocation restrictions on roadshow price discovery. However, the fact that abnormal oversubscription levels in the public offer are used to adjust IPO prices favors the idea that individual investors possess valuable information. To rule out the possibility that the true source of information in the public offer is actually migrating institutions, further tests are conducted in Section 6.3.

As far as controls are concerned, variables *Firm-Size*, *Price-Range, OAO%,* and *Days_BB* load significantly in the Tobit estimation. The positive loading (0.008) on *Firm-Size* supports the idea that larger firms are more difficult to value ex ante than smaller firms, making investor input during the going-public process more beneficial for price discovery. By the same token, the coefficient on *Price-Range* is significantly positive (0.322), a loading consistent with the notion that wider ranges reflect higher uncertainty about preliminary price estimates and with the fact that bookbuilding is bound to result in more dramatic updates of prior expectations the wider the price range. The negative loading (-0.001) on *OAO%* supports Benveniste and Spindt's contention that greenshoe options reduce IBs' incentives to pre-market an IPO, resulting in lower price discovery. Finally, the positive coefficient (0.020) on *Days_BB* confirms that the more time IBs spend building the book, the more information they are able to gather. That the other firm- and issue-specific controls in Equation 1 load insignificantly may reflect the fact that their effect is already captured by *Price-Range*. The insignificant loading in the rest of the controls suggest stock and IPO market information spillovers are not important.

Columns (c) through (e) of Table 4 show the result of OLS regressions on Equation 2. The regression in (c) uses the fitted value of absolute revision (*Ln[1+|Fit.Rev.|]*) from the OLS regression of Equation 1 (i.e. Column (a)), and the regressions in (d) and (e) use the fitted value of absolute revision from the Tobit regression in Column (b). While the regression in (d) uses the fitted value of absolute revision subject to the constraint that this fitted value cannot exceed the upper bound of the pricing range, this restriction does not apply to the fitted value of absolute revision in the regression reported in (e). Thus, this last regression does not include *Revision+* as a dependent variable. Considering that results in Columns (c) through (e) are qualitatively similar (with counted exceptions), only the results in Column (e) are referenced henceforth.

With respect to the effect of clawbacks on the costs associated with price discovery, while *Ln[1+|Fit.Rev.|]* loaded insignificantly by itself, its interaction with dummy *DT* loads significantly positive (4.323), suggesting price discovery becomes more costly (in terms of underpricing) in the presence of clawback restrictions, as most bookbuilding models predict. The insignificant loading on *Ln[1+|Fit.Rev.|]* suggests that rather than compensating investors with higher underpricing in unrestricted settings, IBs do so with higher allocations. This conjecture is supported by the empirical findings of Ljungqvist and Wilhelm.

Equation 2 also poses interesting implications for the IBs' underwriting function and its role on underpricing. As Column (e) shows, while unsatisfied demand in the public offer (*UnstDemPO*) loads insignificantly, the interaction of *DT* with unsatisfied demand in the placing tranche (*DTxUnstDemPlac*) results significantly negative (-0.227), reducing the positive effect on underpricing *UnstDemPlac* has by itself (0.282). Since it is reasonable to expect placing investors to procure in the aftermarket any shares they are unable to obtain in the pre-market, it is not surprising that a high level of unsatisfied demand in the placing will drive up initial returns. However, it is also possible that, faced with of the inability to fully satisfy placing investors' demand in the pre-market, IBs opt to compensate their support with higher underpricing, suggesting a role for the underwriting function in underpricing. While the first explanation for the positive loading of *UnstDemPlac* cannot be ruled out, the negative loading of

DTxUnstDemPlac suggest a definite role for the underwriting function, as there is no reason to suspect that the mere presence of clawbacks (cet. par.) would diminish the placing investors' proclivity to seek in the aftermarket their unsatisfied demand. Rather, it seems that while IBs consider roadshow investor support (i.e. demand) important for securing the success of an offering, the value they place in that support diminishes in the presence of clawbacks. Since clawbacks' promise of larger allocations for public offer investors provides incentives for them to boost their demand, it seems that with these restrictions in place, IBs trust public offer investors will provide the required support to guarantee the success of the offering, avoiding the nuisance of having to absorb any unsold portion of the IPO. As a result, IBs' do not underprice IPOs as heavily in the presence of clawbacks to compensate roadshow investors for their support. Moreover, as the insignificant coefficient on *UnstDemPO* shows, public offer investors do not seem to require more underpricing for their support neither; they seem content with clawbacks' "promise" of a higher allocation of slightly underpriced shares.

That in response to underwriting considerations clawbacks are associated with lower underpricing is at odds with Benveniste and Spindt's model. As the leverage of including a select few in the list of roadshow regulars is weakened by the reduced allocation these investors can expect in the presence of clawbacks, their model suggests that IBs should turn to higher underpricing to entice these investors to keep supporting their underwriting efforts. While the importance of roadshow investors to the success of an IPO cannot be denied, these conflicting results can be explained by the fact that, other than participating in the aftermarket, their model does not contemplate any other role for occasional investors (i.e. the investors not participating in the roadshow). The results of this study show, however, that investors in the public offer can help alleviate IBs' concerns about the possibility of failing to place all the shares in the investors' hands. That retail investors can play such an important role in the fulfillment of the IB's underwriting function is, on the other hand, recognized in Rock's model.

Finally, as Column (e) shows, *DT* loads insignificantly by itself, providing inconclusive evidence about the role of the share distribution function on underpricing. That clawbacks can result in a more diverse shareholder base without affecting underpricing suggests IBs do not price IPOs strategically to implement a target shareholder base, countering the arguments of Booth and Chua (1996), Brennan and Franks (1997), Stoughton and Zechner (1998), and Mello and Parsons (1998). However, this result could also reflect that both retail and large institutional investors are important for issuers and, while clawbacks make it unnecessary to underprice an offering as much to attract retail investors, they also make it necessary to resort to higher underpricing to attract institutional investors; resulting in a wash. While the negative coefficient of *DT* in Column (c) hints diversity in the initial shareholder base may actually be relatively more important for issuers, to truly determine whether the structure of the initial shareholder base matters may require a more thorough examination of the initial shareholder base than what is feasible in this study. Such detailed analysis is left for future research.

It is important to highlight that, while clawbacks are associated with a more costly price discovery process, their negative effect on underpricing from the underwriting function standpoint more than offsets these additional costs. In fact, by valuing all significant variables at their sample means, clawbacks are associated with 14.30 underpricing-points less than their unrestricted counterparts, as shown in the last row of Table 4. Considering that the PP IPOs in the sample are on average 38.36% underpriced, this number is economically significant.

A look at the two control variables in Equation 2 consistently significant in Columns (c) through (e) provides further support for the importance of the underwriting function as a driver of underpricing. The negative loading on *Int'l* (-0.236), for one, is consistent with the notion that marketing to international investors facilitates the job of placing shares on investors' hands, reducing the need for undue underpricing. Moreover, the positive coefficient on *OAO%* (.011) suggests that, in light of the bias favoring placing investors in the exercise of greenshoe options (See Section 2), public offer investors require additional compensation for supporting the IB's underwriting function. While Benveniste and Spindt model implies that greenshoe options should result in lower underpricing as they allow IBs to use larger allocations, rather than higher underpricing, to compensate roadshow investors for particularly good information, it is possible that what this coefficient is capturing is the net effect of these two opposing forces.

6.2. Clawbacks and migration

As noted in Section 2, that institutional investors can submit indications of interest (or strike bids) at either tranche of a DT IPO while only being able to receive shares from one tranche, allows and creates incentives for them to migrate away from the bookbuilt tranche of the IPO.

This phenomenon, by itself, can hinder the roadshow price discovery process and reshape the shareholder base. Since migration, like clawbacks, is only possible in DT IPOs, it clouds some of the earlier results, as the tests in Section 6.1 are unable to distinguish between clawback and migration effects. Moreover, since clawbacks may make migration more attractive for some institutions, the issue is further complicated, highlighting the need for deeper analysis.

To explore this issue further, I first gauge the extent to which this suspected migration takes place and whether there is evidence that migrating institutions really improve their chances of obtaining higher allocations and profits; that is, whether incentives to migrate exists to begin with. To separate institutional from individual investors in the public offer, I rely on HK identification, passport, and business identification numbers provided in allocation reports, and their reported allocations. I exploit the fact that HKEx rules state that multiple applications in the public offer by a single investor will be rejected, unless the investor proves to be acting in representation of a third party, and assume that non-rejected multiple bids belong to migrating institutions. In addition, since institutions are more likely to submit larger bids than individuals [Keloharju (1997)], I use bid-size to classify the rest of the bids. To determine the bid-size threshold separating individual from institutional bids, I use the average HK dollar bid-size of all institutional investors participating in the placing tranche of the DT IPOs in the sample and in those PP IPOs in which individual participation is explicitly prohibited. Since the largest 25 placees typically receive 80% of the placing shares, these top placees are excluded from these threshold calculations. Their exclusion seems sensible since only the smallest institutions stand to improve their allocations by resorting to migration. Using this approach, the bid-size threshold has been estimated at HK$1,232,970 (US$158,436.65).

Table 5 presents key statistics pertaining to migration. As Panel A shows, migration is not a trivial phenomenon. Although the mean (median) number of applications from migrating institutions represents only 18.88% (11.63%) of all public offer applications in the sample, they represent 76.17% (83.35%) of all the shares demanded there. As far as share allocations is concerned, migrating institutions absorb the majority of the shares, taking an average (median) 66.66% (70.46%) of the shares disbursed in the public offer, after all applicable clawbacks. To determine if migration is financially motivated, Panel B compares the expected allocation and profits of a migrating institutional investor bid, with the allocation and profits that institution would receive if it did not migrate to the public offer. The estimates show that non-migrating institutional investors can expect to obtain an average (median) of 13,293 (5,002) shares per placing application, whereas migrating institutional investors can expect to obtain 23,181 (12,256) shares per public offer application, a number significantly higher at the 1% (1%) level. As far as profits are concerned, a non-migrating institutions can expect an average (median) five-day profit of HK$3,809 (HK$4,892) per placing application, whereas migrating institutional investors can expect a HK$12,613 (HK$11,797) profit per public offer application, a number significantly higher at the 1% (1%) level. In conclusion, migrating to the public offer seems to make good business sense, at least for the smallest institutional investors in the sample.

To determine if the magnitude of observed migration affects price discovery and underpricing, I use a system of simultaneous equations analogous to the one in Table 4. The dependent variables are still |*Revision*| and *Underpricing*, but now *Percent Migration* is the explanatory variable of interest. This variable is a measure of suspected migrating institutional demand as a percentage of the total demand of all the institutional investors who, in theory, would participate in the placing in the absence of migration. Since no migration can occur in PPs, these tests are conducted using only the 101 DT IPOs in the sample. Dummy *DT* and all its interactions are eliminated as explanatory variables to avoid a "near-singular matrix-of-regressors" error. The rest of the control variables are still included in the system. The structural specification, as well as regression results, can be found in Table 6.

Interestingly, migration seems to have no adverse effect on price-discovery, as evidenced by the insignificant loading of *Percent Migration* in Columns (a) and (b). These results can be explained by either one of the following two scenarios. It could be that migrating institutions have no valuable information to begin with and are unable (or unwilling) to conduct any research to get it. Alternatively, it is also possible that these migrating investors are actually informed, but find a way to convey their information from the public offer, leaving price discovery unaffected. While the positive loading on *AbnOSPO* in Tables 4 and 6 suggest this last scenario cannot be completely ruled out, further test are needed to pinpoint who is supplying the pricing information in the public offer: migrating institutions or individuals. These tests are performed in Section 6.3. What is clear from the insignificant loading on *Percent Migration* at this point is that the adverse price-discovery effects described in Section 6.1 are likely the product of the presence of clawback restrictions in DT IPOs, rather than the product of the inherent opportunity DT IPOs offer institutions to migrate away from the bookbuilt tranche of the IPO.

As the insignificance of *Percent Migration* in Columns (c) through (e) shows, migration seems to have no effect on underpricing neither. Since the possibility that migration affects price discovery has already been ruled out, these new results reject the idea that migration has any bearing on the fulfillment of IBs' share distribution and underwriting functions. Consequently, Section 6.1's results evidencing the role the underwriting function plays on underpricing must be attributed to individuals' diminishing the IBs' dependence on placing institutional investors, not to migrating institutions playing that role. It is notable that, in accord with Benveniste and Spindt's model predictions, the loading on *Revision+* in Columns (c) and (d) turned significantly positive, confirming that particularly good information is paid for with further underpricing.

Another factor clouding the tests in this section stems from the way public offers are structured. Recall from Section 2 that small bids can be pre-assigned half of the public offer shares (Pool A), while large bids are pre-assigned the other half (Pool B), and that this 50-50 split must be upheld even when clawbacks result in sizable share transfers. In such a setting, an institution hoping to secure a large allocation of IPO shares can migrate to the public offer as a Pool B investor, circumventing competition with both large institutional investors in the placing and individuals in the public offer. Moreover, if there is little institutional competition in Pool B, this investor may be even able to secure an un-rationed allocation. Since it is possible that migration is only significant when the public offer is structured this way, the insignificance of *Percent Migration* in Table 6 may be driven by the 36 DT IPOs in the sample that are not divided in this fashion. Untabulated difference-in-mean and median tests show, however, that this is not the case. Since migrating demand when the public offer is divided into two pools is statistically indistinguishable from migrating demand when this tranche is undivided, splitting the public offer into two bid-size pools does not seem to motivate more migration by itself. Moreover, untabulated multivariate tests also show that this particular public offer structure is not accompanied by any significant price discovery or underpricing effects.

6.3. The source of public offer information

As shown in Columns (a) and (b) of Tables 4 and 6, IBs incorporate information conveyed by abnormal public offer demand into IPO prices. Whether this information comes from migrating institutional or individual investors, however, is yet to be determined. To settle this issue, I re-estimate Equation 1, breaking up the abnormal oversubscription level of the public offer into two: the abnormal oversubscription associated with migrating institutions (*AbnOSInst*) and with individual investors (*AbnOSIndv*). By the same token, Equation 2 is re-estimated breaking up unsatisfied demand in the public offer into unsatisfied demand associated with institutional (*UnstDemInst*) and individual investors (*UnstDemIndv*). To distinguish between these investor types, I once again use the algorithm described in Section 6.2. Table 7 reports the results.

As evidenced by the significantly positive loading on *AbnOSIndv* and the insignificant loading on *AbnOSInst* in Columns (a) and (b), public offer information seems to come from individuals, not migrating institutions. These results counter most bookbuilding models' assumption that retail investors have no information to contribute to the valuation process or that IBs have no practical way to incorporate it into prices. Apparently, not only are individual investors informed, but by simply comparing individual demand in the public offer with typical (median) individual demand levels for this tranche, IBs are able to extract valuable pricing information from individuals outside the roadshow. These results also help account for the irrelevance of institutional investor migration for price discovery found in Section 6.2. Apparently, migrating institutions do not posses (at least on the margin) any valuable pricing information to begin with, they do not conduct any research to become better informed, and they shun away from the roadshow in hopes of securing a larger allocation of underpriced shares in the public offer.

Consistent with Section 6.1, I also find that individual information is insufficient to counter clawbacks' adverse effects on roadshow price discovery. As Table 7 shows, by valuing all significant variables in the Equation 1 at their sample mean, the net effect of clawbacks on price discovery is ultimately negative, with overall price discovery reduced 4.30 (4.30) points when Tobit (OLS) is used. Similarly, except for *TopTier* gaining significance in the Tobit estimation, the loading on all other controls remain qualitatively identical to those in Table 4. The negative loading of -0.02 (-0.014) on *TopTier* in the Tobit (OLS) estimation supports the idea that high quality IBs perform superior ex ante valuation, leaving less price discovery for the roadshow.

As far as the effect that breaking up public offer unsatisfied demand has on the underpricing regression, the only major deviation with respect to prior results is the consistently significant negative coefficient on *DT,* which suggest the IB's share distribution function may play a role on underpricing after all. To be more specific, this negative coefficient supports Booth and Chua (1996) and Brennan and Franks' (1997) view that issuers value a broad shareholder base and IBs underprice IPOs strategically to attract more retail investors. Clawbacks' promise of a higher allocation of slightly underpriced shares for the public offer seems to be a good incentive for retail participation, ultimately reducing IBs' reliance on underpricing to secure diversity. Thus, in spite of the fact that clawbacks are still shown to increase the cost of price discovery (see the positive coefficient on *DTxLn[1+|Fit.Rev.|]*), the negative loadings on *DT* and *DTxUnstDemPlac* account for clawbacks' negative net effect on underpricing (see the last row).

That individual investors have valuable pricing information seems to favor Subrahmanyam and Titman's contention that individuals possess serendipitous information. However more specialized tests show that the information in individuals' hands does not fit that profile. In untabulated tests, I re-estimate the regressions in Table 7, adding to Equation 1 the interaction of a serendipitous information dummy with *AbnOSIndv*. This dummy takes a value of one when the issuer fits the profile of a firm for which serendipitous information is likely to exist, and zero otherwise.[15] In all cases, this interaction variable loaded insignificantly, leaving the rest of the coefficients in Table 7 practically unchanged and rejecting the idea that its results are driven by serendipitous information. Thus, the information on individuals' hands must be the product of deliberate research or the product of information leaks from institutional investors, which in such a small geographical area as HK, cannot be totally ruled out. Unfortunately, I am unable to explore these two possibilities any further, as allocation reports provide no further demographic information on public offer investors other than their identification numbers.

7. Robustness Tests

7.1. Self-selectivity

All empirical tests in Section 6 abstract from self-selectivity considerations. However, to the extent that there may be a systematic relation between the amount of private information IBs

[15] Serendipitous information is likely to exist only for firms that market products to a widespread consumer base, while firms with a narrow consumer base or very specialized products are not good candidates to have this type of information. In the sample, the presence of serendipitous information was only granted for 69 IPOs. These IPOs were selected through a thorough evaluation of the issuer's business and client-base description in the prospectus and included firms from the following industries: toys and recreation, personal services, consumer goods, beer and liquor, utilities, cloth and apparel, fun and entertainment, food products, automobiles and trucks, retail, pharmaceutical products, computers, and some business services.

are able to obtain from investors during the bookbuilding process and the choice of underwriting mechanism (i.e. PP vs. DT IPO), any estimation of Equation 1 may be biased and inconsistent. The same problems may arise with Equation 2 if there is a systematic relation between the demand for the IPO and underwriting mechanism choice.

That self-selectivity may overstate clawbacks' adverse effects of on price discovery is not a major concern. If only issues in need of pricing information use the unconstrained mechanism (the PP mechanism), while issues without much price uncertainty use the constrained mechanism, one may be led to believe that clawbacks in DT IPOs hinder information extraction when, in reality, there is no information to discover in these IPOs to begin with. However, if as this study asserts, the size of the preliminary pricing range is a good proxy for a priori price uncertainty, then the opposite is happening. As evidenced by Table 3B, DT IPOs seem to have more price uncertainty than PP IPOs, with median price ranges of 24.10% and 19.68%, respectively. This fact may actually bias this study's tests against finding a link between clawbacks and price discovery deterioration, adding robustness to the evidence uncovered so far.

With respect to the potential for self-selectivity bias on the underpricing regressions, the story is different. While IBs have limited discretion to choose between the PP or DT mechanisms, HKEx officials have the categorical policy of precluding the use of the PP mechanism if there is likely to be significant public demand for the shares. Thus, even though HKEx officials are the first to admit that they do not have a sophisticated mechanism to develop good ex ante estimates of public interest and only use expected offer size as a proxy, it cannot be ruled out that a systematic link between IPO demand and mechanism choice may lead to the spurious conclusion that clawbacks result in higher underpricing. Since DT IPOs can be expected to have significantly higher demand than PP IPOs, they are likely to also have higher initial returns. Consequently, self-selectivity bias in Equation 2 must be properly accounted and corrected for.

In spite of the earlier pronouncement on the matter, I conduct a more formal analysis to determine whether self-selectivity should be explicitly corrected for in the estimation of Equation 1. To uncover any systematic link between mechanism choice and a priori pricing uncertainty, I study the correlation between *Price Range* and several variables that may influence mechanism choice. To avoid leaving out good proxies for what HKEx officials claim drives mechanism choice, these variables include *Expected Net Proceeds, Normalized Net*

Proceeds, and oversubscription level (*OS*). Given the marked difference in size between PP and DT firms reported in Table 3B, I also look at *Total Assets* and *Gross Income*. *HighTech* and *TopTier* are also considered for any potential link they may bear with the amount of information IBs may be able to obtain from the roadshow. Finally, to directly test for a link between price uncertainty and mechanism choice, I also include *Double Tranche Dummy*. As Table 8A shows, none of the variables tested is significantly correlated with *Price Range*. Thus, even if one of these variables proves to have good predictive power over mechanism choice, self-selectivity correction of Equation 1 is not granted, as they bear no relation to a priori price uncertainty.

A similar analysis is conducted in Table 8B to determine whether self-selectivity should be explicitly corrected for in the estimation of Equation 2. Once again, correlation coefficients are used to explore the existence of a systematic link between IPO demand (*OS*) and several variables that may influence mechanism choice. That IPO demand is significantly correlated with the *Double Tranche Dummy* (0.2741) immediately evidences the need for selectivity correction. However, the insignificant correlation between *OS* and *Expected Net Proceeds* raises questions about the soundness of using *Expected Net Proceeds* as the sole a priori proxy of IPO demand. Rather, it is possible that HKEx officials use additional factors to refine their rough estimates of IPO demand. In fact, while the rest of the variables tested prove to have no significant correlation with IPO demand, *HighTech* turns out to be negatively correlated with *OS* (-0.1577). This negative correlation may reflect the fact that understanding the potential of new technologies requires very specialized expertise only available to a select set of investors, limiting the general public's interest (and demand) in high tech IPOs.

Using Probit methodology, Table 8C studies further the role of *Expected Net Proceeds* and *HighTech* as determinants of mechanism choice and confirm the significance of their predictive power, as both of them load significant at the 1% level. Moreover, the cross tabulation of predictions (table on the right of Panel C) shows these variables predict correctly 62% (36/58) of PPs and 88% (89/101) of DT IPOs; a reasonable fit. Numerous alternative variables tested this way proved insignificant in predicting mechanism choice, adding robustness to this analysis.

That the determinants of mechanism choice have been reasonably identified and have proven to be unrelated to the information that can potentially be uncovered during the bookbuilding process supports the notion that self-selectivity is no real reason of concern in the estimation of Equation 1. In the case of Equation 2, however, it is clear that Heckman's (1978, 1979) self-selectivity correction methodology must be applied to account for any potential biases. Table 8D applies this methodology, adding to the set of Equation 2 explanatory variables in Tables 4 and 7 the Inverse Mill Ratio (*Lambda*) from the binomial Probit estimation in Panel C.

Table 8D shows that this study's earlier conclusions about the influence of the price discovery and underwriting functions on underpricing are robust to self-selectivity concerns. This assertion is supported by *Lambda's* consistent insignificance throughout the table and the negligible change in the loading of the explanatory variables associated with these two IB functions, with respect to Tables 4 and 7.[16] However, the same cannot be said about the influence of the share distribution function on underpricing. Once selectivity-bias is corrected for, the loading of dummy *DT* turns consistently insignificant, casting greater doubt over the already mixed evidence in Tables 4 and 7. In spite of this swing, earlier conclusions about the net effect of clawbacks on underpricing remain unaffected. As Table 8D's last row shows, their net effect is still consistently negative, ranging from 9.5 underpricing-points less than their unrestricted counterparts in Column (3), to 17.2 underpricing-points less in Column (6).

Self-selectivity correction of Equation 2 also seems to uncover some biases in some of the controls. For one, variable *OAO%,* which loads significantly positive in Tables 4 and 7, loses all significance in Table 8D. *TopTier*, on the other hand, turns significantly positive across the board. This positive coefficient is somewhat puzzling. If IB quality certifies the fairness of the final IPO price, then *TopTier* should load negatively. The observed positive loading, however, may be a reflection of how this variable is constructed: it takes a value of one when the sponsoring IB is one of the top-five IBs in HK, as measured by the number of IPOs in which that IB participated as a sponsor, and zero otherwise. If the number of sponsorships an IB gets is influenced by its track record of successfully placed IPOs, then there are reasons to suspect a positive relation between underpricing and *TopTier*: those IBs that underprice more may be more likely to succeed placing shares in the public's hands. Similarly, the standard deviation of daily market returns from the price determination date to the fifth trading day, *SDMkt_Post-Price*, which for the most part is reported insignificant in Tables 4 and 7, turns significantly positive in Columns (3) through (6). This positive loading confirms the expected link between a stock's initial returns and contemporaneous systematic risk.

7.2. The role of U.S. banks and U.S. investors

The work of Ljungqvist el at. (2003) suggests another potential bias in the tests conducted so far that deserves mention. Using a sample of IPOs from 65 countries, they show that bookbuilding only reduces underpricing when conducted by U.S. IBs and/or when directed to U.S. investors. They attribute this phenomenon to U.S. IBs' superior and more efficient information extraction abilities and to U.S. investors' superior analytical skills. Their findings suggest that this study's results may be driven by U.S. involvement in HK primary markets rather than by allocation restrictions. That is, the diminished price discovery in DT IPOs may not be the result of clawbacks, but the product of a higher incidence of U.S. IBs and/or U.S. investors in PPs than in DT IPOs. By the same token, the reduced underpricing in DT IPOs could be easily explained by a higher incidence of U.S. IBs and/or U.S. investors in DT IPOs than in PP IPOs.

Since only six of the IPOs in the sample report a U.S. bank as a sponsor or lead IB, it is unlikely that U.S. IB involvement is driving this study's results. By the same token, while 15 PPs and 40 DT IPOs in the sample involve U.S. investors, further test show that U.S. investor involvement plays no role neither. A re-specification of the equation system in Tables 5 and 8 to incorporate a dummy to control for U.S. investor involvement in the offering and an interaction of this dummy with variable *DT,* shows that both of these controls load insignificantly across the board in both the absolute revision and underpricing equations (not tabulated). The insignificance of these controls substantiates the irrelevance of U.S.-investor participation in this study's results.

8. Conclusions

By studying clawbacks, an institutional feature in HK IPOs that significantly restricts the IBs' discretion to allocate shares freely after the roadshow, I am able to test the implications of some of the leading IPO models in the literature and simultaneously test the role the price discovery, share distribution, and underwriting functions play on IPO underpricing.

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[16] Compare the loading of variables *UnstDemPlac, DTxUnstDemPlac, UnstDemPO, UnstDemInst, UnstDemIndv,* and

While, in accord with the predictions of most bookbuilding models, clawbacks are ultimately found to have a detrimental effect on price discovery, I find that IB's are able to partially offset the loss of roadshow information with information from individual investors participating in the public offer. This counters most bookbuilding models' assumption that IBs are unable to extract any meaningful pricing information from investors not included in their list of roadshow regulars, either because they are uninformed or because it is impractical for IBs to do so. Rather, my findings suggest that by simply comparing individual demand in an offering with typical (median) individual demand levels in HK, IBs are able to extract usable pricing information from individuals outside the roadshow. Interestingly, the information in individuals' hands does not appear serendipitous in nature, as Subrahmanyam and Titman suggest. Although impossible to determine for sure with the available data, their information seems to be either the product of deliberate research efforts from their part or the product of information spillovers from institutional investors.

I also find that clawbacks make the price discovery process more expensive in terms of underpricing, validating the predictions of the bookbuilding models that visualize price discovery as an important driver of underpricing and allocation restrictions as detrimental to market efficiency. However, the fact that clawbacks are on average associated with lower overall underpricing indicates other IB functions play an important role in IPO underpricing. Particularly, I find that the underwriting function plays such a role, as evidenced by the fact that IBs do not compensate institutional roadshow support that heavily in the presence of clawback restrictions. Rather, individual investor support, possibly motivated by clawback's prospects of larger allocations, seems to provide IBs with the required assurance that the IPO shares will be successfully placed in investors' hands, rather than added to their inventories. This result defies Benveniste and Spindt's contention that the repeated participation of a select group of institutional investors in the roadshow is essential for keeping underpricing under check and favors Rock's perception of retail investors as instrumental to insure IBs are able to dispose of low quality IPOs inexpensively.

DTxLn[1+|Fit.Rev.\] in Tables 4 and 7 with their loadings in Table 8D to confirm the similarities.

In contrast, my tests for the significance of the share distribution function on underpricing prove, at best, inconclusive. While dummy *DT* loads significantly negative in the underpricing equation in Table 4 (Column (c)) and Table 7, that significance is not robust to selectivity correction. Moreover, its insignificance could be also explained by the offsetting effect of two opposing forces: on the one hand, clawbacks may make it unnecessary for IBs to underprice an IPO as significantly to attract retail investors to the offering; on the other, they may make it necessary to resort to higher underpricing to attract large institutional investors.

That clawbacks ultimately result in lower underpricing deviates from the results of Loughran et al. and Ljungqvist and Wilhelm, adding to the already mixed evidence in the literature. Since their tests consider only the effect of allocation restrictions on price discovery, I believe that this paper's incorporation of underwriting and share distribution considerations accounts for the differences.

While this study's results should be qualified by the prevalence of firm commitment IPO's in the sample, they do show some clear directives for regulators and issuers wishing to balance primary market efficiency and the costs of going public. Even though allocation restrictions that favor retail investors can result in diminished price discovery, they can also counter the market power of institutional investors in the going public process, resulting in lower underpricing.

Similarly, while migration is found to have no detrimental effects on price discovery, it does highlight the need for theoretical IPO research to deviate from its traditional monolithic treatment of institutional investors and to start recognizing the heterogeneity of this group of investors. In addition, this study is the first to recognize that allocation restrictions can affect the qualitative and quantitative information exchange in the roadshow in different ways. That in unrestricted settings IBs tend to rely merely on qualitative roadshow information to set IPO prices, while in restricted environments they tend to reduce their reliance on qualitative information and turn to quantitative cues from roadshow investors adds an interesting corollary to this study. By noting the existence of these intricate information dynamics within the roadshow, this study is helping bring a little more light to an underwriting mechanism frequently criticized by its obscurity.

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Table 1
Variable Definitions

Dependent variables

- ***|Revision|*** = Absolute value of the deviation of the final offer price from the mid-point of the preliminary price-range, normalized by the mid-point of the range. This measure was constructed based on the work of Hanley (1993).
- ***Underpricing*** = Closing price on the fifth trading day after the offering, divided by the offer price. For comparability with Ljungqvist and Wilhelm (2002), five-day initial returns are reported. First-day, ten-day, and 20-day initial returns were also used with similar qualitative results.

Independent variables

- ***DT*** = Dummy that takes a value of zero if the IPO is a pure placing (PP) and a value of one if it is a double tranched (DT) IPO subject to clawback restrictions.
- ***AbnOSPlac*** = Abnormal oversubscription of the placing. Since IPOs in HK are usually oversubscribed, only oversubscription levels that deviate from typical levels are expected to have informative content. For PP IPOs, this variable is defined by the natural logarithm of one plus the absolute difference between the oversubscription level of the IPO and the median oversubscription level of all PP IPOs in the sample. For DT IPOs, the variable is defined by the natural logarithm of one plus the absolute difference between the oversubscription level of the placing tranche and the median oversubscription level of the placing tranche of all DT IPOs in the sample.
- ***DTxAbnOSPlac***= Interaction between DT and *AbnOSPlac* above.
- ***AbnOSPO*** = Abnormal oversubscription of the public offer tranche. Since IPOs in HK are usually oversubscribed, only oversubscription levels that deviate from typical levels are expected to have informative content. This variable is defined by the natural logarithm of one plus the absolute difference between the oversubscription level of the public offer tranche and the median oversubscription level of the public offer tranche on all DT IPOs in the sample. This variable is only defined for DT IPOs.
- ***AbnOSInst*** = Abnormal oversubscription of institutional investors suspected of migrating into the public offer tranche of a DT IPO. It is defined by the natural logarithm of one plus the absolute difference between the oversubscription level of institutional demand in the public offer and the median oversubscription level of institutional demand on all public offer tranches in the sample. This variable is only defined for DT IPOs.
- ***AbnOSIndv*** = Abnormal oversubscription of individual investors in the public offer tranche. It is defined by the natural logarithm of one plus the absolute difference between the oversubscription level of individual demand in the public offer and the median oversubscription level of individual demand on all DT IPOs in the sample. This variable is only defined for DT IPOs.
- ***Firm-Size*** = Natural logarithm of total assets, taken from the issuer's most recent audited financial statements prior to the IPO.
- ***GEM*** = Dummy variable that takes a value of one if the IPO is listed in the HKEx's Growth Enterprise Market and zero if it is listed in the Main Board sector.
- ***HighTech*** = Dummy that takes a value of one if the issuer belongs to a high tech industry; zero otherwise. Firms are assigned to a technology group based on the prospectuses' detailed description of the firm's main line of business. Only firms in the wireless communications, fiber optics, networking, software, and pharmaceutical business who develop their own technology and products are considered high-tech. Technology resellers, internet service providers, and web portal firms are not considered high-tech.
- ***Int'l*** = Dummy that takes a value of one if the IPO's roadshow is cleared for marketing outside Hong Kong; zero if it is meant to be conducted exclusively within Hong Kong.
- ***Price-Range*** **=** Difference between the top and bottom of the preliminary pricing range in the prospectus, normalized by the mid-point of the range.
- ***OAO%*** **=** Percentage of the initially offered shares that IBs are allowed to sell in conformity with the over-allotment option.
- ***Days_BB*** **=** Natural logarithm of the number of natural days from the opening of the book to the pricing of the IPO.

Table 1 (Continued)
Definition of Independent Variables

- ***TopTier* =** Dummy variable that equals one if one of the IPO's sponsors is one of the top five investment banks in Hong Kong, as ranked by the number of IPOs in which that particular bank participated in that capacity from January 1, 1999 to December 31 of the IPO year. The variable takes a value of zero otherwise.
- **|*MktRet_Pre-Prc*|=** Absolute value of simple net returns on the Hang Seng Index from the prospectus date to the IPO's price determination day.
- ***SDMkt_Pre-Price* =** Standard deviation of daily simple net returns on the Hang Seng Index from the prospectus date to the IPO's price determination day.
- ***Av_ContRev* =** Average revision of all IPOs conducted between the prospectus date and the price determination day.
- ***StdDev_ContRev* =** Standard deviation of the revision of all IPOs conducted between the prospectus date and the price determination day.
- ***Av_InitRet_BB* =** Average first-day initial returns of all IPOs conducted between the prospectus date and the price determination day.
- ***UnstDemPlac*** = Natural logarithm of unsatisfied demand in the placing tranche. That is, natural logarithm of the difference between the total number of shares applied for in the placing tranche and the number of shares allocated in that tranche after clawback reallocations, divided by the number of shares allocated in that tranche.
- ***DTxUnstDemPlac* =** Interaction between *DT* and *UnstDemPlac* above.
- ***UnstDemPO*** = Natural logarithm of unsatisfied demand of the public offer tranche. That is, natural logarithm of the difference between the total number of shares applied for in the public offer tranche and the number of shares allocated in that tranche after clawback reallocations, divided by the total number of shares allocated in that tranche.
- ***UnstDemInst*** = Natural logarithm of unsatisfied demand of migrating institutional investors in the public offer tranche. That is, natural logarithm of the difference between the total number of shares applied for by suspected institutional investors in the public offer tranche and the number of shares allocated to institutions in that tranche after clawback reallocations, divided by the number of shares allocated to institutions in that tranche.
- ***UnstDemIndv*** = Natural logarithm of unsatisfied demand of individual investors in the public offer tranche, net of clawback reallocations. That is, natural logarithm of the difference between the total number of shares applied for by individual investors in the public offer tranche and the number of shares allocated to individuals in that tranche after clawback reallocations, divided by the number of shares allocated to individuals in that tranche.
- ***H-Share*** = Dummy that equals one if the issuer is a People's Republic of China incorporated enterprise; zero otherwise.
- ***Age* =** Natural logarithm of one plus age, where age is the firm's age at the moment of the offering, as measured by the number of years since its incorporation.
- ***IPOVol* =** Natural logarithm of the number of IPOs priced during the window of time spanning the four weeks prior to the pricing of the IPO to the two weeks after the pricing of the IPO.
- ***MktRet_Post-Price* =** Simple net returns on the Hang Seng Index from the price determination date until the fifth trading date after the IPO.
- ***SDMkt_Post-Price* =** Standard deviation of daily simple net returns on the Hang Seng Index from the price determination date until the fifth trading date after the IPO.
- ***Av_IR_Post-Price* =** Average first-day initial returns of all IPOs conducted between the IPO price determination date and the fifth-trading day.
- ***Revision+*** = Dummy variable that equals one if the offer price is set exactly at the high-end of the pricing range and zero otherwise.
- ***Ln[1+|Fit. Rev.|]* =** Natural logarithm of fitted absolute revision from Equation 1.
- ***DTxLn[1+|Fit. Rev.|]* =** Interaction between DT and Ln[1+|Fit. Rev.|] above.
- ***Perc. Migration*** = Demand of migrating institutional investors as a percentage of total shares demanded by all the institutional investors who, in theory, would participate in the placing tranche in the absence of migration. It is assumed that non-rejected repeated applications belong to migrating institutions, as well as those exceeding HK$1,232,970. This variable is only defined for DT IPOs since no migration can exist in PP offerings.

Table 2
Sample Characteristics

Panel A. IPOs in the Hong Kong Stock Exchange and in the original sample

Official IPO frequencies for the Main Board (MB) and Growth Enterprise Market (GEM) prior to 2007 ware obtained from the HKEx Fact-books. IPO Count for 2007 includes only IPOs for the first bimester of the year and was manually collected. Figures under the heading *Both Documents* report the intersection of prospectuses and allocation reports obtained electronically from the HKEx. Since electronic documents only became available starting in November 1999, 1999 includes only documents for the last bimester of the year.

	IPO Count			**Electronic Documents Available**		
Year	**MB**	**GEM**	**Both Sectors**	**Prospectuses**	**Alloc. Reports**	**Both Docs.**
1999	31	7	38	7	17	7
2000	43	47	90	50	90	50
2001	31	57	88	60	88	60
2002	58	57	115	111	109	109
2003	40	27	67	77	67	67
2004	47	21	68	68	68	68
2005	55	10	65	65	65	65
2006	54	6	60	60	60	60
2007	7	0	7	7	7	7
Total	366	232	598	505	571	493

Panel B. Bookbuilt IPOs in the sample (N=159)

From the 493 IPOs in the original sample, 255 fixed-price offerings and 76 bookbuilt global offers were filtered out, as well as three bookbuilt IPOs with no clawback features. Thus, the final sample includes 159 bookbuilt IPOs. Below is the composition of these IPOs, segregated by market segment, underwriting mechanism, and technological sophistication (i.e. high-tech or low-tech). Firms were assigned to a technology group based on the prospectus description of the firm's main line of business. Only firms in the wireless communications, fiber optics, networking, software, and pharmaceutical business, who develop their own technology and products, were considered high-tech.

	Underwriting Mechanism		**Technological Sophistication**		**Final**
Market Segment	**D. Tranched**	**P. Placings**	**Low-Tech**	**High-Tech**	**Sample**
MB	80	0	69	11	80
GEM	21	58	38	41	79
	101	58	107	52	159

Panel C. Pure Placing IPOs (N = 58)

Pure Placings in which individuals are allowed are those for which individual investor participation is explicitly permitted by the prospectus. Those Pure Placing IPOs in which the prospectus explicitly prohibits or discourages individual investor participation are labeled individuals not allowed. Price revision categories denote how the IPO's final offer price compares to the mid-point of the pricing range established in the prospectus.

Individual Investor Tolerance	
Individuals Allowed	41
Individuals Not Allowed	17
Price Revision	
Downward Revision	35
No Revision	3
Upward Revision	20

Panel D. Double Tranched IPOs (N = 101)

Double Tranched IPOs with a non-discretionary clawback are those for which clawback activation and the magnitude of the share transfer are governed by a rigid function of observed over-subscription level in the public offer (See Section 2). IPOs reporting a discretionary clawback in place obtained a waiver from the HKEx to depart from this function, giving IBs freedom to decide when and how to activate the clawback. Price revision categories are defined as in Panel C.

Nature of Clawback	
Non-Discretionary Clawback	89
Discretionary Clawback	12
Price Revision	
Downward Revision	31
No Revision	7
Upward Revision	63

Table 3
Sample Statistics of Bookbuilt IPOs

Panel A. Summary statistics for full sample of bookbuilt IPOs
Expected net proceeds is a measure of offer size, calculated net of expected underwriting fees and commissions. It is computed assuming that the final offer price will be set at the mid-point of the prospectus pricing range. To measure firm size prior to the offering, total assets were obtained from the most recently audited financial statements included in IPO prospectus. Price range is the difference between the maximum and minimum prices of the preliminary pricing range disclosed in the prospectus, normalized by the mid-point of the price range. OS is the total oversubscription of the offering, calculated by dividing the overall interest in the offer (number of shares applied for by both institutional and individual investors, regardless of their tranche) by the number of shares offered in the IPO. Absolute revision is the absolute value of the difference between the final offer price and the mid-point of the preliminary pricing range, normalized by the mid-point of the range. Five-day returns are the net returns on the IPO shares from the offer price to the close of the fifth trading day. For comparability with Ljungqvist and Wilhelm (2002), five-day initial returns are reported. First-day, ten-day, and 20-day initial returns were also used with similar qualitative results. Five-Day Return/Abs. Revision is the ratio of five-day returns over absolute revision, for those IPOs with absolute revision different than zero.

Sample	Exp. Net Proceeds (HK$ Mil)	Assets (HK$ Mil)	Price Range (%)	OS (Times)	Absolute Revision (%)	5-Day Return (%)	5-Day Return / Abs. Rev.
All Bookbuildings							
N	159	159	159	159	159	159	149
Mean	397.77	813.36	24.19	13.94	8.79	21.90	6.19
Median	108.00	233.24	22.56	4.85	7.77	8.80	1.19
Std_Dev	1,134.02	3,457.54	11.45	24.42	6.69	56.58	25.94
Minimum	13.36	3.06	1.98	1.00	0.00	-38.00	-28.28
Maximum	10,710.00	41,553.34	70.59	171.22	36.76	396.09	217.82

Panel B. Comparative statistics between pure placing and double tranched IPOs.
Significance of the results of difference-in-mean and medians between the two subsamples presented below, is denoted by the asterisks to the right of the mean and median statistics. *, **, and *** respectively denote significant differences between the two subsamples at the 10%, 5%, and 1% level.

Sample	Exp. Net Proceeds (HK$ Mil)	Assets (HK$ Mil)	Price Range (%)	OS (Times)	Absolute Revision (%)	5-Day Return (%)	5-Day Return / Abs. Rev.
Double Tranched IPOs							
N	101	101	101	101	101	101	94
Mean	564.76 ***	1,193.23 **	24.90	18.95 ***	8.50	12.44 **	2.65 *
Median	203.20 ***	410.25 ***	24.10 **	8.25 ***	8.19	7.27	0.91 *
Std_Dev	1,392.88	4,297.04	10.12	28.83	5.63	29.28	13.79
Minimum	13.36	8.49	3.64	1.02	0.00	-29.23	-21.13
Maximum	10,710.00	41,553.34	54.55	171.22	27.27	196.67	123.57
Pure Placings							
N	58	58	58	58	58	58	55
Mean	106.97	151.86	22.96	5.21	9.30	38.36	12.24
Median	57.54	87.24	19.68	1.68	6.72	14.74	1.76
Std_Dev	159.83	205.67	13.46	8.55	8.25	83.28	38.17
Minimum	15.00	3.06	1.98	1.00	0.00	-38.00	-28.28
Maximum	1,061.60	1,302.69	70.59	59.00	36.76	396.09	217.82

Table 4
The Effect of Clawbacks on Price Discovery and Underpricing

Regressions of fully recursive system given by Equations 1 and 2. Since the dependent variable of Equation 1 is in the list of explanatory variables of Equation 2, but the dependent variable of Equation 2 is not in the list of explanatory variables in Equation 1, the system is triangular. With uncorrelated errors, such a system can be handled one equation at a time, with Equation 1 estimated first, followed by Equation 2, using of the fitted value of the dependent variable of the first regression as a proxy for the endogenous explanatory variable in Equation 2. Column (a) shows OLS estimation of Equation 1. Since IBs are reluctant to revise IPO prices beyond the upper limit of the prospectus pricing-range to avoid having to re-issue a prospectus and restart the roadshow, the dependent variable in Equation 1 is subject to upward censoring. To account for this censoring, Column (b) reports the results of Tobit estimation of Equation 1. Columns (c), (d), and (e) report OLS regressions of Equation 2 of the system. The regression in Column (c) uses the fitted value for absolute revision from the OLS regression reported in Column (a). The regression in Column (d) and (e) use the fitted value for absolute revision from the Tobit regression reported in Column (b). The fitted value of absolute revision in Column (d), however, is itself censored by the upper limit of the prospectus range. The fitted value of absolute revision used in Column (e) is not subject to that constrain and is allowed to exceed the upper bound of the prospectus pricing range. Asterisks to the right of the White (1980) heteroskedasticity-consistent t-statistics denote significance level of coefficients. Superscripts *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The last row shows clawback's net effect on the two dependant variables, calculated by valuing all the significant variables in the regressions at their respective sample means.

	(Eq. 1) Dep. Variable: |Revison|			
	(a)		**(b)**	
Exp. Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**
Constant	-0.103	-1.748 *	-0.116	-1.315
DT	-0.046	-3.217 ***	-0.047	-2.745 ***
AbnOSPlac	-0.003	-0.560	-0.001	-0.197
DTxAbnOSPlac	0.024	3.178 ***	0.028	2.630 ***
AbnOSPO	0.007	2.256 **	0.017	3.537 ***
Firm-Size	0.007	2.194 **	0.008	1.797 *
GEM	0.004	0.332	0.008	0.489
HighTech	0.001	0.095	0.002	0.172
Int'l	-0.020	-2.269 **	-0.018	-1.529
Price-Range	0.349	10.842 ***	0.322	7.703 ***
OAO%	-0.001	-1.696 *	-0.001	-1.747 *
Days_BB	0.024	2.617 ***	0.020	1.946 *
TopTier	-0.013	-1.689 *	-0.018	-1.628
|MktRet_Pre-Prc|	0.013	0.032	0.046	0.103
SDMkt_Pre-Price	-1.428	-1.817 *	-0.991	-0.941
Av_ContRev	0.036	0.843	0.067	1.009
StdDev_ContRev	-0.043	-0.206	-0.099	-0.261
Av_InitRet_BB	0.006	1.222	0.033	1.314
Adj. R^2	0.486		N/A	
N	159		159	
Clawback's Net Effect	-0.035		-0.028	

	(Eq. 2) Dep. Variable: Underpricing					
	(c)		**(d)**		**(e)**	
Exp. Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**
Constant	1.072	0.935	1.212	1.030	1.298	1.136
DT	-0.493	-1.841 *	-0.416	-1.523	-0.355	-1.164
UnstDemPlac	0.277	2.756 ***	0.279	2.813 ***	0.282	2.914 ***
DTxUnstDemPlac	-0.218	-2.265 **	-0.220	-2.275 **	-0.227	-2.474 **
UnstDemPO	0.000	-0.817	0.000	-0.698	0.000	-0.758
OAO%	0.009	1.681 *	0.010	1.792 *	0.011	1.841 *
TopTier	0.217	1.581	0.233	1.602	0.228	1.666 *
Firm-Size	-0.045	-0.815	-0.056	-0.988	-0.063	-1.171
GEM	-0.164	-1.368	-0.176	-1.404	-0.159	-1.264
HighTech	-0.046	-0.419	-0.046	-0.423	-0.070	-0.651
H-Share	-0.013	-0.130	0.005	0.045	-0.006	-0.060
Int'l	-0.260	-1.765 *	-0.248	-1.801 *	-0.236	-1.718 *
Age	0.069	1.276	0.059	1.137	0.060	1.071
Price-Range	0.490	0.701	-0.057	-0.097	-0.260	-0.621
IPOVol	-0.043	-0.644	-0.040	-0.604	-0.029	-0.446
MktRet_Post-Price	0.754	0.539	0.719	0.518	0.596	0.432
SDMkt_Post-Price	21.552	1.507	22.807	1.552	25.147	1.761 *
Av_IR_Post-Price	0.078	1.518	0.083	1.637	0.087	1.600
Revision+	0.169	1.444	0.141	1.216		
Ln[1+|Fit.Rev.|]	-4.389	-1.363	-2.603	-0.932	-2.102	-0.746
DTxLn[1+|Fit.Rev.|]	5.115	2.055 **	4.668	1.894 *	4.323	1.678 *
Adj. R^2	0.233		0.228			0.233
N	159		159		159	
Clawback's Net Effect	-0.579		-0.114		-0.143	

Table 5
Exploring Institutional Migration into the Public Offer Tranche

Panel A. Aggregate Measures of Institutional Investor Migration in Double Tranched (DT) IPOs

Public offer applicants whose identification number is repeated at least once in the allocation report of a particular IPO and applicants whose bids exceed a given HK dollar threshold are assumed to be migrating institutional investors. This threshold, estimated at HK$1,232,970, is calculated by using the average bid-size of institutional investors participating in the placing tranche of the DT IPOs in the sample and in the PP IPOs in which individual participation is explicitly prohibited. Since the largest 25 placees typically receive 80% of placing shares, these institutional investors are excluded from these threshold calculations. Investors submitting only one public offer application per IPO and whose bids are below the threshold are assumed to be individual investors. Column 1 shows the demand (in million shares) of suspected institutions in the public offer tranche of the 101 DT IPOs in the sample. Column 2 shows the demand (in million shares) of suspected individuals in the public offer tranche of the DT IPOs in the sample. Columns 3 and 4 respectively show the demand by suspected institutions and individuals, as a percentage of total share demand in the public offer. Columns 5 and 6 (Columns 7 and 8) respectively show the allotment of suspected institutions and individuals, in million shares (as a percentage of total shares allotted in the public offer). Columns 9 and 10 (Columns 11 and 12) respectively show the incidence of suspected institutions and individuals, measured by the number of submitted applications (as a percentage of total applications submitted in the public offer).

	Share Demand				Share Allocation				Applications for Shares			
	(1) Institutions (Mil. Shrs)	(2) Individuals (Mil. Shrs)	(3) Institutions (%)	(4) Individuals (%)	(5) Institutions (Mil. Shrs)	(6) Individuals (Mil. Shrs)	(7) Institutions (%)	(8) Individuals (%)	(9) Institutions (# of Appl.)	(10) Individuals (# of Appl.)	(11) Institutions (%)	(12) Individuals (%)
Mean	3,206	426	76.17	23.83	42	20	66.66	33.34	1,815	19,792	18.88	81.12
Median	269	54	83.35	16.65	23	9	70.46	29.54	245	1,038	11.63	88.37
Minimum	0	1	0.00	0.65	0	1	0.01	1.91	0	38	0.00	26.64
Maximum	87,932	10,530	99.35	100.00	234	453	98.09	100.00	19,293	378,604	73.36	100.00
Std. Dev.	9,799	1,220	19.30	19.30	49	47	20.83	20.83	3,435	58,464	18.46	18.46

Panel B. Effectiveness of the Migrating Strategy

Column (1) presents the number of shares a small institutional-investor bid (i.e. not one of the top 25 bids) would receive if that investor were to stay in the placing tranche, along with all other institutional investors. Since this hypothetical situation assumes that no institution migrates, aggregate allocations in both tranches of all the DT IPOs in the sample had to be recalculated, as some clawbacks would certainly not be exercised in the absence of migration. Therefore, in some instances, the theorized number of shares disbursed in the placing tranche is larger than what is actually observed. Column (2) gives the HK dollar value of the expected allocation of a placing institutional bid, multiplied by the final IPO price and the five-day initial net return rate. Column (3) gives the typical number of shares a migrating investor bid actually gets in the public offer tranche of the DT IPOs in the sample, when that investor migrates. Column (4) gives the HK dollar value of the expected allocation of a placing institutional bid, multiplied by the final IPO price and the five-day initial net return rate. Significance of the results of difference-in-mean and difference-in-medians tests between the expected allocation of a placing institutional bid and a migrating institutional bid is denoted by the asterisks to the right of the mean and median statistics in Column (1). Significance of the results of difference-in-mean and difference-in-medians tests between the expected profits of a placing institutional bid and a migrating institutional bid is denoted by the asterisks to the right of the mean and median statistics in Column (2). Superscripts *, **, and *** respectively denote significant differences between these subsample pairs at the 10%, 5%, and 1% level.

	(1) Expected Allocation of a Placing Institutional investor (Shares)	(2) Expected Profits of a Placing Institutional investor (HK$)	(3) Expected Allocation of a Migrating Institutional investor (Shares)	(4) Expected Profits of a Migrating Institutional investor (HK$)
Mean	13,293 ***	3,809 ***	23,181	12,613
Median	5,002 ***	4,892 ***	12,256	11,797
Minimum	219	-511,955	3,012	-2,100,000
Maximum	1,691,087	306,631	4,552,000	1,645,714
Std. Dev.	36,472	12,374	57,818	19,664

Table 6
The Effect of Institutional Investor Migration on Price Discovery and Underpricing

Regression of fully recursive, triangular system given by the redefined Equations 1 and 2 below. The dependent variables are absolute revision and underpricing, respectively. The explanatory variables of each redefined equation are listed in the bold columns to the left of Columns (a) and (c). Variable definitions can be found in Table 1. Column (a) shows OLS estimation of Redefined Equation 1. Since IBs are reluctant to revise IPO prices beyond the upper limit of the prospectus pricing-range to avoid having to re-issue a prospectus and restart the roadshow, the dependent variable in this equation is subject to upward censoring. To correct for this censoring, Column (b) reports the results of Tobit estimation of Redefined Equation 1. Columns (c), (d), and (e) report OLS regressions of Redefined Equation 2 of the system. The regression in Column (c) uses the fitted value for absolute revision from the OLS regression reported in Column (a). The regression in Column (d) and (e) use the fitted value for absolute revision from the Tobit regression reported in Column (b). The fitted value of absolute revision in Column (d), however, is itself censored by the upper limit of the prospectus range. The fitted value of absolute revision used in Column (e) is not subject to that constrain and is allowed to exceed the upper bound of the prospectus pricing range. Asterisks to the right of the White (1980) heteroskedasticity-consistent t-statistics denote significance level of coefficients. Superscripts *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

	(Eq. 1) Dep. Variable: |Revison|			
	(a)		**(b)**	
Exp. Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**
Constant	-0.096	-1.170	-0.121	-1.078
AbnOSPlac	0.019	3.039 ***	0.024	3.037 ***
AbnOSPO	0.009	1.922 *	0.017	3.070 ***
Perc. Migration	-0.013	-0.595	-0.002	-0.080
Firm-Size	0.006	1.531	0.007	1.335
GEM	0.005	0.408	0.009	0.547
HighTech	-0.003	-0.289	-0.004	-0.289
Int'l	-0.015	-1.582	-0.013	-0.901
Price-Range	0.301	6.504 ***	0.259	4.639 ***
OAO%	0.000	-0.760	-0.001	-0.728
Days_BB	0.009	0.843	0.007	0.388
TopTier	-0.019	-2.018 **	-0.027	-1.966 **
|MktRet_Pre-Prc|	0.141	0.388	0.087	0.164
SdMkt_Pre-Price	-1.638	-1.516	-0.721	-0.500
Av_ContRev	0.030	0.749	0.050	0.786
StdDev_ContRev	0.105	0.648	-0.014	-0.038
Av_InitRet_BB	-0.002	-0.313	0.002	0.068
Adj. R^2	0.496		N/A	
N	101		101	

	(Eq. 2) Dep. Variable: Underpricing					
	(c)		**(d)**		**(e)**	
Exp. Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**
Constant	-0.685	-1.334	-0.603	-1.235	-0.589	-1.094
UnstDemPlac	0.009	0.291	0.009	0.252	0.021	0.730
UnstDemPO	0.000	1.480	0.000	1.445	0.000	1.081
Perc. Migration	0.175	1.428	0.170	1.343	0.225	1.380
OAO%	0.007	1.388	0.007	1.398	0.008	1.381
TopTier	0.020	0.241	0.036	0.438	0.038	0.430
Firm-Size	0.021	0.830	0.016	0.670	0.013	0.497
GEM	-0.008	-0.087	-0.012	-0.135	0.015	0.152
HighTech	0.093	0.908	0.094	0.924	0.056	0.588
H-Share	-0.009	-0.105	-0.007	-0.077	-0.063	-0.787
Int'l	-0.093	-1.183	-0.092	-1.208	-0.085	-1.101
Age	-0.005	-0.134	-0.007	-0.193	-0.013	-0.369
Price-Range	0.708	1.225	0.506	1.175	0.236	0.661
IPOVol	0.030	0.670	0.032	0.730	0.048	1.050
MktRet_Post-Price	0.916	0.989	0.849	0.907	0.462	0.461
SdMkt_Post-Price	-6.920	-0.701	-5.892	-0.681	-3.347	-0.379
Av_IR_Post-Price	0.196	1.421	0.199	1.445	0.277	1.675 *
Revision+	0.190	2.115 **	0.182	2.079 **		
Ln[1+|Fit.Rev.|]	0.041	0.027	0.700	0.598	1.211	1.318
Adj. R^2	0.143		0.146		0.115	
N	101		101		101	

Table 7
Exploring the Origin of Public Offer Information

Regression of fully recursive, triangular system given by the redefined Equations 1 and 2 below. The dependent variables are absolute revision and underpricing, respectively. The explanatory variables of each redefined equation are listed in the bold columns to the left of Columns (a) and (c). Variable definitions can be found in Table 1. Column (a) shows OLS estimation of Redefined Equation 1. Since IBs are reluctant to revise IPO prices beyond the upper limit of the prospectus pricing-range to avoid having to re-issue a prospectus and restart the roadshow, the dependent variable in this equation is subject to upward censoring. To account for this censoring, Column (b) reports the results of Tobit estimation of Redefined Equation 1. Columns (c), (d), and (e) report OLS regressions of Redefined Equation 2 of the system. The regression in Column (c) uses the fitted value for absolute revision from the OLS regression reported in Column (a). The regression in Column (d) and (e) use the fitted value for absolute revision from the Tobit regression reported in Column (b). The fitted value of absolute revision in Column (d), however, is itself censored by the upper limit of the prospectus range. The fitted value of absolute revision used in Column (e) is not subject to that constrain and is allowed to exceed the upper bound of the prospectus pricing range. Asterisks to the right of the White (1980) heteroskedasticity-consistent t-statistics denote significance level of coefficients. Superscripts *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The last row shows clawback's net effect on the two dependant variables, calculated by valuing all the significant variables in the regressions at their respective sample means.

	(Eq. 1) Dep. Variable: |Revison|					**(Eq. 2) Dep. Variable:** Underpricing					
	(a)		**(b)**			**(c)**		**(d)**		**(e)**	
Exp. Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Exp. Variables**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**
Constant	-0.111	-1.855 *	-0.141	-1.610	**Constant**	0.965	0.848	1.123	0.949	1.132	1.001
DT	-0.050	-3.414 ***	-0.053	-3.100 ***	**DT**	-0.580	-2.266 **	-0.505	-1.989 **	-0.482	-1.680 *
AbnOSPlac	-0.002	-0.541	-0.001	-0.201	**UnstDemPlac**	0.276	2.786 ***	0.279	2.837 ***	0.283	2.960 ***
DTxAbnOSPlac	0.026	3.537 ***	0.034	3.163 ***	**DTxUnstDemPlac**	-0.243	-2.453 **	-0.245	-2.446 **	-0.253	-2.601 ***
AbnOSInst	-0.004	-0.870	-0.002	-0.412	**UnstDemInst**	0.040	1.273	0.042	1.324	0.043	1.148
AbnOSIndv	0.012	2.457 **	0.023	3.135 ***	**UnstDemIndv**	0.000	-1.108	0.000	-1.215	0.000	-1.351
Firm-Size	0.007	2.369 **	0.009	2.164 **	**OAO%**	0.009	1.694 *	0.010	1.764 *	0.010	1.757 *
GEM	0.002	0.199	0.007	0.413	**TopTier**	0.209	1.516	0.224	1.524	0.211	1.546
HighTech	0.001	0.151	0.003	0.288	**Firm-Size**	-0.040	-0.729	-0.052	-0.903	-0.053	-0.997
Int'l	-0.020	-2.315 **	-0.018	-1.572	**GEM**	-0.160	-1.363	-0.172	-1.379	-0.155	-1.283
Price-Range	0.348	10.919 ***	0.319	7.751 ***	**HighTech**	-0.051	-0.472	-0.053	-0.494	-0.071	-0.678
OAO%	-0.001	-1.822 *	-0.002	-1.965 **	**H-Share**	-0.037	-0.359	-0.023	-0.221	-0.041	-0.412
Days_BB	0.026	2.820 ***	0.023	2.200 **	**Int'l**	-0.263	-1.803 *	-0.251	-1.830 *	-0.243	-1.770 *
TopTier	-0.014	-1.805 *	-0.020	-1.833 *	**Age**	0.078	1.409	0.068	1.289	0.072	1.254
|MktRet_Pre-Prc|	-0.004	-0.010	0.007	0.015	**Price-Range**	0.563	0.833	0.015	0.025	-0.030	-0.067
SDMkt_Pre-Price	-1.549	-1.960 **	-1.195	-1.149	**IPOVol**	-0.030	-0.431	-0.026	-0.376	-0.018	-0.256
Av_ContRev	0.040	1.004	0.080	1.206	**MktRet_Post-Price**	0.896	0.648	0.811	0.592	0.659	0.486
StdDev_ContRev	-0.012	-0.061	-0.034	-0.090	**SDMkt_Post-Price**	20.657	1.442	22.022	1.487	23.567	1.643
Av_InitRet_BB	0.005	0.832	0.032	1.293	**Av_IR_Post-Price**	0.075	1.493	0.081	1.636	0.082	1.588
					Revision+	0.141	1.280	0.112	1.025		
					Ln[1+|Fit.Rev.|]	-4.655	-1.483	-2.885	-1.068	-2.875	-1.015
					DTxLn[1+|Fit.Rev.|]	5.230	2.129 **	4.770	1.990 **	4.566	1.689 *
Adj. R^2	0.494		N/A		**Adj. R^2**	0.234		0.227		0.234	
N	159		159		**N**	159		159		159	
Clawback's Net Effect	-0.043		-0.043		**Clawback's Net Effect**	-0.709		-0.660		-0.661	

Table 8
Self-Selectivity Correction

Panel A. Correlation between a priori price uncertainty (*Price Range*) and variables potentially related to mechanism choice

Definitions for variables *Total Assets*, *Expected Net Proceeds*, and *OS* can be found in Table 3. Definitions for variables *Price Range, HighTech*, and *TopTier* can be found in Table 1. *Gross Income* measures the issuer's gross sales (or revenue), as reported in the most recently audited financial statements included in IPO prospectus. *Normalized Net Proceeds* is defined as the ratio between *Expected Net Proceeds* and *Total Assets*. *Double Tranche Dummy* equals one if the IPO is Double Tranched and zero if the IPO is a Pure Placing. Significance level of the Pearson correlation coefficients is denoted by asterisks to the right of the coefficient. Superscripts *, **, and *** denote significant levels of 10%, 5%, and 1%, respectively.

	Total Assets	Exp. Net Proceeds	Gross Income	Normalized Net Procs.	HighTech	TopTier	OS	Double Tranche Dummy
Corr. Coeff. (Pearson)	0.0431	0.0165	0.0437	-0.1021	-0.0261	0.1018	-0.1076	0.0685
Prob > | r |	0.5857	0.8348	0.5807	0.1959	0.7413	0.1973	0.1728	0.3864

Panel B. Correlation between IPO demand (*OS*) and variables potentially related to mechanism choice

	Total Assets	Exp. Net Proceeds	Gross Income	Normalized Net Procs.	HighTech	TopTier	Price Range	Double Tranche Dummy
Corr. Coeff. (Pearson)	0.0197	0.1183	0.0579	-0.0232	-0.1577**	-0.0224	-0.1076	0.2741***
Prob > | r |	0.8032	0.1338	0.4639	0.7698	0.0451	0.7769	0.1728	0.0004

Panel C. Binomial Probit estimation of Mechanism Choice

The table on the left reports the coefficients and t-statistics of a binomial Probit estimation of mechanism choice. The dependent variable is *Double Tranche Dummy*. The choice of *Expected Net Proceeds* (logged) as an explanatory variable is based on Hong Kong Exchange Official's accounts as to the determinant of mechanism choice. The inclusion of *HighTech* as an explanatory variable responds to the negative significant correlation found between this variable and the *Double Tranche Dummy* in Panel B. Other firms and offer specific variables were tried, but failed to load into the estimation in a significant way. The pair *HighTech* and *Expected Net Proceeds* (logged) showed to have the highest predictive power. Significance level of the coefficients is denoted by asterisks to the right of the White (1980) heteroskedasticity-consistent t-statistics. Superscripts *, **, and *** denote significant levels of 10%, 5%, and 1%, respectively. The table on the right reports the frequency of actual predicted outcomes. The predicted outcome is that which has the maximum probability of occurring. Threshold value for predicting *Double Trance Dummy*=1 is a probability of .50.

Variable	**Coeff.**	**t-stat**
Constant	-9.4703	-4.433***
HighTech	-1.0062	-4.178***
Ln (Net Expected Proceeds)	0.5489	4.753***
N	159	

	Predicted		
Actual	0	1	**Total**
0	36	22	58
1	12	89	101
Total	48	111	159

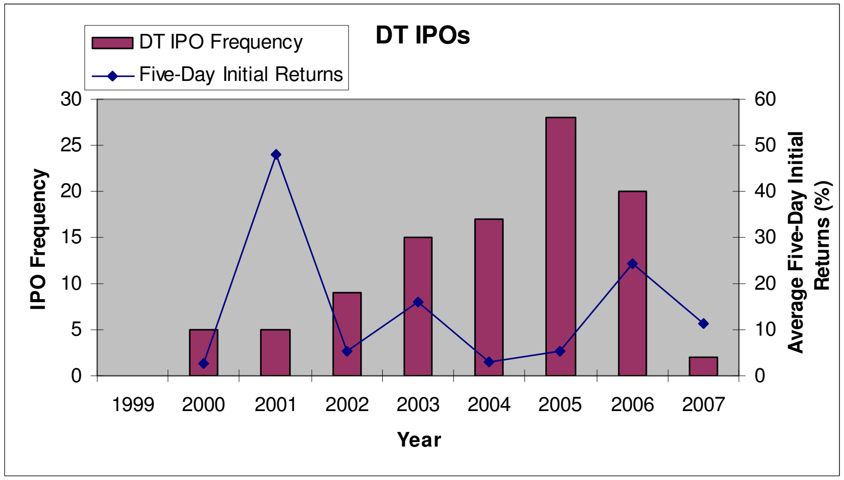
Panel D. Selectivity Corrected Underpricing Regressions

Selectivity corrected OLS estimation of underpricing regressions. Explanatory variables are listed in the bolded column to the further left. Variable definitions can be found in Table 1. The regression in Columns (1) and (2) use the fitted value for absolute revision from the OLS regressions reported in Column (a) of Tables 4 and 7, respectively. The regressions in Column (3) and (5) use the fitted value for absolute revision from the Tobit regression reported in Column (b) of Table 4. The fitted value of absolute revision in Column (3), however, is itself censored by the upper limit of the prospectus range. The fitted value of absolute revision used in Column (5) is not subject to that constrain and is allowed to exceed the upper bound of the prospectus pricing range. The regressions in Columns (4) and (6) use the fitted value for absolute revision from the Tobit regression reported in Column (b) of Table 7. The fitted value of absolute revision in Column (4), however, is itself censored by the upper limit of the prospectus range. The fitted value of absolute revision used in Column (6) is not subject to that constrain and is allowed to exceed the upper bound of the prospectus pricing range. Asterisks to the right of the White (1980) heteroskedasticity-consistent t-statistics denote significance level of coefficients. Superscripts *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The last row shows clawback's net effect on underpricing, calculated by valuing all the significant variables in the regressions at their respective sample means.

	(1)		(2)		(3)		(4)		(5)		(6)	
Exp. Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**
Constant	1.354	1.551	1.275	1.460	1.459	1.678 *	1.377	1.581	1.594	1.822 *	1.494	1.709 *
DT	-0.104	-0.281	-0.168	-0.446	-0.128	-0.340	-0.193	-0.507	-0.002	-0.006	-0.041	-0.113
UnstDemPlac	0.275	3.773 ***	0.274	3.773 ***	0.272	3.673 ***	0.271	3.679 ***	0.280	3.835 ***	0.280	3.888 ***
DTxUnstDemPlac	-0.218	-2.532 **	-0.244	-2.689 ***	-0.215	-2.469 **	-0.240	-2.633 ***	-0.224	-2.625 ***	-0.252	-2.801 ***
UnstDemPO	0.000	-0.514			0.000	-0.489			0.000	-0.520		
UnstDemInst			0.038	0.910			0.0399	0.951			0.042	1.020
UnstDemIndv			0.000	-0.658			-4E-04	-0.731			0.000	-0.775
OAO%	0.007	0.888	0.007	0.928	0.008	1.082	0.008	1.064	0.008	1.043	0.007	0.938
TopTier	0.215	2.227 **	0.209	2.173 **	0.228	2.350 **	0.220	2.269 **	0.225	2.337 **	0.210	2.182 **
Firm-Size	-0.069	-1.439	-0.066	-1.380	-0.075	-1.588	-0.072	-1.512	-0.087	-1.841 *	-0.083	-1.752 *
GEM	-0.187	-1.312	-0.184	-1.296	-0.192	-1.346	-0.188	-1.322	-0.184	-1.285	-0.185	-1.295
HighTech	0.089	0.594	0.084	0.562	0.068	0.462	0.068	0.463	0.062	0.386	0.085	0.530
H-Share	-0.005	-0.037	-0.024	-0.184	0.009	0.065	-0.016	-0.124	0.004	0.033	-0.025	-0.188
Int'l	-0.315	-2.913 ***	-0.313	-2.963 ***	-0.296	-2.885 ***	-0.301	-2.967 ***	-0.286	-2.731 ***	-0.299	-2.928 ***
Age	0.069	0.924	0.077	1.020	0.064	0.853	0.074	0.974	0.062	0.824	0.074	0.970
Price-Range	0.742	0.846	0.714	0.878	0.284	0.370	0.332	0.464	-0.014	-0.021	0.179	0.297
IPOVol	-0.045	-0.554	-0.033	-0.395	-0.040	-0.488	-0.026	-0.316	-0.033	-0.407	-0.022	-0.269
MktRet_Post-Price	0.767	0.543	0.942	0.666	0.761	0.537	0.894	0.628	0.602	0.425	0.709	0.501
SDMkt_Post-Price	19.406	1.615	18.927	1.593	20.513	1.727 *	19.634	1.661 *	23.496	2.012 **	21.852	1.888 *
Av_IR_Post-Price	0.075	1.223	0.071	1.165	0.084	1.357	0.080	1.307	0.085	1.390	0.079	1.308
Revision+	0.151	1.425	0.122	1.113	0.129	1.225	0.100	0.918				
Ln[1+|Fit.Rev.|]	-5.007	-1.570	-4.922	-1.573	-3.776	-1.398	-3.986	-1.580	-2.846	-1.198	-3.451	-1.580
DTxLn[1+|Fit.Rev.|]	4.930	2.668 ***	4.933	2.723 ***	4.881	2.490 **	4.984	2.607 ***	4.397	2.413 **	4.545	2.597 ***
Lambda	-0.259	-1.222	-0.258	-1.242	-0.219	-1.051	-0.230	-1.118	-0.253	-1.049	-0.299	-1.280
Adj. R^2	0.230		0.230		0.227		0.227		0.229		0.231	
N	159		159		159		159		159		159	
Clawback's Net Effect	-0.096		-0.139		-0.095		-0.131		-0.133		-0.172	

Figure 1
Time-Series Properties of the Bookbuilt IPOs in the Sample

Panel A. Double-Tranched (DT) Bookbuilt IPOs
Number of DT Bookbuilt IPOs and Average Percentage Five-Day Initial Returns of DT Bookbuilt IPOs in the HKEx, presented by calendar year. IPO Frequencies include only DT Bookbuilt IPOs conducted between November 1999 and February 2007, excluding 76 global IPOs and three DT IPOs not subject to clawback restrictions. The scale for the IPO frequency figures can be found on the left vertical axis. Initial returns are calculated by dividing a stock's closing price on the fifth trading day after the offering, by its offer price. The scale for percentage Average Five-Day Initial Returns can be found on the right vertical axis.



Panel B. Pure Placing (PP) Bookbuilt IPOs
Number of PP Bookbuilt IPOs and Average Percentage Five-Day Initial Returns of PP Bookbuilt IPOs in the HKEx, presented by calendar year. IPO Frequencies include only PP Bookbuilt IPOs conducted between November 1999 and February 2007. The scale for the IPO frequency figures can be found on the left vertical axis. Initial returns are calculated by dividing a stock's closing price on the fifth trading day after the offering, by its offer price. The right vertical axis shows the scale for Average Five-Day Initial Returns.