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Mazouz, K, Mohamed, A, Saadouni, B et al. (1 more author) (2017) Underwriters' allocation with and without discretionary power: Evidence from the Hong Kong IPO market. International Review of Financial Analysis, 49. pp. 128-137. ISSN 1057-5219

https://doi.org/10.1016/j.irfa.2016.12.006

Underwriters' allocation with and without discretionary power: Evidence from the Hong Kong IPO market

Abstract

This study uses a unique and extensive data set from the Hong Kong IPO market to examine the theory of adverse selection under two distinct regulatory regimes in relation to underwriters' discretionary power in IPO share allocation. Consistent with Rock's (1996) theory of adverse selection in the IPO market, we show that, prior to the introduction of the clawback provision, retail (uninformed) investors were allocated more of the overpriced offerings and less of the underpriced issues. However, after the provision is implemented, retail investors have been allocated significantly more of the underpriced offerings and less of the overpriced ones. Overall, we find that allocation-adjusted initial returns for the retail investors are lower (higher) than the risk-free rate pre- (post-) clawback provision. These findings imply that the mandatory clawback provision has enhanced the fairness in IPO share allocations among different investor groups and has reduced the winner's curse in the IPO market.

JEL classification: G1, G2, G3

Key words: mandatory clawback, adverse selection, allocation-adjusted returns

1. INTRODUCTION

"*… HONG KONG (Dow Jones Investment Banker) – Claw-back rules for retail tranches in Hong Kong IPOs are a unique feature of that market. They bring an element of fairness between institutions and the general public; however, retail investors have increasingly shunned new issues and also now account for a smaller proportion of secondary trading, as compared with a few years ago. Now might perhaps be a good time to rethink those provisions, and to grant more flexibility to ECM bankers and issuers to allocate books of demand…*"

Dow Jones Investment Banker on 13 September 2011[1]

Several studies show that underwriters' IPO share allocation policies are biased towards institutional investors (see, e.g., Aggarwal et al., 2002; Hanley and Wilhelm, 1995; Ljungqvist and Wilhelm, 2002). Benveniste and Wilhelm (1990) find that underwriters' discretion improves the pre-market price discovery by inducing informed investors to reveal their information in return for a favorable allocation. Ljungqvist and Wilhelm (2002) examine the hybrid bookbuilding offerings conducted in France and the UK. They find that allocation constraints, such as clawback provisions, result in smaller price revisions, smaller institutional allocations and greater underpricing.[2] Bubna and Prabhala (2011) find that, in India, when underwriters control the allocation, bookbuilding IPOs exhibit lower underpricing than fixed-price IPOs, but such effect dissipates when regulations restrict underwriters' allocation power. The authors interpret their findings as evidence in support of the bookbuilding theories, which suggest that underwriters' control over allocations assists in the pre-market price discovery.

In this study, we investigate the role of underwriters' allocation power in the IPO process from a different perspective. Specifically, we examine whether the introduction of a mandatory clawback provision, which restricts the underwriters' control over allocation, mitigates the adverse

[1] Further details on this issue can be found at http://www.ipo-book.com/blog/2011/09/20/scrapping-the-claw-back-rules/

[2] They include 19 Hong Kong hybrid offerings to provide international evidence on institutional allocations, and find that institutions receive 65% of IPO shares in the allocations.

selection costs faced by retail (small/uninformed) IPO investors.[3] We study firms that are listed in the Hong Kong Stock Exchange (SEHK). This market provides an interesting setting to examine the association between share allocation and clawback provision for at least two reasons. First, prior to 26 June 1998, underwriters in Hong Kong had discretion in allocating shares among different groups of investors. However, since then, their discretion has been curtailed by the introduction of a standardized mandatory clawback provision. Under the mandatory clawback provision, underwriters' allocation power is restricted by requiring them to reallocate to retail investors shares that would otherwise have been allocated to institutional investors. Second, underwriters in Hong Kong are required to publicly disclose the share allocations made to various parties. Such detailed information on allocations is not available in most markets since underwriters are not typically required to disclose bids or IPO share allocations (e.g., Bubna and Prabhala, 2011; Welch and Ritter, 2002).

We use Rock's (1986) information asymmetry framework to assess the impact of the mandatory clawback provision on the adverse selection costs faced by uninformed IPO investors and the effectiveness of the provision in bringing about fairness among different investor groups. Although Rock's model is generally supported by empirical studies (e.g., Amihud et al., 2003; Keloharju, 1993; Koh and Walter, 1989; Levis, 1990), there is no prior work that examines the impact of a mandatory clawback provision on the severity of the "winner's curse" problem faced by uninformed IPO investors.[4] This study seeks to fill the gap and contribute to the literature in the following ways. First, we investigate whether the introduction of the mandatory clawback provision affects the allocation of shares in underpriced and overpriced issues to investor groups with different application sizes. Following previous studies (e.g., Koh and Walter, 1989; Vong and Trigueiros, 2009), we use investors' application size as a proxy for information quality; i.e., we

[3] We use retail, small, and uninformed investors interchangeably.
[4] Boreiko and Lombardo (2011) examine 164 Italian IPOs listed on the Milan Stock Exchange. They show that, despite the presence of voluntary clawback, retail investors still end up with more shares in less profitable offerings.

assume that retail/small investors and uninformed investors belong to the same group. Second, we investigate the impact of the clawback provision on allocation-adjusted initial returns earned by different investor groups. Specifically, we argue that, if the mandatory clawback provision mitigates the unfair rationing faced by uninformed investors, its introduction should result in a significant increase (decrease) in the actual share allocation of underpriced (overpriced) IPOs to uninformed investors. The mandatory clawback provision should also result in an increase in the allocation-adjusted returns earned by uninformed investors.

We find that uninformed investors receive a higher allocation in overpriced than underpriced issues prior to the implementation of the clawback provision. However, post-clawback, uninformed investors receive more of the underpriced issues and less of the overpriced issues, consistent with the view that clawback provisions mitigate the winner's curse problem faced by uniformed investors. Specifically, we find that the chance of an uninformed investor receiving IPOs with positive (negative) initial returns is significantly higher (lower) in the post- than in the pre-clawback-provision period. We also find a significant increase in the allocation-adjusted initial returns earned by uninformed investors after the mandatory clawback initiation. The results of the multivariate analysis suggest that the impact of the clawback provision on the shares allocated to investors with small (large) application sizes remains positive (negative) and significant after controlling for listing methods, underwriter’s reputation and other firm and offering characteristics. These findings are robust to alternative measures of initial returns, to inclusion of other well-known determinants of IPO underpricing and to endogeneity concerns.

Overall, our results indicate that the introduction of the mandatory clawback in the Hong Kong IPO market has improved the way in which uninformed investors are treated in share allocations. The implication is that the Hong Kong regulatory authority should resist the deregulation pressure to scrap the mandatory clawback provision and other markets should consider introducing similar restrictions on underwriters’ discretion in order to promote fairness in the IPO

allocation process.

The remainder of the paper is organized as follows. Section 2 provides a brief review of the related literature. Section 3 describes the offering and allocation process in the Hong Kong IPO market. Section 4 describes our data set and provides some descriptive statistics. Section 5 discusses the results, while the conclusion is presented in Section 6.

2. BRIEF REVIEW OF THE LITERATURE

Overwhelming evidence from the literature suggests that IPOs are typically underpriced. The theoretical explanations for IPO underpricing are mostly based on the information asymmetry between the different parties involved in the IPO process.[5] Perhaps the best known and most studied explanation is the adverse selection model proposed by Rock (1986). Rock's model suggests that, when underwriters have discretion in allocating IPO shares, the average initial returns for uninformed investors should not be statistically different from the risk-free rate. A number of studies examine the implications of Rock's model and find consistent results in different markets (e.g., Amihud et al., 2003 (Israel); Keloharju, 1993 (Finland); Koh and Walter, 1989 (Singapore); Levis, 1990 (UK); Pons-Sanz, 2005 (Spain)).

The literature on the pricing and share allocations of bookbuilding IPOs suggests that institutional investors are generally favored by underwriters. Aggarwal et al. (2002) report that retail investors receive a smaller proportion of highly underpriced US IPOs. They also show that, on average, retail investors earn less than institutional investors from the new issues. Michaely and Shaw (1994) find that underpricing is lower for IPOs with little participation by institutional (informed) investors. Cornelli and Goldreich (2001) find that underwriters allocate more shares to investors who provide information through limit price bids. Aggarwal et al. (2002) suggest that

[5] For a detailed summary of international evidence on underpricing and detailed reviews of the theories that have been proposed to explain underpricing, see Loughran et al. (1994), Jenkinson and Ljungqvist (2001), Welch and Ritter (2002) and Ljungqvist (2007).

underwriters allocate more shares to institutional investors in IPOs with favorable pre-market information, while Jenkinson and Jones (2004) document that underwriters favor long-term investors.

Several studies also relate underwriters' allocation discretion to the price discovery process. Ljungqvist and Wilhelm (2002) argue that constraining underwriters' allocation discretion reduces institutional investors' allocation and undermines the efficiency of the price discovery process. Using a sample of 1,032 IPOs from 37 countries, the authors show that share allocations to institutional investors is almost double compared to those received by retail investors. They also show that restricting underwriters' discretion reduces institutional allocations and yields smaller price revisions, implying diminished information production. Similarly, Morales-Camarogo (2013) finds that the introduction of the clawback provision has had an adverse effect on the price discovery of the Hong Kong IPO market. Nevertheless, Chang et al. (2014) find that the price revisions of IPOs in Taiwan and Hong Kong are higher than those in the US, even though the dual-tranche bookbuilding in Taiwan and Hong Kong imposes more restrictions on underwriters' discretion than the US bookbuilding. They argue that the larger price revisions associated with the Taiwanese and Hong Kong IPOs are driven by market inefficiency rather than information production. Using variance ratios to control for the endogenous heterogeneity of price revisions related to underpricing among countries, they show that their results are not contradictory to the findings of Ljungqvist and Wilhelm (2002).

This study adds to the literature by investigating the extent to which the winner's curse depends on the level of underwriters' discretion in IPO shares allocations.[6] A few markets including Italy and the US, allow underwriters complete discretion in determining IPO share allocations to both retail and institutional investors. However, France, Germany, the UK, India, Hong Kong,

[6] Our study differs from that of Vong and Trigueiros (2009) who focus on Hong Kong IPO share allocation prior to the implementation of the clawback provision.

Malaysia, and Singapore, impose constraints on share allocations. For example, fixed-tranche deals, in which allocations to different groups of investors are fixed prior to the bookbuilding, are highly common in both France and the UK. Automatic clawback provisions, which require underwriters to transfer shares from institutional to retail investors when demand is strong, are also present in some of the hybrid transactions in the UK.[7] The Italian clawback provision is much more flexible, as it allows underwriters to reallocate shares from retail to institutional investors, and vice versa, without any restrictions (Boreiko and Lombardo, 2011).

In Hong Kong, the allocation between the retail tranche and the institutional tranche were determined by the underwriters and the issuers. However, since June 1998, underwriters have been subject to a stricter and more standardized clawback provision (see Section 3 below). The introduction of mandatory clawback in the Hong Kong IPO market provides us with a unique opportunity to investigate the extent to which the underwriters' discretion affects the severity of the winner's curse in the IPO market.

3. OFFERING AND ALLOCATION METHODS IN THE HONG KONG IPO MARKET

The Hong Kong IPO market has experienced a number of regulatory changes over the last few decades. Prior to the early 1990s, most IPOs were conducted through fixed-price offerings. Following the listing of the first H shares in July 1993, hybrid equity offerings, which involve a Hong Kong subscription for retail investors and an international placing for institutional (both domestic and foreign) investors, have become more common.[8] Allocations between the two tranches (subscription and placing) used to be left to the discretion of the underwriters and the issuers. However, following the significant decline of shares allocated to the subscription tranche in 1994 and 1995 (SEHK, 1997), the SEHK amended its listing rules on 26 June 1998 to ensure that a

[7] See Ljungqvist and Wilhelm (2002) for further discussions on the level of underwriters' discretion in different markets.

[8] H shares are defined as shares in companies incorporated in mainland China but listed on the SEHK. Red chips are defined as companies incorporated and listed in Hong Kong with controlling Chinese shareholders.

minimum of 10% of IPO shares is allocated to retail investors and a mandatory clawback provision is adopted in the cases of oversubscribed issues.[9] Under the mandatory clawback provision, underwriters are required to allocate 30% of an issue to retail investors if demand in the subscription tranche is between 15 and 50 times the initial allocation, 40% if it is from 50 to 100 times that amount, and 50% if it is greater than 100 times.

Underwriters in Hong Kong still enjoy considerable discretion over the method of allotment in the case of oversubscribed issues. When shares in the subscription tranche are oversubscribed, they are usually allocated by ballot, scaling down or a combination of the two methods.[10] When balloting is used, the chance of receiving an allocation tends (in the vast majority of cases) to be lower than unity. This is because the IPO shares are distributed to a reduced number of applicants using some form of random selection. Whilst all investors are allocated shares when the scaling-down approach is used, each investor receives only a fraction of the total number of shares they have applied.

4. DATA AND DESCRIPTIVE STATISTICS

Our initial sample includes 936 IPOs. We exclude 27 IPOs, which were listed via introduction and their offer prices are not disclosed in the prospectuses. Our final sample consists of 909 IPOs listed on the SEHK from January 1990 to the end of 2010. IPO issue statistics, including offer price, gross proceeds raised, closing, refund and listing dates, and underwriters, are obtained from the IPO prospectuses. Data on underwriters' allocations are collected from the SEHK. All prospectuses and company announcements (excluding financial statements) from January 1990 to December 1999 are collected from the SEHK. For the period between 1990 and June 1998, Lippo Asia Limited has

[9] For further details, see the SEHK consultation paper (1997). In 1994, the average size of the subscription tranche represented 31% of the total issue size, compared to 12.5% disregarding the effect of the clawback and 18.75% taking into account the maximum effect of the clawback in 1995.

[10] See McGuinness (1993) and Vong and Trigueiros (2009) for more detailed descriptions of these methods.

provided us with the data on shares allocations for 418 IPOs.[11] From July 1998 to the end of 2010, the data are hand-collected from the allocation fillings o (section on prospectus filings), on the SEHK website. The missing allocation results (39) and prospectuses (16) were obtained from the Securities and Futures Commission (SFC).[12]

Our initial dataset comprises about 33.2 million investors' applications, which spread over 1,100 different application sizes, ranging from a minimum of 50 shares (South Gobi Energy (SGE), listed in January 2010)[13] to a maximum of 2,515 million shares (Companion Building Material (CBM), listed in September 1993).[14] More specifically, the allocation data show that 3,103 investors applied for 50 SGE shares, while one investor applied for 2,515 million CBM shares. This single CBM investor resulted in the offering being oversubscribed by 36.5 times the IPO shares offered. This, in turn, led the SEHK to introduce a new requirement whereby no single application should exceed 50% of the shares on offer. We require a minimum of 20 IPOs per application size included in the final analysis. For example, within the band of 50 to 15,000 shares, there are 72 different application sizes. However, we only use 15 of these in our analysis, namely, multiples of 1,000 up to 15,000 shares. The total number of shares across these application sizes represents about 96% of investors' applications for the shares offered within this band (50 to 15,000 shares). We also exclude applications relating to cornerstone and strategic investors, as these investors receive full allocation well in advance irrespective of the demand from other investors. In other words, allocations to these two groups of investors do not depend on underwriters' discretion and should not therefore be affected by the introduction of the mandatory clawback provision.[15].

Altogether, we examine 212 application sizes, ranging from 1,000 shares to over 5 million

[11] We are grateful to David Ng at Lippo Asia Limited for allowing us to use his data for this period.
[12] We are also grateful to Richard Chow (ex-Director of Enforcement) at the SFC for providing us with the missing allocation results and prospectuses.
[13] This company offered 69 million shares and was oversubscribed by over 470 times.
[14] The subscription rate for this company was just over 21 times the 27 million shares offered.
[15] See Espenlaub et al. (2016) for a detailed description of cornerstone and strategic investors in the Hong Kong IPO market.

shares. These application sizes represent over 85% of investors' share applications. Following Vong and Trigueiros (2009), we also estimate the allocation-adjusted returns for six different investor groups (1-50k; >50k-100k; >100k-600k; >600k-1M; >1M-5M; and >5M). If an investor's application size is a proxy for information quality, it is reasonable to assume that small investors and uninformed investors belong to the same group (Koh and Walter, 1989; Vong and Trigueiros, 2009). Other data, such as the first day's closing price, the prime rate (a proxy for the borrowing rate) and the 7-day Hong Kong Inter-bank Offered Rate (HIBOR - a proxy for the risk-free rate), are obtained from DataStream, while proceeds, total assets, age and earnings before interest and tax (EBIT) are hand-collected from IPO prospectuses.

5. EMPIRICAL RESULTS

5.1 Univariate Analysis

Table 1 reports the descriptive statistics of our sample. The average initial return associated with our sample is 15.2%, which is consistent with the level of underpricing reported by earlier studies on the Hong Kong IPO market (see, e.g., Cheung et al., 1993; Chang et al., 2014; McGuiness, 1992; Morales-Camarogo, 2013). The average values of the offer price, IPO proceeds and total assets during the sample period are HK$2.664, HK$1,640 million and HK$38.6 billion, respectively. Table 1 shows that Hong Kong IPOs are generally more mature (average age about 19 years) than UK or US IPOs (see, e.g., Espenlaub et al., 2012; Hensler et al., 1997).

Table 1 also reports the descriptive statistics for the pre- and post-mandatory clawback provision periods. The average values of the raw initial returns (IPO proceeds) are significantly higher (lower) in the pre- than post-clawback period. Post-clawback IPOs are younger and underwritten by more reputable underwriters, as measured by the gross proceeds and the number of IPOs underwritten two years prior to the IPO. The average allocation-adjusted initial returns are

lower than the risk-free rate, but the magnitude of the mean is significantly larger in the pre- than in the post-clawback period.[16] Allocation-adjusted initial returns are corrected for rationing, while raw initial returns assume full allocations.

Over the full sample period, investors who applied for between 1k and 50k shares were, on average, allocated 30% of their application size, while those who applied for more than 5M were allocated only 13%. Splitting the sample into pre- and post-clawback periods, we find that the IPO share allocation to small investors has improved significantly since the implementation of the clawback provision. For instance, small investors (application size 1k-50k) were allocated 24% of their application size in the pre-clawback period compared to 39% in the post-clawback period. In contrast, big investors (i.e. application size >5M) were allocated 19% of their application size in the pre-clawback period compared to 8% post-clawback. The difference in the share allocations between the pre- and post-clawback periods is economically and statistically significant for all investor groups. Panel B shows the number of shares allocated for different application sizes. It suggests that the number of shares allocated to big investors (application size >5M) decreased significantly following the clawback initiation. Overall, the results in Table 1 show that the smaller is the application size, the higher is the allocation ratio and the number of shares allocated in the post-clawback period.

[Insert Table 1 about here]

Table 2 reports the share allocation ratios and the allocation-adjusted initial returns for

[16] We follow Koh and Walter (1989) to calculate the initial returns adjusted for rationing. In Hong Kong, retail investors are required to make full payment up front for the shares they apply for. We calculate the interest cost for each application size from the application closing date to the refund date. We account for total trading costs, which comprise the brokerage fee, the SFC transaction levy, the investor protection levy, the SEHK trading fee, and the selling costs. For the selling costs, we use a figure of 0.415%, as suggested by Fung et al. (2004). The fixed cost is assumed to be HK$100 for all application sizes, to cover the various application costs (see McGuiness, 1999).

different application sizes in the pre- and post-clawback-provision periods. Panel A presents the share allocations without rationing for the six groups of investors. The share allocations are tabulated by initial returns (overpriced vs underpriced) for the pre- and post-clawback periods. We find that investors who applied for between 1k and 50k shares received more of the overpriced issues than those who applied for over 5M shares in the pre-clawback period. However, in the post-clawback period, the small investors (1k-50k) were allocated more of the underpriced shares than they were of the overpriced ones (30% vs 22%). For big investors (>5M), the allocation of underpriced shares has been significantly lower in the post- than in the pre-clawback period (12% vs 8%).

Panel B shows the allocation results for the pre- and post-clawback periods, adjusted for rationing. We find that small investors were allocated a higher (lower) proportion of their application size in the overpriced (underpriced) offerings in the pre-clawback period (39% vs 25%). In contrast, big investors were allocated 22% of their application size in overpriced stocks and 15% in underpriced ones. However, since the clawback provision has been in place, small investors have been allocated 23% of their application size in overpriced stocks compared to 32% in underpriced offerings. By contrast, big investors have been allocated 7% of their application size in overpriced stocks and 9% in the underpriced ones. The changes in the allocations to both small and big investors following the clawback initiation are significant at the 1% level. Together, these findings suggest that small investors have benefited the most from the clawback provision. We also find evidence that the benefits of the clawback provision gradually reduce as we move towards the larger application sizes. For example, for application sizes over five million shares, investors are allocated significantly less of the underpriced offerings in the post- than in the pre-clawback provision period (8.092% vs. 11.989%).

Panel C reports the allocation-adjusted initial returns by overpriced and underpriced stocks, and by period, pre- and post-clawback provision. We find that, prior to the clawback provision

implementation, small investors earned -5.9% in the overpriced offerings compared to -5.7% for big investors. In the underpriced offerings, small investors earned 3.6%, while big investors earned 0.49%. Following the introduction of clawback, small investors have earned -2.6% from overpriced offerings and 4.6% from underpriced ones. In contrast, big investors have earned -3.7% and 0.32% in the overpriced and underpriced offerings, respectively. Collectively, the results in Panel C suggest that small investors have earned positive allocation-adjusted initial returns since the mandatory clawback initiation and have benefited the most from its introduction.

[Insert Table 2 about here]

5.2 Multivariate Analysis

We aim to investigate the relationship between the allocation and initial returns for six investor groups with different application sizes (i.e., 1-50k; >50k-100k; >100k-600k; >600k-1M; >1M-5M; and >5M), under the effect of the mandatory clawback provision. We use the following Tobit regression to examine the influence of initial returns on share allocations at the time of listing:

$$Allocation = \alpha + \beta_1 Initialreturn + \beta_2 Clawback + \beta_3 \text{Bookbuilding} + \lambda Control + \varphi YDUM + \psi INDDUM + \varepsilon, \quad (1)$$

where Allocation is the percentage of shares allocated to an investor at the time of listing; Initialreturn is the difference between the closing price on the first day of trading and the offer price divided by the offer price; Clawback is a dummy variable with a value of one for IPOs issued after the clawback initiation and zero otherwise; Bookbuilding is a dummy variable taking a value of one for bookbuilding offerings and zero otherwise; Control is the a vector of control variables, which includes underwriter reputation (Underwriter), a dummy variable with a value of one if the market

capitalization and the number of IPO firms taken public by the underwriter over the last two years are above the median, and zero otherwise, Earnings Before Interest and Tax (EBIT), size as measured by the book value of assets (LnBVA), the amount raised at the time of listing (Lnproceeds), and age at the time of listing (LnAge); YDUM and INDDUM are year and industry dummies, respectively.

Equation (1) is estimated separately for investor groups with different application sizes. A negative and significant β_1 would suggest that the higher the initial returns the lower the share allocation. We expect this effect to be more pronounced for small application sizes than for large ones. If the clawback provision improves the allocation to small investors, we expect β_2 to be positive and significant for small application sizes and negative or zero for large application sizes. IPO firms choose different listing methods, between bookbuilding and fixed-price offerings. Typically, IPO firms that use bookbuilding are likely to allocate more shares to investors with larger application sizes. We test the impact of the listing method using a dummy variable that takes a value of one if the IPO firm uses a bookbuilding method and zero otherwise. If the bookbuilding has a positive impact on the share allocation, we expect a positive and significant β_3. We control for underwriter reputation, EBIT, size, proceeds, and age at the time of listing. We further control for industry and year of listing.

Model 1 of Table 3 presents the results of Tobit regression for application sizes between 1k and 50k. The significantly negative coefficient on Initialreturn suggests that allocation to small investors is lower when the initial returns are high. The coefficient on Clawback is positive and significant at the 5% level, indicating that the clawback provision has improved share allocations to small investors. It is evident from the table that the use of the bookbuilding listing method has a positive impact on the share allocation. The negative coefficients on LnBVA and LnAge imply that small investors are allocated fewer shares of large and mature IPO. We find similar results for larger application sizes (Models 2 through 6). However, for the largest application sizes (Model 6), the

negative coefficient for the raw initial returns is nearly half of that for the smallest application sizes (-0.128 vs -0.231 in Model 1). Furthermore, the clawback provision has a negative and significant effect on large application sizes, but a positive and significant effect on small ones. These findings are consistent with the regulator's objectives to bringing some fairness to the market in terms of allocating shares among different investor groups.

[Insert Table 3 about here]

Allocation-adjusted initial returns (Adj-Initialreturn) can also influence the share allocations at the time of listing. Similar to the case of initial returns, we expect lower share allocations when allocation-adjusted initial returns are higher and we expect the effect to be stronger for smaller application sizes. To test these predictions, we re-estimate Equation (1) using Adj-Initialreturn, instead of Initialreturn, as an explanatory variable.

Table 4 shows the relationship between share allocation and allocation-adjusted initial returns for different application sizes. The significantly negative coefficient on Adj-Initialreturn in Model 1 suggests that small investors receive fewer shares of IPOs with higher allocation-adjusted initial returns. Again, for largest application size (Model 6), the magnitude of the coefficient on Adj-Initialreturn is significantly lower than that of the smallest application size (Model 1) (-0.027 vs. -1.327). The coefficients on Clawback in Models 1 through 3 are positive and significant at the 5% level, indicating that the clawback provision has improved share allocations to investors with relatively small application sizes. For larger application sizes, the coefficients on Clawback are either insignificant (Models 4 and 5) or significantly negative (Model 6), consistent with the results reported in Table 3. We also find similar effects, on average, for the other control variables.

[Insert Table 4 about here]

To investigate whether the clawback provision has improved the share allocations in underpriced issues for small investors, we interact the clawback dummy with the initial returns in the following Tobit regression:

$$Allocation = \alpha + \beta_1 Initialreturn + \beta_2 Clawback + \beta_3 \text{Initialreturn x Clawback} + \beta_4 \text{Bookbuilding} + \lambda Control + \varphi YDUM + \psi INDDUM + \varepsilon. \quad (2)$$

Comparing the coefficient on Clawback across different application groups, a positive β_3 would indicate that the clawback provision has improved share allocations to that particular group. Model 1 in Table 5 shows that initial returns are negative and significantly related to the share allocation, consistent with the results in Tables 3 and 4. Our main variable of interest is Initialreturn x Clawback. Models 1 through 4 show that coefficients on Initialreturn x Clawback associated with the applications between 1k and 1M are positive and significant. However, for applications over 1M, the coefficients on this interaction term are significantly negative (in Models 5 and 6). Taken together, these results suggest that the SEHK regulator has succeeded in protecting small investors through the introduction of the clawback provision.

[Insert Table 5 about here]

Finally, we re-estimate Equation (2) replacing Initialreturn with Adj-Initialreturn and report the results in Table 6. Model 1 shows that the coefficient on Adj-Initialreturn is negative and significant, while that on the interaction term (Adj-Initialreturn x Clawback) is positive and significant. This finding also holds for all investors who applied for up to 1M shares (i.e. Models 2 to 4). However, the coefficient on the interaction term associated with investors who applied for

over 5M shares is negative and statistically significant at the 10% level (Model 6), implying that big investors are allocated less of the heavily underpriced offerings following the implementation of the mandatory clawback provision. Overall, the results in Table 6 suggest that smaller investors have earned positive returns in the post-clawback period, while larger investors (i.e., those with application sizes of more than 5M) have earned negative returns.

[Insert Table 6 about here]

5.3. Robustness checks

In this section, we investigate the reliability of our results by performing a number of robustness tests. We summarize the results of these tests in Table 7. First, we re-estimate Equation (2) replacing Adj-Initialreturn with the market-adjusted initial returns (MRK-Initialreturn), defined as the raw returns subtracted by the contemporaneous Hang Seng Index (HIS) value-weighted returns. Our results (see Panel A) remain qualitatively the same as those in Table 6, implying that our findings are not driven by changes in the required risk premium across pre- and post-clawback provision periods.

[Insert Table 7 about here]

Second, we examine the sensitivity of our results to the inclusion of additional control variables in our models. We include the subscription rate for retail tranche (SUBRATE), defined as the number of share subscribed by individual investors divided by the number of shares assigned to the retail tranche, turnover on the first day of trading (TURNOVER), estimated as the total trading volume dividend by the number of shares offered at the time of listing.[17] We also include a crisis

[17] Jiang and Li (2014) use SUBRATE and TURNOVER as proxies of the pre-market and aftermarket sentiment,

dummy (CRISIS), which takes the value of one for IPOs issued between 2007 and 2008, and zero otherwise, and the hotness of the IPO market (HOT), measured as the number of IPO issued in a given year divided by the number of IPOs issued over the entire sample period as additional controls in Equation (2). Our results (see Panel B) remain largely unchanged, indicating that our earlier results are unlikely to be the outcome of changes in investor sentiment, market conditions or Global financial crisis.

Third, we use two-stage instrumental Tobit model to account for the possibility that allocations are endogenously determined by the same forces that affect market adjusted initial returns. In the first stage, we regress the market adjusted initial returns on offer size, offer price, book building, underwriter reputation, market returns, IPO hotness and turnover on the first day of trading.[18] In the second stage, we use the instrumental market adjusted initial returns estimated from the first stage as an explanatory variable in the allocation equation. The results in Panel C of Table 7 are qualitatively similar to those in Table 6, implying that our results not driven by endogeneity. Further we use Wald test to examine whether market adjusted initial returns is exogenous to allocations. In Panel C, the Wald test is not statistically significant at any conventional level, indicating that endogeneity does not pose a serious problem in our empirical tests.

Finally, to exclude any confounding effect from the introduction of the Hong Kong Securities and Futures Ordinance in April 2003, which changed the regulation and disclosure requirements on price stabilization activities, we re-estimate Equation (2) using data for the period January 1990 to March 2003. The results in Panel D show that our conclusions are affected by the 2003 regulatory changes.

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respectively.

[18] These control variables are employed by Banerjee, Dai and Shrestha (2011) as determinants of initial returns.

6. CONCLUSION

This study investigates the impact of the mandatory clawback provision on underwriters' IPO share allocation and the allocation-adjusted returns for various investor groups in Hong Kong. Consistent with the winner's curse, we show that the ability of investors to earn positive initial returns is minimal, due to greater allocations of overpriced IPOs and smaller allocations of underpriced issues. Interestingly, we find that the mandatory clawback provision has favored retail investors and enhanced their chances of receiving more of the underpriced IPOs and less of the overpriced ones. Furthermore, we show that the pre- (post-) mandatory-clawback allocation-adjusted returns earned by different investor groups are significantly lower than (not significantly different from) the risk-free rate. Finally, we show that the mandatory clawback provision has significantly improved share allocations to small investors. Our results provide support for the view that the mandatory clawback provision has reduced the winner's curse and brought about an element of fairness among investors. The results also show that the Hong Kong regulatory authorities should resist the deregulation pressure to scrap the clawback provision, and other countries should consider introducing similar provisions to maintain fairness in IPO share allocations.

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Table 1: Descriptive statistics

This table presents descriptive statistics for a total of 909 Hong Kong IPOs issued over the period 1990-2010. The sample is also stratified into two groups. The first group contains 389 IPOs, which were issued prior to the mandatory clawback provision initiation (i.e. prior to 26 June 1998) and the second group includes the 520 IPOs offered following the introduction of the mandatory clawback provision. Panel A reports the descriptive statistics of the following variables: Offer price is the price offered at the IPO; Raw initial returns is the difference between the closing price on the first day of trading and the offer price divided by the offer price; Proceeds are the amount raised at the time of listing; Total assets are the total assets of the IPO firm at the time of listing; Age is the age of the IPO firm measured as the difference between the IPO date and the founding date; Underwriters is a dummy variable taking a value of one if the market capitalization and the number of IPO firms taken public by the underwriter over the last two years are above the median and zero otherwise; EBIT is the earnings before interest and tax at the time of listing; Allocation-adjusted initial returns are initial returns adjusted for inflation and transaction costs and measured using Rock's model; Allocation is the percentage of shares allocated to investors at the time of listing based on application size. Panel B shows the number of shares allocated for different application sizes. The Z-scores from the Mann–Whitney test are reported to assess the difference in these variables before and after the adoption of the mandatory clawback provision.

Panel A:	Full sample			Pre clawback			Post clawback			
Variables	Mean	Median	STD	Mean	Median	STD	Mean	Median	STD	Z-Score
Offer price	2.664	1.300	5.219	2.002	1.130	2.833	3.159	1.735	6.410	-5.907
Raw initial returns	0.152	0.071	0.327	0.213	0.109	0.411	0.107	0.076	0.238	4.003
Proceeds (M)	1640.000	201.000	6060.000	478.000	111.000	1790.000	2520.000	487.000	7750.000	-8.530
Total assets (HK$ billions)	38.600	0.001	423.000	1.302	0.307	3.235	67.900	0.394	559.000	-15.256
Age	18.712	14.000	16.276	21.032	15.000	18.848	17.018	13.000	13.882	3.381
Underwriters	0.227	0.000	0.419	0.4113	0.0000	0.4927	0.881	0.000	0.284	11.498
EBIT (HK$ Millions)	137.437	66.035	417.851	87.001	31.000	244.003	187.872	101.071	591.700	-16.733
Adjusted initial returns	-0.008	-0.004	0.093	-0.0166	-0.0057	0.1014	-0.002	-0.001	0.085	-2.020
Allocations (1k-50k)	30.165	15.733	38.730	23.819	11.444	37.408	38.633	20.266	38.892	12.275
Allocations (>50k-100k)	23.592	14.618	35.527	17.871	10.226	32.342	31.225	19.352	38.103	12.622
Allocations (>100k-600k)	20.611	13.773	33.204	14.636	10.203	28.592	28.582	17.004	37.074	12.859
Allocations (>600k-1M)	19.306	13.500	31.610	26.183	16.390	34.745	14.152	10.166	27.986	12.484
Allocations (>1M-5M)	17.121	13.557	29.607	23.869	17.954	33.286	12.063	10.232	25.399	12.327
Allocations (>5M)	12.691	9.328	27.082	18.966	12.578	31.389	7.987	5.059	22.236	9.266
No of obs.	**909**			**389**					**520**	

Table 1 continues

Panel B: Number of shares allocated to investors with different application sizes										
# of shares (1k-50k)	779,298	163,852	3,539,032	718,067	89,179	4,337,642	860,991	320,722	2,036,498	-11.360
# of shares (>50k-100k)	274,261	57,516	1,140,675	217,957	100,000	332,898	316,462	24,900	1,480,229	7.832
# of shares (>100k-600k)	1,784,840	293,661	5,999,595	1,086,661	47,781	4,740,664	2,716,344	665,175	7,253,792	-14.815
# of shares (>600k-1M)	1,357,796	359,676	2,612,058	1,847,532	891,000	2,679,865	990,730	49,416	2,500,428	13.643
# of shares (>1M-5M)	721,792	195,000	1,609,699	901,476	420,922	1,722,492	587,115	50,668	1,507,379	9.885
# of shares (>5M)	1,140,253	72,810	2,543,040	1,792,135	674,850	341,0231	651,656	28,194	1,433,263	8.278
No of obs	**909**			**389**					**520**	

Table 2: Descriptive statistics

This table shows the percentage of allocations based on the size of application. Allocations (1k-50k) is the average percentage of shares allocated to investors who applied for between 1,000 and 50,000 shares at the time of listing. Allocations (>50k-100k) is the average percentage of shares allocated to investors who applied for between 50,000 and 100,000 shares at the time of listing. Allocations (>100k-600k) is the average percentage of shares allocated to investors who applied for between 100,000 and 600,000 shares at the time of listing. Allocations (>600k-1M) is the average percentage of shares allocated to investors who applied for between 600,000 and 1 million shares at the time of listing. Allocations (>1M-5M) is the average percentage of shares allocated to investors who applied for between 1 and 5 million shares at the time of listing. Allocations (>5M) is the average percentage shares allocated to investors who applied for more than 5 million shares at the time of listing. Panel A shows the results of the allocations without rationing in the pre- and post-clawback periods. Panel B shows the results of the allocations with rationing, while Panel C shows the initial returns for different application sizes adjusted for rationing. T-test overpriced is the t-test of the difference in overpriced issues between pre- and post-clawback periods. T-test underpriced is the t-test of the difference in underpriced issues between pre- and post-clawback periods.

Panel A: Allocation without rationing

	Pre clawback		Post clawback		T-test	T-test
Number of shares	Overpriced	Underpriced	Overpriced	Underpriced	Overpriced	Underpriced
Allocations (1k-50k)	67.515	27.323	22.229	29.773	-2.328	-8.191
Allocations (>50k-100k)	58.909	21.774	16.090	25.796	-2.276	-7.842
Allocations (>100k-600k)	55.806	17.988	13.115	19.288	-2.714	-8.412
Allocations (>600k-1M)	51.876	17.412	12.487	18.822	-2.279	-7.823
Allocations (>1M-5M)	48.281	15.536	10.676	15.117	-2.444	-7.979
Allocations (>5M)	39.403	11.989	7.940	8.092	-2.194	-8.209
No of obs	**290**	**99**	**357**	**163**		

Table 2 continued

Panel B: Allocation with rationing						
Allocations (1k-50k)	38.647	24.688	22.877	31.612	-4.283	-3.931
Allocations (>50k-100k)	33.453	18.651	17.026	27.967	-3.277	-4.521
Allocations (>100k-600k)	31.851	16.253	12.883	23.803	-3.691	-4.991
Allocations (>600k-1M)	29.239	15.273	12.936	21.715	-3.023	-4.745
Allocations (>1M-5M)	27.027	19.253	10.536	13.470	-3.328	-4.832
Allocations (>5M)	21.771	14.864	6.687	9.187	-3.573	-4.793
No of obs	**158**	**231**	**249**	**271**		

	Pre clawback		Post clawback		T-test	T-test
Panel C : Allocation-adjusted initial returns	Overpriced	Underpriced	Overpriced	Underpriced	Overpriced	Underpriced
Allocations (1k-50k)	-0.0590	0.0360	-0.0264	0.0459	-2.4120	-2.010
Allocations (>50k-100k)	-0.0555	0.0176	-0.0360	0.0273	-2.203	-2.419
Allocations (>100k-600k)	-0.0530	0.0181	-0.0270	0.0236	-3.433	-2.327
Allocations (>600k-1M)	-0.0480	0.0191	-0.0280	0.0245	-2.813	-2.695
Allocations (>1M-5M)	0.0000	0.0182	-0.0010	0.0153	-1.584	2.594
Allocations (>5M)	-0.0571	0.0049	-0.0367	0.0032	-7.369	2.819
No of obs	**158**	**231**	**249**	**271**		

Table 3: Regression results

The dependent variable (Allocation) is the percentage of shares allocated to an investor at the time of listing. RawInitialreturn is the raw initial returns, defined as the difference between the closing price on the first day of trading and the offer price divided by the offer price. Clawback is a dummy variable taking a value of one for IPOs in the clawback provision period and zero otherwise. Bookbuilding is a dummy variable taking a value of one if the IPO is a bookbuilding offering and zero otherwise. Underwriter is a dummy variable with a value of one if the market capitalization and the number of IPO firms taken public by the underwriter over the last two years are above the median, and zero otherwise. LnEBIT is the natural logarithm of the earnings before interest and tax.. LnBVA is natural logarithm of the book value of assets. Lnproceeds is the natural logarithm of amount raised at the time of listing. LnAge is the natural logarithm of age at the time of listing. The values in brackets are the p-values. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
RawInitialreturn	-0.231***	-0.224***	-0.215***	-0.201***	-0.194***	-0.128***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clawback	0.112**	0.022**	0.019**	0.018*	-0.002	-0.084*
	(0.018)	(0.037)	(0.042)	(0.080)	(0.983)	(0.092)
Bookbuilding	0.060**	0.057**	0.047*	0.046*	0.039*	0.016
	(0.023)	(0.044)	(0.083)	(0.085)	(0.095)	(0.115)
Underwriter	0.028	0.009	0.005	0.006	0.014	0.016
	(0.231)	(0.721)	(0.844)	(0.811)	(0.538)	(0.436)
LnEBIT	0.003	0.003	0.002	0.002	0.001	0.005
	(0.401)	(0.507)	(0.590)	(0.677)	(0.806)	(0.163)
LnBVA	-0.014***	-0.010**	-0.009**	-0.009**	-0.007*	-0.004*
	(0.004)	(0.041)	(0.046)	(0.032)	(0.061)	(0.086)
Lnproceeds	0.020**	0.014	0.008	0.006	0.008	0.004
	(0.025)	(0.129)	(0.327)	(0.414)	(0.360)	(0.659)
LnAge	-0.027**	-0.026*	-0.026*	-0.022*	-0.011	0.001
	(0.034)	(0.069)	(0.051)	(0.086)	(0.391)	(0.978)
Constant	0.190*	0.188	0.277**	0.182	0.233	-0.017
	(0.067)	(0.114)	(0.031)	(0.187)	(0.171)	(0.926)
No of obs	**909**	**909**	**909**	**909**	**909**	**909**
Industry and Year	Y	Y	Y	Y	Y	Y
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	-2.270	-54.400	-20.460	-2.820	33.410	76.500

Table 4: Regression results

The dependent variable (Allocation) is the percentage of shares allocated to an investor at the time of listing. Adj-Initialreturn is the raw initial return adjusted for transaction costs and measured using Rock's model. Clawback is a dummy variable taking a value of one for IPOs in the clawback provision period and zero otherwise. Bookbuilding is a dummy variable taking a value of one if the IPO is a bookbuilding offering and zero otherwise. Underwriter is a dummy variable with a value of one if the market capitalization and the number of IPO firms taken public by the underwriter over the last two years are above the median, and zero otherwise. LnEBIT is the natural logarithm of the earnings before interest and tax. LnBVA is natural logarithm of the book value of assets. Lnproceeds is the natural logarithm of amount raised at the time of listing. LnAge is the natural logarithm of age at the time of listing. The values in brackets are the p-values. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
Adj-Initialreturn	-1.327***	-1.250***	-1.119***	-0.846***	-0.700***	-0.027***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clawback	0.143**	0.125**	0.101*	0.078	-0.077	-0.111*
	(0.046)	(0.048)	(0.056)	(0.535)	(0.361)	(0.087)
Bookbuilding	0.046*	0.045*	0.056**	0.054**	0.010	0.016
	(0.076)	(0.077)	(0.047)	(0.046)	(0.667)	(0.217)
Underwriter	0.006	0.016	0.021	0.024	0.041*	0.010
	(0.795)	(0.499)	(0.384)	(0.256)	(0.084)	(0.461)
LnEBIT	0.003	0.002	0.004	0.004	0.004	-0.001
	(0.477)	(0.587)	(0.371)	(0.216)	(0.331)	(0.752)
LnBVA	-0.011**	-0.011**	-0.013**	-0.004	-0.015***	-0.003*
	(0.014)	(0.015)	(0.010)	(0.352)	(0.003)	(0.098)
Lnproceeds	0.015*	0.011	0.022*	0.001	0.025**	0.001
	(0.093)	(0.215)	(0.060)	(0.878)	(0.035)	(0.818)
Lnage	-0.033***	-0.027**	-0.034***	-0.002	-0.033**	-0.003
	(0.008)	(0.022)	(0.010)	(0.448)	(0.011)	(0.710)
Constant	0.089	0.027	0.048	-0.102	0.092	0.149
	(0.539)	(0.854)	(0.715)	(0.587)	(0.402)	(0.120)
No of obs	**909**	**909**	**909**	**909**	**909**	**909**
Industry and Year	Y	Y	Y	Y	Y	Y
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	3.270	-41.230	-16.610	19.420	515.230	80.420

Table 5: Regression results

The dependent variable (Allocation) is the percentage of shares allocated to an investor at the time of listing. RawInitialreturn is the difference between the closing price on the first day of trading and the offer price divided by the offer price. Clawback is a dummy variable taking a value of one for IPOs in the clawback provision period and zero otherwise. Bookbuilding is a dummy variable taking a value of one if the IPO is a bookbuilding offering and zero otherwise. Underwriter is a dummy variable with a value of one if the market capitalization and the number of IPO firms taken public by the underwriter over the last two years are above the median, and zero otherwise. LnEBIT is the natural logarithm of the earnings before interest and tax. LnBVA is the natural logarithm of the book value of assets. Lnproceeds is the natural logarithm of the amount raised at the time of listing. LnAge is the natural logarithm of the age at the time of listing. The values in brackets are the p-values. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
RawInitialreturn	-0.309***	-0.291***	-0.281***	-0.261***	-0.251***	-0.186***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clawback	0.017	0.021	0.020	0.113	-0.003	-0.085*
	(0.812)	(0.900)	(0.813)	(0.269)	(0.977)	(0.054)
Clawback x RawInitialreturn	0.223***	0.196***	0.189***	0.173**	-0.164*	-0.169*
	(0.001)	(0.003)	(0.003)	(0.039)	(0.086)	(0.081)
Bookbuilding	0.054**	0.051**	0.042*	0.040*	0.034	0.011
	(0.043)	(0.042)	(0.082)	(0.098)	(0.111)	(0.657)
Underwriter	0.030	0.010	-0.003	0.007	0.015	0.017
	(0.202)	(0.674)	(0.892)	(0.767)	(0.499)	(0.397)
LnEBIT	0.002	0.002	0.001	0.001	0.002	0.004
	(0.557)	(0.653)	(0.751)	(0.825)	(0.669)	(0.244)
LnBVA	-0.013***	-0.010*	-0.008*	-0.009**	-0.007*	-0.004
	(0.005)	(0.051)	(0.057)	(0.039)	(0.094)	(0.422)
Lnproceeds	0.020**	0.014	0.008	0.006	0.008	0.003
	(0.024)	(0.127)	(0.321)	(0.408)	(0.359)	(0.672)
Lnage	-0.027**	-0.026*	-0.026**	-0.022*	-0.010	0.001
	(0.031)	(0.066)	(0.048)	(0.082)	(0.385)	(0.475)
Constant	0.180*	0.180	0.269**	0.174	0.226	-0.024
	(0.077)	(0.125)	(0.033)	(0.200)	(0.182)	(0.895)
No of obs	**909**	**909**	**909**	**909**	**909**	**909**
Industry and Year	Y	Y	Y	Y	Y	Y
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	-5.030	-56.150	-19.180	-1.040	33.260	79.030

Table 6: Regression results

The dependent variable (Allocation) is the percentage of shares allocated to an investor at the time of listing. Adj-Initialreturn is the raw initial return adjusted for transaction costs and measured using Rock's model. Clawback is a dummy variable taking a value of one for IPOs in the clawback provision period and zero otherwise. Bookbuilding is a dummy variable taking a value of one if the IPO is a bookbuilding offering and zero otherwise. Underwriter is a dummy variable with a value of one if the market capitalization and the number of IPO firms taken public by the underwriter over the last two years are above the median, and zero otherwise. LnEBIT is the natural logarithm of the earnings before interest and tax. LnBVA is the natural logarithm of the book value of assets. Lnproceeds is the natural logarithm of the amount raised at the time of listing. LnAge is the natural logarithm of the age at the time of listing. The values in brackets are the p-values. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
Adj-Initialreturn	-1.788***	-1.738***	-1.482***	-1.200***	-1.106***	0.028***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clawback	0.211**	0.179**	0.177**	0.137*	-0.054	-0.124*
	(0.022)	(0.032)	(0.47)	(0.095)	(0.537)	(0.076)
Clawback x Adj-Initialreturn	1.234***	1.039***	0.989***	0.943**	-0.001	-0.736*
	(0.001)	(0.005)	(0.024)	(0.000)	(0.634)	(0.096)
Bookbuilding	0.048*	0.048*	0.059**	0.058**	0.016	-0.016
	(0.056)	(0.058)	(0.034)	(0.028)	(0.486)	(0.220)
Underwriter	0.013	0.004	0.019	0.038	0.023	0.010
	(0.575)	(0.875)	(0.441)	(0.109)	(0.267)	(0.497)
LnEBIT	0.001	0.002	0.003	0.003	0.003	-0.001
	(0.816)	(0.618)	(0.493)	(0.477)	(0.341)	(0.669)
LnBVA	-0.009**	-0.010**	-0.011**	-0.013***	-0.004	-0.003
	(0.025)	(0.023)	(0.017)	(0.004)	(0.402)	(0.288)
Lnproceeds	0.009	0.013*	0.020**	0.023**	-0.002	0.002
	(0.167)	(0.095)	(0.049)	(0.015)	(0.818)	(0.775)
Lnage	-0.025**	-0.031**	-0.032**	-0.029**	-0.001	-0.002
	(0.034)	(0.013)	(0.015)	(0.023)	(0.893)	(0.722)
Constant	-0.036	0.020	-0.015	-0.001	-0.123	0.129
	(0.810)	(0.897)	(0.917)	(0.993)	(0.512)	(0.182)
No of obs	**909**	**909**	**909**	**909**	**909**	**909**
Industry and Year	Y	Y	Y	Y	Y	Y
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	-5.620	-37.440	13.250	34.890	511.890	89.430

Table 7: Regression results

The dependent variable (Allocation) is the percentage of shares allocated to an investor at the time of listing. Panel A shows the regression results when the initial returns are adjusted for the market returns. MRK-Initialreturn is the initial returns adjusted for the market, defined as the raw returns subtracted by the contemporaneous Hang Seng Index (HIS) value-weighted return. Clawback is a dummy variable taking a value of one for IPOs in the clawback provision period and zero otherwise. Other control variables include Bookbuilding, Underwriter, LnEBIT, LnBVA, and LnAge, which are previously defined. Panel B includes additional control variables, namely the subscription rate for retail tranche (SUBRATE), defined as the number of share subscribed by individual investors divided by the number of shares assigned to the retail tranche, turnover on the first day of trading (TURNOVER), defined as the total trading volume divided by the number of shares offered at the time of listing, a crisis dummy (CRISIS), which takes the value of one for IPOs issued between 2007 and 2008, and zero otherwise, and the hotness of the IPO market (HOT), measured as the number of IPO issued in a given year divided by the number of IPOs issued over the entire sample period. Panel C shows the regression results after controlling for endogeneity and Panel D shows the regression results for a subsample up to March 2003.The values in brackets are the p-values. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Market adjusted	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
MRK-Initialreturn	-0.427***	-0.393***	-0.374***	-0.347***	-0.328***	0.258***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clawback	0.104***	0.123**	0.133**	0.127**	-0.039	-0.087*
	(0.003)	(0.020)	(0.039)	(0.043)	(0.222)	(0.065)
Clawback x Market-adjusted initial return	0.310***	0.279***	0.271***	0.250***	-0.036*	-0.136*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.061)	(0.052)
Other Control variables	Y	Y	Y	Y	Y	Y
No of obs	**909**	**909**	**909**	**909**	**909**	**909**
Industry and Year	Y	Y	Y	Y	Y	Y
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	-149.47	-157.52	-115.16	-94.05	-45.48	-9.96

Panel B: Sentiment and Global crisis	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
MRK-Initialreturn	-0.362***	-0.347***	-0.330***	-0.300***	-0.288***	-0.221***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clawback	0.118**	0.117**	0.109***	0.104***	-0.105**	-0.108**
	(0.037)	(0.029)	(0.003)	(0.003)	(0.041)	(0.031)
Clawback x MRK-Initialreturn	0.263***	0.235***	0.228***	0.218***	-0.0215	-0.117**
	(0.000)	(0.001)	(0.001)	(0.002)	(0.121)	(0.032)
Other Control variables	Y	Y	Y	Y	Y	Y
No of obs	**909**	**909**	**909**	**909**	**909**	**909**
Industry and Year	Y	Y	Y	Y	Y	Y
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	-109.34	-129.13	-88.16	-66.78	-22.72	-6.88

Panel C: Endogeneity	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
MRK-Initialreturn (instrumented)	-0.310**	-0.291**	-0.339**	-0.293***	-0.211**	-0.206**
	(0.011)	(0.021)	(0.030)	(0.010)	(0.040)	(0.042)
Clawback	0.146**	0.132**	0.108**	0.103**	-0.088*	-0.109**
	(0.021)	(0.031)	(0.023)	(0.033)	(0.062)	(0.011)
Other Control variables	Y	Y	Y	Y	Y	Y
No of obs	**909**	**909**	**909**	**909**	**909**	**909**
Industry and Year	Y	Y	Y	Y	Y	Y
Wald test Prob>chi2	0.220	0.240	0.206	0.383	0.376	0.216
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	-109.34	-129.13	-88.16	-66.78	-22.72	-6.88

Panel D: Jan 1990 to March 2003	Allocation (1k-50k) Model 1	Allocation (>50k-100k) Model 2	Allocation (>100k-600k) Model 3	Allocation (>600k-1M) Model 4	Allocation (>1M-5M) Model 5	Allocation (>5M) Model 6
MRK-Initialreturn	-0.238***	-0.241***	-0.230***	-0.219***	-0.222***	-0.168***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)
Clawback	0.077**	0.061*	0.058*	0.057*	-0.029	-0.073*
	(0.045)	(0.090)	(0.097)	(0.092)	(0.183)	(0.079)
Clawback x MRK-Initialreturn	0.135**	0.145**	0.147**	0.144**	-0.022	-0.114*
	(0.028)	(0.039)	(0.029)	(0.047)	(0.273)	(0.091)
Other Control variables	Y	Y	Y	Y	Y	Y
No of obs	**536**	**536**	**536**	**536**	**536**	**536**
Industry and Year	Y	Y	Y	Y	Y	Y
Prob>F	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Likelihood ratio	-139.01	-162.34	-148.83	-131.42	-119.45	-111.86