The short-run price performance of initial public offerings in Hong Kong: New evidence

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ABSTRACT

The study examines the first day returns of over 480 initial public offerings (IPO) in Hong Kong during a 12-year period (1994–2005). Based on this set of observations the study builds a comprehensive model of the short-term price performance of new offerings, in the light of the existing theoretical hypotheses about IPO underpricing. Results show clear evidence of the signaling effect of underwriters' reputation. For a set of different conditions and time periods examined, the most sought after underwriters are consistently associated with less underpriced offerings. In addition, the study shows that offerings underwritten by two or more underwriters tend to be less underpriced and that underpricing may be a signal in its own right. The study also shows that the informed demand hypothesis of Rock (1986) is supported only where some specific circumstances are verified. Finally, results confirm the recent trend (in Hong Kong) towards a less aggressive underpricing.

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1. Introduction

The short-run underpricing of initial public offerings (IPOs) is a well-documented deviation from market efficiency. Numerous studies have shown that a significant first day return can be earned by investors during IPOs. Loughran, Ritter, and Kristian (1994) is a comprehensive survey showing that the level of underpricing in 25 countries may range from 4.2% (France) to 80.3% (Malaysia). Hong Kong is no exception: Dawson and Hiraki (1985), Dawson (1987), McGuinness (1992), Chen et al. (2001), Cheng, Cheung, and Po (2004), Cheng et al. (2005) and Vong (2006) have shown that new offerings in Hong Kong are underpriced across a number of different time periods.

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Positive first day returns have perplexed practitioners and academics; and it was not until the early 1980s that theoretical explanations for this anomaly were proposed. Amongst these explanations, the informed demand hypothesis advocated by Rock (1986) seems most appealing. According to Rock, there are two types of investors, informed and uninformed. Superior information helps informed investors to decide whether an offering price is promising or not. But their participation in underpriced offerings reduces the number of shares that uninformed investors can obtain. The recognition of such an adverse selection discourages uniformed investors from investing in an IPO unless the expected return, conditional upon being allotted shares, is non-negative. Thus the incentive, in the part of issuers, is to underprice offerings.

Grounded on the model of Rock, Beatty and Ritter (1986) developed several testable hypotheses. The first is the direct relation between the uncertainty surrounding the after market clearing price and the first day returns of IPOs. As this ex-ante uncertainty is not directly observable, proxy measures, both ex-ante and ex-post, have been adopted and tested. Various IPO studies have already confirmed the positive relation between after market uncertainty and first day returns. Examples are Miller and Reilly (1987), Buckland and Davis (1990), Kim, Krinsky, and Lee (1993), Clarkson and Merkley (1994), Lee, Taylor, and Walter (1996), Chen and Mohan (2002), Cassia, Giudici, Paleari, and Redondi (2004), and Reber and Fong (2006).

Another frequently tested proposition of Beatty and Ritter (1986) concentrates on the role of underwriters in enforcing the underpricing equilibrium. According to these authors, when underwriters face speculative offerings, they lower the offering price to avoid being punished later by either issuing firms (if they underprice too much) or investors (if they underprice too little). Indeed, these authors found that underwriters who deviate from such behavior have lost market share.

McDonald and Fisher (1972), Logue (1973), Neuberger and Hammond (1974), Block and Stanley (1980), Neuberger and LaChapelle (1983), Booth and Smith (1986), Titman and Trueman (1986), Johnson and Miller (1988) and Carter and Manaster (1990) noticed that short-run excess returns tend to be smaller when new offerings are taken public by a reputed or prestigious underwriter. Authors such as Megginson and Weiss (1991) have tested this hypothesis. They adopt the number of underwritten offerings as a proxy for reputation. Carter, Dark, and Singh (1998) examine both categorical and continuous proxies for reputation, noticing that categorical proxies perform better in explaining first day returns. Bates and Dunbar (2002) also tested two reputation proxies with mixed results.

Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) have claimed that investment banks play no active role in the underpricing of IPOs except perhaps as a rationing administrator. They assume that the best information about a new firm's prospects is held by the firm itself. Selling new shares at a discount in an initial offering serves as a credible signal that a firm is sound, as only firms in good condition are able to recoup this loss after its performance is realized. The underpricing level of an IPO is therefore a signal of the post-issue or intrinsic value of a new firm.

The purpose of the paper is to build a comprehensive model of the short-term price performance of new offerings in Hong Kong over the period 1994–2005 in the light of the three theoretical hypotheses outlined above. As mentioned, these hypotheses are (1) the informed demand (Rock, 1986), (2) signaling by means of the reputation of underwriters and (3) signaling with intentional underpricing.

The interest of the new evidence offered here lies in the fact that the existing studies are not comprehensive regarding the three hypotheses just mentioned and the factors that may affect them. By examining a large sample and an extensive period of time (which, in turn, is divided in two sub-periods), the study is able to shed light on the combined role of these three effects. Moreover, although the role of an underwriter's reputation on IPOs' underpricing has been documented in US markets, in Hong Kong such type of analysis is limited.[2]

The paper is organized as follows. Section 2 presents the sample data and methodology. Section 3 reports empirical findings and the conclusion section summarizes results.

2. Data and methodology

The sample consists of all the new offerings listed on the Hong Kong Exchanges and Clearing Limited (HKEx) over the period 1994–2005, a total of 483 companies. The primary sources of data are the fact books of the HKEx and the IPO's prospectuses. From the latter, information such as the offer price, the offering size

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[2] Example of those studies are McGuinness (1992); Vong (2006); Vong and Zhao (2008) and Lin and Hsu (2008).

and the identity of underwriters can be gathered. Closing prices on the first day of trading are collected from DataStream.

The annual number of new offerings in the HKEx is depicted in Fig. 1. The IPO market reached a peak in 1997 but afterward, during a few years, the number of new companies going public remained low. One probable reason for this fall might be the establishment of a competing exchange, the Growth Enterprise Market (GEM). With the burst of the high-technology boom in 2002, IPOs picked up again.

Following the convention, the study defines first day return R_j for the j-th company as

$$R_j = \left(\frac{CP_j - OP_j}{OP_j} \right)$$

where CP_j is the closing price on the first day of trading and OP_j is the offer price at the time of offering. First day (or excess or initial) returns reflect the level of underpricing of an IPO (Dawson, 1987; Dawson & Hiraki, 1985; McGuinness, 1992).

In the study, returns R_j are regressed on a set of variables reflecting the three hypotheses discussed earlier, together with variables intended to control for other effects. Variables used in the study are now described.

As mentioned, Rock (1986) considers a market where both informed and uninformed investors are active. With superior information, the former will participate only in underpriced offerings. Thus, the higher the underpricing level, the higher the informed demand. The subscription rate (SUBR) which measures the number of times an IPO has been over- or undersubscribed, is used to proxy for the level of informed demand. This variable is expected to exhibit a positive relation with excess returns.

In the literature, both ex-ante and ex-post risk proxies are used to test or to control for the relation between ex-ante uncertainty of IPOs and first day returns. A common ex-ante risk measurement relates to the size of an IPO. Since smaller offerings are, on average, more speculative than larger ones, their first day returns may be higher. As proxies for size, the study examines both the logarithm of the offering size (LNSIZE) and of the total assets of an offering firm (LNASSET). The offer price of an IPO (OFFER) is also used as an ex-ante risk proxy since IPOs with higher offer price lead to lower levels of underpricing (Ibbotson et al., 1994; Booth and Chua, 1996; Cheng et al., 2005). With regard to the ex-post risk proxy, the study uses the standard deviation of daily returns measured between the close of the first and tenth days of trading (STD10).

Corwin and Schultz (2005) noticed that offerings where more than one underwriter is involved tend to be less underpriced, since information-gathering and price-setting activities are more efficient. In recognition of this, a variable (MULTI) is also included. This variable accords a value of one if two or more underwriters are employed in the underwriting of an offering and zero otherwise.

The study tests two proxies for the reputation of an underwriter. The first (REP1) is the market share of an underwriter as a percentage of the number of companies that have been taken public. When more than one underwriter is involved in an IPO, the average percentage is used. The natural logarithm of the capital volume of the IPOs (REP2) is also examined as an alternative proxy for reputation. When more than one underwriter is involved in an IPO, the average of this proxy is used. The two proxies (REP1 and REP2) just mentioned, assume that the reputation of an agent is reflected in either the number or the value of the offerings underwritten.
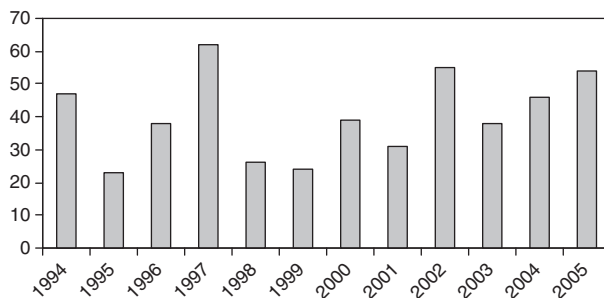

Fig. 1. Annual number of new offerings in Hong Kong: 1994–2005.

Table 1
Annual average excess return and offering size in Hong Kong: 1994–2005.

Year	No. of offerings	Excess returns				Offering size (HK$ million)			
		Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1994	47	0.035	0.0100	−0.3100	0.7200	352.58	113.3	54.06	2380.00
1995	23	0.007	0.0200	−0.5900	0.2300	188.26	102.4	50.00	1248.00
1996	38	0.162	0.0850	−0.7000	1.2500	604.52	246.3	50.00	4326.30
1997	62	0.384	0.0550	−0.8600	4.1200	654.25	239.4	25.00	3800.42
1998	26	0.054	0.0100	−0.8900	4.0800	143.31	69.94	50.00	737.46
1999	24	−0.137	−0.1050	−0.8900	0.6400	209.76	94.80	14.30	1094.29
2000	39	−0.178	−0.1000	−0.9000	0.6300	455.41	75.00	10.00	5628.00
2001	31	0.076	0.0400	−0.9000	4.4000	183.87	65.00	31.50	874.94
2002	55	0.036	0.0400	−0.8700	0.4800	254.66	70.00	16.50	6495.95
2003	38	0.061	0.0400	−0.6700	0.5000	1049.8	114.8	25.84	26713.8
2004	46	0.045	0.0150	−0.2100	0.5800	572.45	225.6	5.50	3344.37
2005	54	0.04	0.0100	−0.2300	0.4200	391.81	132.0	6.78	4668.15
Total	483	0.069	0.0200	−0.9000	4.4000	451.47	108.8	5.50	26713.8

The impact on underpricing of another type of agent, the reporting accountant/auditor, is also investigated. As with underwriters, the reputation of advising accountants is supposed to reduce excess returns (Balvers, McDonald, & Miller, 1988; Beatty, 1989; Menon & Williams, 1991; Simunic & Stein, 1987). In the study the accountant variable (ACCT) is coded as one if the accountant to an IPO belongs to the Big Six group[3] and zero otherwise.

In order to test the signaling role of underpricing, the logarithm of the market capitalization of the issuing firm at the close of the tenth day of public trading (MCAP) is included. This proxy is assumed to capture the intrinsic value of a firm. According to the signaling hypothesis, the intrinsic value should be positively related to underpricing.

Studies by Ibbotson and Jaffe (1975), Davis and Yeomans (1976) and McGuinness (1992) have shown that underpricing is higher during rising markets. Thus the average percentage change in the Hang Seng Index one month before an offering (STATE), is included in the study as a proxy for the state of the market prior to an offering.

Other control variables also tested are the age of the firm going public (AGE), the IPO taking place before or after the introduction of the GEM competing market (GEM) is established in Hong Kong, the number of firms syndicating the IPO (SYNDICATE) and the origin[4] of the firm going public (HSHARE).

3. Empirical results

Table 1 shows average excess returns and offering sizes of IPOs for each of the 12 years from 1994 to 2005. Unlike early IPO studies in Hong Kong where an underpricing level in excess of 15% was detected, in the present study such return is shown to be decreasing significantly to less than 7%. In fact, at the beginning of the examined period, average returns skyrocket to 38.44% (1997) but afterwards, with the launch of the competing market (GEM) returns become negative, −13.67% (1999) and −17.82% (2000). Finally, with the burst of the high-technology boom, returns revert to positive but small, more stable values. The average size of an offering is HK$ 451.47 million which is comparatively larger than those of the GEM market (HK$ 177.46 million, see Vong & Zhao, 2008).

Table 2 shows some correlations amongst the continuous predictors and between these and excess returns (RETURN). In order of significance, three variables are correlated with excess returns: the rate of subscription (SUBR), the state of the market (STATE) and the ex-post volatility of returns (STD10). The rate of subscription (SUBR) is in turn positively related to the size of the offering and to REP2, the proxy for

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[3] The BIG SIX group included Arthur Anderson, KPMG, Price Waterhouse, Deloitte& Touche, Coopers & Lybrand and Ernst & Young. In 1998 Price Waterhouse and Coopers & Lybrand merged into Price Waterhouse Coopers. In 2002 Arthur Anderson surrendered its licenses. Nowadays there remain only four big accounting firms.

[4] In the HKEx, an H-Share is a share from a mainland Chinese company, typically a former state owned company.

Table 2
Pearson correlation coefficients amongst some of the continuous variables used in the study.

	SUBR	LNSIZE	LNASSET	OFFER	STD10	REP1	REP2	MCAP	STATE
RETURN	0.28 **	0.08	− 0.02	0.007	0.09 *	0.005	− 0.004	0.08	0.14 **
SUBR		0.21 **	− 0.02	0.07	0.06	− 0.1	0.1 *	0.06	0.14 **
LNSIZE			0.29 **	0.33 **	− 0.05	− 0.005	0.57 **	0.4 **	− 0.01
LNASSET				0.15 **	− 0.04	− 0.01	0.24 **	0.2 **	− 0.04
OFFER					− 0.05	0.04	0.3 **	0.1 *	0.01
STD10						− 0.05	0.01	− 0.02	− 0.04
REP1							0.5 **	− 0.03	0.02
REP2								0.2 **	0.02
MCAP									− 0.03

* Significant at the 5% level.
** Significant at the 1% level.

reputation based on value. REP2 is correlated to variables such as REP1, OFFER and LNSIZE which are not directly correlated to RETURN.

The positive relationship between STATE and both RETURN and SUBR, suggests that offerings following a rising market experience a higher demand than offerings following a falling market. The positive sign of the correlation between STD10 (the ex-ante uncertainty proxy) and RETURN is a well supported characteristic of IPOs while the positive sign between LNSIZE and RETURN contrasts with some previous IPO studies.

Table 3 shows the effect of binary variables upon the mean values of some continuous variables. Binary variables divide the sample in two sub-samples and, in some cases, these sub-samples exhibit significantly different mean values.

The after market standard deviation of returns (STD10) is the less affected by any of the partitions examined. On the other extreme, the proxy for reputation (REP2) is the more affected. GEM and the reputation of accountants (ACCT) are the binary variables with a higher impact on continuous variables, the former reducing excess returns directly and the latter reducing only the rate of subscription. The floating of an H-Share increases excess returns. Importantly, the use of more than one underwriter (MULTI) lowers both subscription rates and excess returns. The impact of the number of underwriters on mean values of other continuous variables is discussed further down.

Binary variables (MULTI, ACCT, GEM and HSHARE) were also examined to determine whether they share variability amongst themselves. However, no significant linkages were found amongst them.

Table 3
Variables which exhibit significant differences in mean values across sub-samples defined by binary variables. Significance refers to two-tail equal variance t-tests.

Mean values and significance of mean differences for groups defined by binary variables	HSHARE	MULTI	ACCT	GEM
	No (63 cases)	One (289 cases)	Other (38 cases)	Before (196 cases)
	Yes (418 cases)	More (194 cases)	Big 6 (445 cases)	After (287 cases)
IPO initial return (RETURN)	0.049 no	0.01 one	0.2 other	0.17 before
	0.072 yes	0.003 more *	0.058 big 6	0.001 after **
Subscription rate (SUBR)	84.0 no	76.2 one	106.5 other	72.6 before
	63.1 yes	52.9 more	63.5 big 6 *	62.8 after
Percent change in HIS 1 month before (STATE)	0.013 no	0.01 one	0.009 other	0.0013 before
	0.089 yes	0.01 more	0.011 big 6	0.0177 after *
Proxy for reputation (REP2)	22.13 no	21.14 one	20.48 other	21.19 before
	20.94 yes **	21.04 more	21.15 big 6 *	21.03 after
After market standard deviation of returns (STD10)	0.041 no	0.044 one	0.04 other	0.029 before
	0.045 yes	0.046 more	0.045 big 6	0.038 after

* Significant at the 5% level.
** Significant at the 1% level.

Table 4
Regression model explaining IPO's excess returns in Hong Kong (1994–2005). The number of observation is 483.

Explanatory variable	Coefficient, std error and level of significance
Constant	-1.7 (0.5) **
Subscription rate (SUBR)	0.001 (0.00) **
After market standard deviation of returns (STD10)	1.5 (0.6) *
Percent change in HIS one month before (STATE)	0.8 (0.3) **
More than one underwriter (MULTI)	-0.15 (0.05) **
Market capitalization after 10 days (MCAP)	0.2 (0.2) **
Amount raised (LNSIZE)	0.4 (0.00) **
Proxy for reputation (REP2)	-0.1 (0.02) **
Adjusted *R*-square	0.275 (0.22) **

*   Significant at the 5% level.
**   Significant at the 1% level.

3.1. The model

A cross-sectional regression model explaining RETURN in terms of both continuous predictors and dummy, or binary, variables, is detailed in Table 4.

Variables not shown in Table 4 are either statistically non-significant (OFFER, REP1, ACCT, SYNDICATE, AGE) and were thus removed from the final model, or are significant but of little import to the amount of variability explained or to the study. This is the case of GEM and HSHARE (the floating of a mainland firm) which will be examined in detail later.

The positive relation between SUBR and RETURN supports the informed demand hypothesis of Rock (1986). The positive sign of STD10, a proxy of ex-ante uncertainty, suggests that the more volatile the ex-post return of an offering is, the higher the excess return will be. The direct relation between STATE and RETURN suggests that underpricing increases during rising markets and decreases during falling markets.

Unlike prior IPO studies in Hong Kong, results also support the signaling effect of underpricing as contended by Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989). Indeed, in Hong Kong, firms with a higher intrinsic value (MCAP) do experience a higher underpricing level.

Importantly, the negative influence of REP2 and MULTI in excess returns suggests that the more reputable an underwriter is, the lower the return's level of an IPO becomes. Specifically, when more than one underwriter is included in an IPO, its return level also tends to be lower. Such finding is consistent with that of Corwin and Schultz (2005) and other authors who argue that the efficiency of information-gathering and price-setting activities increases with the number of underwriters.

3.2. Further evidence: the number of underwriters and GEM

Table 3 has highlighted significant differences in the mean values of excess returns (RETURN) when IPOs involving one underwriter only are compared with IPOs using more than one underwriter.

When offerings involving one underwriter are compared with offerings where two and more than two underwriters are present, it becomes clear that these three groups of IPOs are quite dissimilar in a number of characteristics such as excess returns and offering sizes. Moreover, such differences are statistically significant. The group with just one underwriter experiences the highest excess returns of 11.43% in average while the excess returns for the other two groups are 1.71% (two underwriters) and -3.92% (more than two underwriters) on average. The offering size for the group of IPOs with one underwriter is the smallest, with an average size of HK\$ 276 million, whereas for the other two groups it is HK\$ 521 million and HK\$ 1.29E + 9 million, respectively. Since the underwriting fee is being paid out from the proceeds of an offering, it is not surprising that groups of two or more underwriters are present to underwrite larger offerings.

Given these dissimilarities, it is worth asking whether the three theoretical hypotheses being studied (informed demand, reputation of underwriters as a signal and intentional underpricing in the part of the firm going public), keep their significance when the three groups of IPOs or the two different time periods (before and after GEM) are examined separately. Thus a total of five regression models, each controlled for a specific effect, are conducted and results are shown in Table 5.

Table 5

Results from cross-sectional regression analyses of IPO underpricing: for groups with one, two, and three or more underwriters and for IPOs taken public before and after the establishment of the GEM competing market in Hong Kong.

Explanatory variables	Number of underwriters involved in an IPO			GEM market	
	One, 289 cases	Two, 146 cases	Three or more, 48 cases	Before, 196 cases	After, 287 cases
Constant	−6.1 (0.9)**	−2.4 (0.6)**	−2.02 (0.67)**	−5.5 (1.2)**	−1.56 (0.4)**
Subscription rate (SUBR)		0.00 (0.00)**	0.01 (0.00)*	0.00 (0.0)**	
After market std deviation returns (STD10)			1.9 (0.8)*	2.65 (1.37)*	0.95 (0.5)*
HSI 1 month before (STATE)	0.9 (0.4)*			0.91 (0.4)*	
Market capitalization (MCAP)	0.4 (0.04)**	0.2 (0.02)**	0.2 (0.4)**	0.48 (0.05)**	0.17 (0.02)**
Amount raised (LNSIZE)	−0.6 (0.00)**	−0.4 (0.04)**	−0.3 (0.05)**	−0.41 (0.0)**	−0.36 (0.0)*
Proxy for reputation (REP2)	−0.09 (0.03)**	−0.07 (0.03)**	−0.1 (0.04)*	−0.17 (0.05)**	−0.71 (0.02)**
Offering price (OFFER)	−0.04 (0.08)*		−0.02 (0.01)*		
H-Share (HSHARE)				0.30 (0.13)*	
No. of companies syndicating IPO (SYNDIC)				−0.17 (0.00)*	−0.10 (0.0)*
More than one underwriter (MULTI)	Not used	Not used	Not used		−0.12 (0.04)**
Before or after GEM Market (GEM)				Not used	Not used
Adjusted R-square	0.32 (0.5)**	0.56 (0.3)**	0.50 (0.2)**	0.43 (0.4)**	0.23 (0.3)**

In parenthesis are standard errors.

Non-significant variables were removed from the model.

* Significant at the 5% level.

** Significant at the 1% level.

Results are clearly consistent amongst groups and regarding the previous, all-groups regression. The negative relation between the reputation of underwriters (REP2) and underpricing is apparent for all of the groups. The negative relation between size (LNSIZE) and underpricing is also quite visible across groups and the same applies to the positive influence of market capitalization (MCAP) upon underpricing.

The exception to such consistency seems to be the subscription rate (SUBR), which is now non-significant for some groups. Indeed, for IPOs with just one underwriter, not only the subscription rate but also the ex-ante uncertainty (STD10) seems to lose their explanatory power. For IPOs with two and with three or more underwriters the state of the market (STATE) loses explanatory power as well. In turn, the offering price (OFFER), a proxy for risk which, in the all-groups model was non-significant, now becomes significant in two of the regressions.

Results confirm that the more reputable underwriters are (in terms of the capital volume of IPO underwritten), the lower the extra return. The signaling role of underpricing is also confirmed: confident firms indulge in some degree of underpricing, knowing that they will recoup their value. As for the informed demand hypothesis, it seems to be contingent on the number of underwriters: with more than one underwriter, its effect is no longer visible.

Where the sample is divided in two by the establishment of the GEM competing market (before and after) results remain consistent as also shown in Table 5: the negative relation between reputation (REP2) and underpricing is apparent for each of the time periods. The negative relation between size (LNSIZE) and underpricing is also visible in both time periods. The same applies to the positive influence of market capitalization (MCAP) upon underpricing. Therefore, whether an IPO is posterior to the introduction of GEM or not, the joint effect of the two theories on underpricing remains significant. It is again noticed that both SUBR and STATE lose their significance after the introduction of GEM. This suggests that the informed demand hypothesis is contingent on specific conditions (probably the higher volatility and underpricing levels that are characteristic of the period before the introduction of GEM).

4. Conclusion

The study shows that, no matter the time period (before or after GEM) or the number of underwriters involved in an IPO, the reputation of underwriters, together with their coalition, indeed helps to reduce

excess returns since information-gathering and price-setting activities are more efficient. The study also shows that firms facing good prospects tend to underprice more, so as to distinguish themselves from less accepted firms (the signaling effect of underpricing).

Results support the informed demand hypothesis (Rock, 1986) insofar as some conditions are met. For more than one underwriter or for IPOs posterior to the introduction of the GEM market, the hypothesis seems to lose importance. It might be speculated that either the distinction between informed and uninformed investors is becoming less sharp in the HKEx or the theory of informed demand itself is applicable to high levels of underpricing and volatility.

Indeed, soon after the introduction of the GEM marketplace in Hong Kong, average underpricing suffered a clear reduction, both in value and in volatility. IPOs carried out in the HKEx are evolving towards becoming moderately underpriced with an average return below 7% on the first trading day. When compared with previous studies, this underpricing level is low (Cheng et al., 2004; McGuinness, 1992; Vong, 2006).[5]

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