Naveen Jindal School of Management

2014-05

Investment Banks' Entry into New IPO Markets and IPO Underpricing

UTD AUTHOR(S): Suresh Radhakrishnan

Management Science

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

Investment Banks' Entry into New IPO Markets and IPO Underpricing

Simon Yu Kit Fung, Ferdinand A. Gul, Suresh Radhakrishnan

To cite this article:
Simon Yu Kit Fung, Ferdinand A. Gul, Suresh Radhakrishnan (2014) Investment Banks' Entry into New IPO Markets and IPO Underpricing. Management Science 60(5):1297-1316. http://dx.doi.org/10.1287/mnsc.2013.1817

MANAGEMENT SCIENCE
Vol. 60, No. 5, May 2014, pp. 1297–1316
ISSN 0025-1909 (print) | ISSN 1526-5501 (online)

http://dx.doi.org/10.1287/mnsc.2013.1817

Investment Banks' Entry into New IPO Markets and IPO Underpricing

Simon Yu Kit Fung
School of Accounting and Finance, Hong Kong Polytechnic University, Kowloon, Hong Kong, afsf@polyu.edu.hk

Ferdinand A. Gul
Department of Accounting and Finance, School of Business, Monash University Malaysia, Kuala Lumpur, Malaysia, ferdinand.gul@buseco.monash.edu.my

Suresh Radhakrishnan
School of Management, University of Texas at Dallas, Richardson, Texas 75083, sradhakr@utdallas.edu

We examine the relationship between investment banks' initial public offering (IPO) market shares and their prior IPO underpricing in the new IPO market for China-based companies on the Hong Kong Stock Exchange. To gain expertise in Chinese business practices, investment banks have the incentive to obtain business in this new IPO market by providing high offer prices to the issuer, leading to less underpricing and less money on the table. We hypothesize and find that the less an investment bank underprices China-based company IPOs, the greater its subsequent market share of China-based company IPOs in the Hong Kong Stock Exchange. Furthermore, this relationship is driven by a bank's initial China-based company IPO deals. These results suggest that in new IPO markets, investment banks' initial market shares, obtained through lower underpricing, help them grow their market shares in later periods, possibly through the expertise gained in the initial business.

Keywords: IPO underpricing; market share; investment banks; Hong Kong
History: Received September 1, 2010; accepted July 22, 2013, by Mary Barth, accounting. Published online in *Articles in Advance* January 2, 2014.

1. Introduction

Previous studies examining the role played by investment banks on the underpricing of initial public offerings (IPOs) and their subsequent IPO business market shares in the United States document mixed evidence. In particular, studies either find no relationship or find that the greater the underpricing by an investment bank, the greater its subsequent IPO market share (see Krigman et al. 2001, Nanda and Yun 1997, Dunbar 2000, Hoberg 2007).[1] These results suggest that competition among investment banks for IPO business does not mitigate IPO underpricing. Hoberg (2007) and Dunbar (2000) argue that investment banks that have superior ability to value companies can obtain IPO business even if they persistently underprice IPOs. A natural question is how do investment banks gain such expertise? To provide insights into this question, we examine IPO underpricing and investment banks' subsequent IPO market shares in a *new* IPO market. Specifically, we examine the IPOs of China-based companies in the Hong Kong Stock Exchange, where investment banks are likely to be on an equal footing in the initial years in terms of their ability to value these companies.

In 1993, the Chinese–Hong Kong Memorandum of Regulatory Cooperation allowed Chinese companies to be listed on the Hong Kong Stock Exchange; these shares are called H-shares. At that time, all investment banks were competing in the new IPO market on an equal footing in terms of their ability to value Chinese companies, because Chinese companies were different from Hong Kong companies and were new to these investment banks. This new IPO market provides an excellent setting to examine (a) whether investment bank competition can help mitigate IPO underpricing, and (b) whether investment banks can gain competitive advantage by obtaining the initial IPO business in new markets, i.e., learning by doing.

China-based company IPOs on the Hong Kong Stock Exchange are different from Hong Kong-based company IPOs in a number of dimensions. First, China-based company IPOs are related to state owned enterprises (SOEs), which are markedly different from privately owned Hong Kong-based company IPOs

[1] An early study by Beatty and Ritter (1986) documents the opposite result, i.e., the greater the underpricing by an investment bank, the smaller its subsequent IPO business market shares.

(Fan and Wong 2002). Second, securities, corporate, and minority rights laws are different in China, especially in comparison to Hong Kong (De Jonge 2008). Third, the relationship-based networking known as guanxi is a key component of doing business in China (Peng and Luo 2000). Given these differences between Chinese and Hong Kong companies, an investment bank's superior ability to value Hong Kong companies is not likely to translate into a superior ability to value Chinese companies. It follows that in the new market, all of the investment banks would have been on an equal footing in terms of their ability to value China-based company IPOs. The price competition would thus have been more intense for China-based company IPOs than for Hong Kong-based company IPOs. We thus hypothesize that the lower the magnitude of underpricing of China-based company IPOs by an investment bank, the higher will be its subsequent market share of such IPOs in Hong Kong; for Hong Kong-based company IPOs this relationship is not expected to exist, consistent with evidence in the United States as documented in previous studies.

The potential for China's phenomenal growth was well acknowledged in the 1990s (see Liaw 2007). Investment banks that strategically chose to expand into the Chinese market would have had the incentive to underprice China-based company IPOs in Hong Kong less, with a view to obtaining business and gaining expertise in valuing Chinese companies. In other words, obtaining China-based company IPO business in the initial years would enable investment banks to gain expertise in the new market. In addition, obtaining China-based company IPO business would enable investment banks to establish and build key relationships, i.e., guanxi, with the government and the business community, which is a key ingredient of doing business in China (Seligman 1999, Peng and Luo 2000). However, once some of the investment banks have expertise on China, the incentive to lower the magnitude of underpricing for China-based company IPOs is not as strong as in the initial deals. As such, we expect that the relationship between investment banks' lower HIPO underpricing and their higher subsequent HIPO market shares is driven by the initial few deals.[2]

Our sample consists of all China- and Hong Kong-based company IPOs handled by investment banks that handled at least one China-based company IPO in Hong Kong during 1993–2007. Similar to Dunbar (2000), we conduct an investment bank level analysis with investment banks' China- and Hong Kong-based company IPO market shares as the dependent variable. Specifically, we regress each investment bank's annual IPO market share on its average IPO underpricing over the prior two years for China- and Hong Kong-based company IPOs separately. We control for the prior years' IPO market shares and the future years' average abnormal returns and stock price volatility of the IPO companies (see Dunbar 2000). As predicted in the hypothesis, we find that the less an investment bank underprices a China-based company IPO, the greater its subsequent China-based company IPO market share; this relationship is not observed for Hong Kong-based company IPOs. We also find that the relationship between investment banks' lower underpricing of China-based company IPOs and greater subsequent market shares is stronger for the initial IPO deals.

We then provide some evidence on the benefits that investment banks gain in the Chinese financial services industry possibly from the China-related business expertise they gain by handling China-based company IPOs in the Hong Kong Stock Exchange. We do this in two ways. First, we choose one investment bank from our sample that had one of the lowest underpricing of Chinese-based company IPOs in the initial periods and held informal discussions with top-level, vice presidents about their strategy to gain entry into the Chinese financial services industry. Although the investment bank's officials did not indicate an explicit strategy of lowering the underpricing for the initial deals, the officials stated that they made all efforts to obtain the China-based company IPO business by helping issuers maximize the amount of capital raised in the offering. This additional effort helped them gain significant experience in the nuances of Chinese business practices as well as gain important competitive advantage in the Chinese financial services industry. As examples the officials cited that they were one of the first to obtain two important licenses in China: one for underwriting IPOs in the Chinese stock exchanges and one for engaging in brokerage and trading activities in China. In addition, it was chosen to handle one of the biggest Chinese company IPOs in global stock exchanges. Second, we empirically examine whether the market shares of investment bank's China-based company IPO market share in the Hong Kong Stock Exchange correlates with its subsequent market share in the Chinese financial services industry. Our empirical analyses show that the investment banks with greater market shares in the early stages of the Hong Kong Stock Exchange China-based company IPO market have greater subsequent market shares in the Chinese

[2] Hereafter we use the term lower or less underpricing to imply the lower magnitude of underpricing. For example, consider an IPO with the true valuation of \$100, which the investment bank typically offers at \$80. For China-based company IPOs due to intense competition they offer it at \$90. As such, instead of the typical \$20 underpricing, the China-based company IPO underpricing is \$10. This lower magnitude of underpricing is referred to as lower/less underpricing.

stock exchange IPO market. This provides some evidence that obtaining business of handling the initial China-based company IPOs in the Hong Kong Stock Exchange helps investment banks gain expertise in Chinese business practices and obtain increased market shares in the Chinese market as well.

We contribute to the IPO literature in two important ways. First, we provide insights into how investment banks gain expertise and become high-quality investment banks. Although Hoberg (2007) provides evidence that some investment banks persistently underprice in an established IPO market because of their superior private information, we show that investment banks exhibit lower underpricing for the first few deals when entering a new market and this enables them to gain expertise and superior private information to help them better compete in the market. Second, our findings have implications for agency issues between investment banks and IPO firms and the underpricing phenomenon.[3] Our findings suggest that agency problems between investment banks and IPO firms are indeed mitigated by competition (e.g., Baron and Holmström 1980, Baron 1982), and that the persistence of IPO underpricing in developed markets is likely due to competitive forces.

The remainder of this paper is organized as follows. Section 2 discusses the institutional setting and develops the hypotheses. Section 3 presents the empirical analyses. Section 4 provides concluding remarks.

2. Motivation, Background, and Hypotheses Development

2.1. Motivation and Background

Recent research examining the relationship between investment banks' market shares and IPO underpricing in the United States finds that IPO underpricing is either not associated or is positively associated with investment banks' market shares (see Beatty and Welch 1996, Krigman et al. 2001, Nanda and Yun 1997 and Dunbar 2000, Logue et al. 2002). These findings suggest that competition among investment banks does not mitigate IPO underpricing.

Hoberg (2007) provides one rationale for why competition does not mitigate IPO underpricing. He develops an analytical model and shows that investment banks with superior private information that leads to more accurate valuation of IPOs will exhibit more underpricing than their rivals. He then empirically shows that investment banks that underprice IPOs more will continue to do so in the future. If this underpricing persistence is driven by superior private information, then the natural question is how do some investment banks gain such expertise? We examine this question in a new IPO market setting; specifically, the IPOs of Chinese companies in the Hong Kong Stock Exchange. In this new market all of the investment banks are likely to be on an equal footing in terms of their ability to value Chinese companies. In the following section, we provide a brief institutional background and lay out the empirical expectations.[4]

2.2. Institutional Setting and Hypotheses Development

The Chinese–Hong Kong Memorandum of Regulatory Cooperation, promulgated in 1993, enables the Hong Kong Stock Exchange to accept listings of Chinese companies; shares of such China-based companies are called H-shares. H-share companies are incorporated under Chinese law and domiciled in China, and Hong Kong companies are incorporated under Hong Kong law and domiciled in Hong Kong.[5]

Investment banks' private information on Hong Kong companies and their valuation ability is not likely to translate into superior knowledge of Chinese companies, because the business environments for Chinese and Hong Kong companies are significantly different in at least three dimensions. First, the primary objective of an IPO in Hong Kong by a China-based company was to raise money for state owned enterprises that were starved of much needed capital. These companies face different agency issues than Hong Kong public companies (see Fan and Wong 2002). Second, the securities, corporate, and minority right laws were ambiguous and nascent in China. Furthermore, the importance of political connections in business and the political tensions between the provincial and the central ministries that helped shape the laws in China were not well understood (De Jonge 2008, Green 2004). Third, relationship-based business networking, known as *guanxi*, is a key component of doing business in China, primarily because judicial enforcement was not reliable, even when state agencies are involved (Xin and Pearce 1996, Seligman 1999). These differences across Chinese and Hong Kong companies contributed to the difficulties that investment banks faced when trying to translate their competitive advantage of superior private

[3] Previous studies examine the agency issues related to information asymmetry in terms of the technical knowledge and expertise of the issuer and IPO valuation/underpricing (see Shane and Stuart 2002, Babich and Sobel 2004, Berg et al. 2009, Junkunc and Eckhardt 2009).

[4] The discussion of institutional details is drawn from De Jonge (2008) and Green (2004). These studies describe the evolution of corporate and security-related rules and laws in China. De Jonge (2008) uses the first nine China-based company IPOs to illustrate how Chinese corporate and security laws evolved.

[5] Although Hong Kong is an integral part of China, the principle of "one country, two systems," is adopted and practiced.

information and/or ability to value Hong Kong IPOs to superior private information and/or ability to value China-based company IPOs. The lack of a competitive advantage in the new IPO market would increase the competition among investment banks for China-based company IPOs.

In addition, the competition among investment banks for China-based company IPOs was likely to be more intense because of China's large growth potential. The China-based company IPOs market was large; for example, Lee and Chang (2003) document that during the 1997–2002 period, 50 China-based company IPOs raised US$14.6 billion (HK$113.9 billion), representing 36.4% of the total funds raised in the Hong Kong Stock Exchange. This increased to US$36.7 billion (HK$286.3 billion) in 2006, representing 91.1% of the funds raised in Hong Kong (Anonymous 2008). A 2005 Deloitte and Touche survey finds that more than 40% of financial firms were already involved in the Chinese market in some form or another. Only 18% of the firms polled had no interest in entering the China market (see Liaw 2007).[6] To reap the benefits of the future growth potential in China, the intensity of competition among investment banks to obtain China-based company IPO business in the early period would have been high. This argument is consistent with the theoretical consequences of repeated agency problems (see, e.g., Baron and Holmström 1980, Baron 1982), which suggests that the potential for obtaining future business is a mechanism for mitigating agency problems.

These arguments together suggest that investment banks that strategically choose to gain expertise in the Chinese business market to gain future China-based company IPO market shares will underprice these IPOs less. This is stated as an empirically testable hypothesis below.

Hypothesis 1A (H1A). *The less an investment bank underprices China-based company IPOs in the Hong Kong Stock Exchange, the greater its subsequent market share of the China-based company IPO market.*

In contrast, we expect competition among investment banks for Hong Kong-based company IPOs to be similar to those in other free markets such as the United States. Similar to the United States, Hong Kong consistently ranks near the top of the roughly 154 territories/countries in the Index of Economic Freedom Report, whereas China is at the bottom of the rankings (see, for example, Gul et al. 2010, Fung et al. 2013). Thus, we expect that the relationship between Hong Kong-based company IPO underpricing by an investment bank and their subsequent IPO market shares to be similar to the findings in the United States; that is, we either expect a positive relationship or no relationship (see Krigman et al. 2001, Nanda and Yun 1997, Dunbar 2000, Hoberg 2007). We state this as a null hypothesis.

Hypothesis 1B (H1B). *An investment bank's underpricing of Hong Kong-based company IPOs in the Hong Kong Stock Exchange is not related to its subsequent market share of the Hong Kong-based company IPO market.*

Investment banks that wish to gain entry and establish a strategic presence in the China market have an incentive to underprice less in the initial deals so as to gain a competitive advantage in terms of superior private information and/or better ability to value China companies, i.e., learning by doing. Those investment banks that obtain China-based company IPO business in the initial years will build expertise in the business environment in China and gain a competitive advantage in later years. Once they obtain expertise and superior ability through the initial deals, they will be able to leverage their superior private information to their competitive advantage. Based on this learning-by-doing argument we expect H1A to be driven by the first few China-based company IPO deals.

In addition, the institutional arrangement of the quota system was removed in 2001. In 1993, China implemented a quota system for IPOs as a multistage approval system starting with the local/regional government, going up to the ministry and national party level. Each province was allotted a quota of SOEs for listing, and it was up to the local leadership to determine which firms would list.[7] Although the local and regional authorities selected the companies to be listed, it had to be de facto approved by the central authorities.[8] Legal scholars argue that the involvement of regulatory authorities was necessary in the initial years, because corporate and security laws needed to be changed and stop gap rules

[6] China formally signed the World Trade Organization agreement in 2005 to open up its financial services sector. The attractiveness comes from not only taking advantage of the economic growth, but also the potential for offering premium services to the large population base and taking advantage of the high savings rate (see Liaw 2007).

[7] The provincial governments used the quotas for SOEs that were starved for capital, and such SOEs were not necessarily the best candidates for listing based on the economics of the enterprise itself. To meet the listing requirements in Hong Kong, SOEs were restructured and bundled so that the profitability requirements could be met. In some cases, the management personnel did not know each other until just before going public. As such, China-based company IPOs are not necessarily better performers when compared to IPOs issuers of the local Hong Kong firms.

[8] De Jonge (2008) illustrates how tensions between central and provincial authorities in China affected the choice of IPOs candidates. For example, localities that failed to subscribe to the assigned state treasury bonds by the central Finance Ministry were not given a preference in the allocation of listing quotas.

needed to be instituted as part of the evolution of corporate and security laws. Up until 2000 when the quota system was eliminated, the de facto issuer was the government. The investment banks could not conduct conferences, identify good target companies, or market their services effectively in the initial years.

In essence, the competitive intensity among investment banks in the initial years is likely to be high either because of the institutional arrangement of the quota system or the learning by doing. Although it is difficult to disentangle the effects of institutional arrangement from learning by doing, we expect H1A to be driven by the initial deals of China-based company IPOs when the investment banks are gaining expertise. This is formally stated in the following hypothesis.

Hypothesis 2 (H2). *The relationship between an investment bank's lower underpricing of China-based company IPOs in Hong Kong and its greater subsequent market share of the China-based company IPO market is stronger in the investment bank's initial China-based company IPO deals than in later deals.*

One important alternative explanation for H1A and H2 stems from the investors' demand for China-based company IPOs. Specifically, if the investors' demand for China-based company IPOs is low in the initial years because of the uncertainty of China's transition to the market-based economy, and higher in later years, then the underpricing would exhibit an increasing trend (Derrien 2005). We address this explanation in three ways. First, we employ a reverse regression specification (see Equations (1) and (2)), in which we regress current IPO market shares on lagged IPO underpricing at the investment bank level so that the time-varying investor demand is controlled by year fixed effects. Second, we include the ex post stock market-based measures of uncertainty and performance to control for investor demand, similar to Dunbar (2000). Third, we use the IPO underpricing model to test the hypotheses, which enables us to include trend, revision of offer price, and first day trading volume to control for trends in investor demand.

3. Empirical Analyses

3.1. Sample and Data

We consider all 103 China-based company IPOs in the Hong Kong Stock Exchange (HIPOs) from 1993 to 2007. After eliminating nine IPOs that belong to the financial industry and the nine that have offer price to sales ratios greater than 10, our final sample contains 85 China-based company IPOs.[9] We hereafter refer to the China-based company (H-shares) IPOs in the Hong Kong Stock Exchange as HIPOs and the Hong Kong company IPOs as HKIPOs. Corresponding to the HIPOs, we consider all of the nonfinancial HKIPOs ($N = 236$) for which prospectuses are available, that are handled by investment banks that have also handled at least one HIPO. This matching of HKIPOs to the investment banks that have handled HIPOs controls for the institutional investor-clientele effect and the investment banks' business-related expertise. The stock prices and financial information are from the PACAP and OSIRIS databases. The sample selection criteria are summarized in panel A of Table 1.

Panels B and C of Table 1 provide the distribution of the sample by year and industry. Panel B shows that there are roughly two to four times as many HKIPOs as HIPOs each year, with the exception of 2003 and 2006 when the number of HIPOs are similar to the number of HKIPOs, and in 2007 when there are 10 times as many HKIPOs as HIPOs. Thus, in general the HIPOs and HKIPOs follow the trend of "hot" and "cold" IPO periods.[10] Fifty-seven percent of the HKIPOs and 66% of the HIPOs belong to the "Industrials" sector, i.e., the industry distribution of the HIPOs and HKIPOs are roughly similar. This is partly attributable to the investment bank matching criterion.

IPO underpricing is measured by the day-one-return, D1R, computed as the end of day-one price over offer price minus one. Figure 1 plots the D1Rs of the HKIPOs and HIPOs in the sample. The D1Rs of the HKIPOs are generally higher than those of the HIPOs in the initial years (before 2002); in later years (after 2002), the D1Rs of the HIPOs are similar to (and in some years higher than) those of the HKIPOs. In essence, the HIPO D1Rs exhibit an increasing trend over the period. One potential explanation for this phenomenon is based on demand side arguments. Benveniste and Spindt (1989) show that underpricing is necessary to stimulate investor

[9] Of the nine China-based company IPOs deleted, five are companies engaged in large infrastructure projects such as railways and expressways, three are engaged in mining, and one is in oil and gas exploration. Correspondingly, we do not consider the 45 IPOs of Hong Kong-based companies with offer price to sales ratio of greater than 10 (for the sample of Hong Kong-based company IPOs, there are a few investment companies in addition to oilfield services and infrastructure construction companies). The business models of these firms require capital before revenues can be generated. As such, the prior sales are very low or nonexistent in most of these cases. Expertise in these business models may not translate into general expertise in Chinese business. However, to the extent that this enables investment banks to establish relationships with government officials and the business community these China-based company IPOs may be strategically important. As a sensitivity test, we include these observations and find similar results.

[10] The annual distribution of the HKIPOs handled by investment banks that have not handled any of the HIPOs shows a similar to pattern to the HKIPOs in panel B. In total there are 268 such HKIPOs.

Table 1 Hong Kong Stock Exchange IPOs from 1993 to 2007

Panel A: Sample selection

	HKIPOs	HIPOs	Total
IPOs from 1993 to 2007	610	103	713
Less:			
Financial institutions or investment firms (with no sales data)	(58)	(9)	(67)
Missing prospectuses	(3)	—	(3)
Offer price to sales ratios (P0) with extreme values	(45)	(9)	(54)
HKIPOs[a] with IBs that never handle HIPOs	(268)	—	(268)
Final sample	236	85	321

Panel B: IPOs by year

Year	HKIPOs	HIPOs	Total	HKIPOs[a]
1993	34	6	40	15
1994	24	9	33	15
1995	9	2	11	11
1996	12	5	17	15
1997	28	13	41	27
1998	5	1	6	20
1999	8	3	11	14
2000	11	2	13	15
2001	7	3	10	18
2002	9	4	13	29
2003	7	8	15	18
2004	23	7	30	10
2005	14	7	21	30
2006	13	12	25	13
2007	32	3	35	18
Total	236	85	321	268

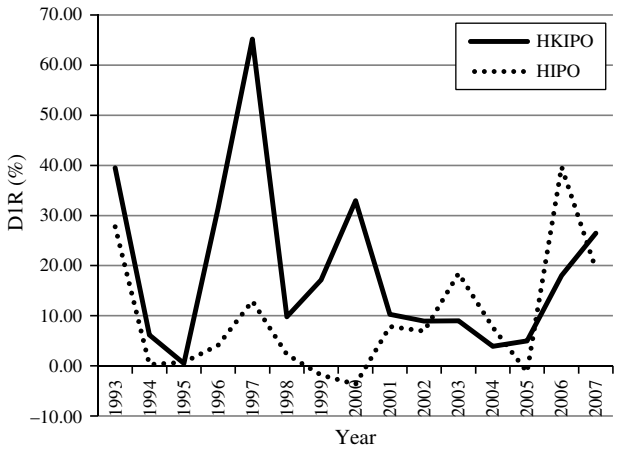
Panel C: IPOs by industry

Industry groups	HKIPO	HIPO	Total	HKIPOs with IBs that never handle HIPOs
Utilities	6	4	10	2
Properties	13	5	18	13
Consolidated enterprises	79	16	95	76
Industrials	135	56	191	175
Hotels	2	0	2	1
Others	1	4	5	1
Total	236	85	321	268

[a]These are the HKIPOs handled by investment banks that never handle HIPOs and are not included in our main test sample. This information is reported for the purpose of comparison.

demand. Derrien (2005) analytically demonstrates and provides evidence that investor demand is positively associated with IPO underpricing. Thus, the trend in HIPO underpricing could be driven by the changes in investor demand instead of completion and learning by doing. To mitigate the problem of investor demand driving our results, we consider investment banks' market shares as the dependent variable in our primary research design (see the following section). Furthermore, in an additional test using the IPO underpricing model, we include the first day trading volume and revision in offer price to control for investor demand.

Figure 1 Trend of Mean Day-One Returns (D1R)



3.2. Investment Banks' Market Shares and Prior IPO Underpricing: Test of H1

To test H1A and H1B, we regress the investment bank's IPO market share on the lagged investment bank's IPO underpricing. The unit of analysis is the annual market share of each investment bank that has handled at least one HIPO during the sample period. We estimate the following equation:

$$HIPOMS_t \text{ or } HKIPOMS_t = \alpha + \beta_1 HIPOD1R_{t-1,\,t-2} + \beta_2 HKIPOD1R_{t-1,\,t-2} + \delta_i X_i, \quad (1)$$

where HIPOMS (HKIPOMS) is the investment bank's market share in year t and is measured as the proportion of HIPO (HKIPO) offer proceeds that the investment bank handles in year t.[11] In cases when more than one lead investment bank handles the same IPO, the offer proceeds are allocated equally among these lead investment banks to compute their market shares.[12] The dependent variable is HIPOMS (HKIPOMS) to test H1A (H1B).

The test variable for H1A (H1B) is $HIPOD1R_{t-1,\,t-2}$ ($HKIPOD1R_{t-1,\,t-2}$), computed as the offer size-weighted average D1R of the HIPOs (HKIPOs) handled by the investment bank over the previous two

[11] Alternatively, we measure the investment bank's market shares as the number of HIPO and HKIPO over the total number of HIPO and HKIPO, respectively, and obtain similar results.

[12] We also consider the following two ways of allocating offer proceeds to the lead investment banks: (1) the total offer proceeds is allocated to each investment bank because these banks have a joint and several liability and hence have an equal incentive to learn about Chinese business (note that the annual market share in this method can be greater than 100%); (2) allocating offer share proceeds based on the investment bank's prior two year's HKIPO and HIPO market shares, i.e., weight the market share by prior experience. The results are similar to those reported here.

years.[13] Based on H1A (H1B), we expect β_1 (β_2) to be negative (positive or zero) when the dependent variable in Equation (1) is HIPOMS (HKIPOMS). We estimate Equation (1) using the ordinary least squares (OLS) procedure and correct the standard errors by clustering on investment bank and year.[14]

We include the lagged market shares of HIPOs and HKIPOs to control for investment bank quality effects. The inclusion of a lagged dependent variable as an additional explanatory variable makes the research design equivalent to a change specification in the econometric sense.[15] We also include the average prior D1Rs of an investment bank's HKIPOs (HIPOs) over the previous two years when the dependent variable is HIPOMS (HKIPOMS), to control for investment bank specific effects that influence all of the IPOs; this allows us to explore the spillover effects of the HKIPOs onto HIPOs (or HIPOs onto HKIPOs).

To control for the nature and type of IPOs handled by specific investment banks, we include the average value-weighted market-adjusted abnormal returns and volatility for the HIPOs and HKIPOs for the three years after the IPO, corresponding to the IPOs in years $t-1$ and $t-2$ that were handled by the investment bank. Specifically, these ex post measures of uncertainty control for the difference in the uncertainty associated with the valuation of the HIPO and HKIPO firms and investor demand factors that are likely to be correlated with the test variables, HIPOD1R and HKIPOD1R in years $t-1$ and $t-2$ (see Dunbar 2000). All variable definitions are included in the appendix.

The sample for the analysis includes 40 investment banks for each sample year.[16] Because we need data for two years prior to year t, the test period covers 13 years from 1995 to 2007, resulting in a test sample of 520 (40 investment banks $\times$ 13 years). Therefore, the first HIPOs of the investment banks that obtained HIPOs in 1993 and 1994 are not considered. However, for the investment banks that handled their first HIPO after 1994, the first HIPO is considered the dependent variable, with the test variable HIPOD1R being zero by design. We follow a similar procedure for the HKIPOs.[17]

Panel A of Table 2 presents the descriptive statistics of the variables. The mean HIPO market share (HIPOMS) is 4%, and the mean HKIPO market share is 1%, i.e., 0.01. This shows that HKIPOs are more uniformly distributed across the investment banks than HIPOs. The lagged HIPO (HKIPO) underpricing is 3% (2%). More than 75% of the market shares are zero, because if in a year an investment bank is not a lead investment bank for any IPO, the market share is measured as zero; the assumption here is that all of the 40 banks actively compete for the IPO and some fail to win any underwriting business for a year. To the extent that some of the zero market shares reflect an investment bank's strategic choice to not compete for IPOs, it should lower the explanatory power of the model. Panel B of Table 2 provides the correlations among the variables. The correlation between the lagged HIPOD1R and HIPOMS is -0.16 and is statistically significant at the 1% level, which is consistent with H1A. The correlation between the lagged HKIPOD1R and HKIPOMS is 0.11 and is significant at the 1% level, which is consistent with H1B.

Panel C of Table 2 provides the results of estimating Equation (1). The first (last) two columns present the results with the dependent variable HIPOMS (HKIPOMS). We show the results with and without the future performance of the IPO variables because, by design, one year of the future IPO performance includes the year of the dependent variable. As predicted in H1A, for the model including all of the control variables, the coefficient estimate on $\text{HIPOD1R}_{t-1,\,t-2}$ is -1.03 (t-statistic $= -3.82$) when the

[13] We consider the following three ways of averaging D1Rs: (1) abnormal D1R, computed as the difference between D1R and predicted D1R based on the D1R determinant model in Equation (4) (without the HIPO indicator variables, i.e., test variables) to account for investor demand driven factors associated with D1Rs; (2) annual mean-differenced D1R over all HIPOs and HKIPOs, respectively, to account for year effects in D1Rs; and (3) issuer's sales-weighted D1R to account for client size on investor demand. The results are similar to those reported here.

[14] Given the number of zeros in the dependent variable, we use the Tobit procedure in a sensitivity test and obtain similar results. We also use the seemingly unrelated regression (SUR) procedure because the residuals of Equation (1) when HIPOMS and HKIPOMS are the dependent variables are likely to be correlated. In addition, the SUR procedure allows us to statistically test the difference between β_1 and β_2 when the dependent variables are HIPOMS and HKIPOMS, respectively, which are reported.

[15] In a sensitivity test we estimate Equation (1) using the change in market shares as the dependent variable and obtain similar results.

[16] We eliminate two China-based state owned investment banks (BOCI Asia Ltd. and China International Capital Corporation) and consider only the Hong Kong-based investment banks because they face a different incentive structure. Liaw (2007) provides examples of how the Chinese authorities groom their banks to learn Western market-based financial economics with the ultimate objective of becoming globally prominent banks. The incentives for these banks are different for at least two reasons. First, these banks do not face intense competition as the other investment banks in obtaining HIPO business. Second, instead of learning about China businesses, their objective would have been to learn and establish relationships with Hong Kong investors. As such, these banks have an incentive to "favor" the investors and thereby increase underpricing. To test H1A and H1B, we eliminate these investment banks.

[17] We follow the same procedure for HKIPOs as well. As such, HKIPOs serve as a pseudo-control for any bias we may induce from this measurement choice. In a sensitivity test, we exclude all of the HIPOMS that pertain to the first deal within the sample because by definition the prior D1Rs for these observations are zero and the results are similar to those reported in the paper.

Table 2 Investment Banks' Market Shares and Prior IPO Underpricing

Panel A: Descriptive statistics ($N = 520$)

Variable	Mean	Std. dev.	Min	Q1	Median	Q3	Max
$HIPOMS_t$	0.04	0.14	0.00	0.00	0.00	0.00	1.00
$HKIPOMS_t$	0.01	0.04	0.00	0.00	0.00	0.00	0.42
$HIPOD1R_{t-1,t-2}$	0.03	0.30	−2.74	0.00	0.00	0.00	3.68
$HKIPOD1R_{t-1,t-2}$	0.02	0.14	−0.07	0.00	0.00	0.00	2.64
$HIPORET3_{t-1,t-2} \times 100$ (%)	−0.03	0.40	−6.96	0.00	0.00	0.00	0.52
$HKIPORET3_{t-1,t-2} \times 100$ (%)	0.00	0.18	−2.50	0.00	0.00	0.00	1.39
$HIPOVOL3_{t-1,t-2} \times 100$ (%)	0.03	0.27	0.00	0.00	0.00	0.00	5.22
$HKIPOVOL3_{t-1,t-2} \times 100$ (%)	0.02	0.08	0.00	0.00	0.00	0.00	1.37

Panel B: Correlation (p-values are reported in parentheses)

Variable	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) *HIPOMS*	0.21 (0.00)	−0.16 (0.00)	0.25 (0.00)	−0.01 (0.77)	0.10 (0.03)	0.01 (0.80)	0.08 (0.06)
(2) *HKIPOMS*		−0.05 (0.27)	0.11 (0.01)	−0.15 (0.00)	0.11 (0.01)	0.10 (0.02)	0.13 (0.00)
(3) $HIPOD1R_{t-1,t-2}$			0.11 (0.01)	0.36 (0.00)	−0.12 (0.01)	−0.41 (0.00)	0.07 (0.11)
(4) $HKIPOD1R_{t-1,t-2}$				0.01 (0.87)	0.12 (0.01)	0.03 (0.56)	0.21 (0.00)
(5) $HIPORET3_{t-1,t-2}$					−0.03 (0.49)	−0.95 (0.00)	−0.05 (0.21)
(6) $HKIPORET3_{t-1,t-2}$						0.00 (0.98)	−0.38 (0.00)
(7) $HIPOVOL3_{t-1,t-2}$							0.01 (0.81)
(8) $HKIPOVOL3_{t-1,t-2}$							1.00 NA

Panel C: Estimating Equation (1) ($N = 520$) based on OLS with clustered standard errors

	Dependent variable: $HIPOMS_t$							Dependent variable: $HKIPOMS_t$						
Variables	Pred. sign	Coef.	t-stat.	p-value	Coef.	t-stat.	p-value	Pred. sign	Coef.	t-stat.	p-value	Coef.	t-stat.	p-value
			(I)			(II)				(III)			(IV)	
Test variable														
$HIPOD1R_{t-1,t-2}$	−	−1.02	−3.80	0.00	−1.03	−3.82	0.00	?	−0.06	−0.91	0.36	−0.07	−1.09	0.28
$HKIPOD1R_{t-1,t-2}$	?	0.22	4.76	<0.01	0.21	4.50	<0.01	+	0.01	0.67	0.50	0.01	0.90	0.37
Controls														
$HIPOMS_{t-1,t-2}$	+	0.20	0.64	0.52	0.19	0.60	0.55	?	−0.11	−1.34	0.18	−0.06	−0.72	0.47
$HKIPOMS_{t-1,t-2}$	?	0.45	0.64	0.52	0.29	0.40	0.69	+	0.66	3.58	0.00	0.50	2.68	0.01
$HIPORET3_{t-1,t-2}$	?				−0.01	−0.47	0.64	?				−0.03	−3.80	0.00
$HKIPORET3_{t-1,t-2}$	?				0.00	−0.02	0.98	?				−0.02	−2.48	0.01
$HIPOVOL3_{t-1,t-2}$	?				0.04	0.86	0.39	?				0.00	0.13	0.90
$HKIPOVOL3_{t-1,t-2}$	?				0.05	1.35	0.18	?				0.03	2.87	0.00
Year fixed effect			Yes			Yes				Yes			Yes	
Adjusted R^2			0.10			0.10				0.10			0.14	

HIPO market share is the dependent variable. The results are similar when the future performance variables are not included. In addition, the lagged HKIPOD1R is positively related to the HIPO market share, indicating a spillover effect, possibly due to investor clientele as argued in Hoberg (2007).

As predicted in H1B, for the model including all of the control variables, the coefficient estimate on $HKIPOD1R_{t-1,t-2}$ is 0.01 (t-statistic = 0.90) when the HKIPO market share is the dependent variable. We test the difference in the coefficient estimates on $HIPOD1R_{t-1,t-2}$ in the HIPOMS regression, and the $HKIPOD1R_{t-1,t-2}$ in the HKIPOMS regression, using the seemingly unrelated regression procedure; the difference is statistically significant (F-statistic = 14.83). The results are similar when the future returns and price volatility controls are excluded from the model.[18]

[18] In a sensitivity test, we include *TREND* in Equation (1) and find that the coefficient on TREND for HIPOMS is 0.0004 (t-statistic = 0.14) and for HKIPOMS it is 0.0004 (t-statistic = 0.59); all of the other results are similar.

As mentioned earlier, the assumption in the research design is that all of the 40 investment banks compete for all of the HIPOs and HKIPOs in all of the years in our sample period. However, it is possible that an investment bank will strategically choose not to compete in a particular IPO market in a given year, and therefore it might not be valid to treat them as being unsuccessful in obtaining a future market share and assign them zero market shares. Specifically, based on this assumption, the market shares of more than 75% of the observations are zero for both HIPOs and HKIPOs. Since we use the same measurement procedure for both HIPOs and HKIPOs, and obtain results supporting H1A (negative association between prior day one returns and market shares for HIPO) and H1B (no association between prior day-one returns and market shares for HKIPOs), HKIPOs act as a pseudo-control and provide a degree of confidence that our results are not driven by this assumption. However, to check if our results are affected by this assumption, we perform a battery of sensitivity tests. First, we eliminate observations with zero HIPOMS, under the assumption that these investment banks did not compete in the HIPO market in those years. There are 160 observations satisfying this criterion. Using this sample, we repeat the main analyses of Table 2, panel C. We find that the coefficient on $\text{HIPOD1R}_{t-1,\,t-2}$ is -1.11 (t-statistic $= -3.21$) when HIPOMS_t is the dependent variable, and the coefficient on $\text{HKIPOD1R}_{t-1,\,t-2}$ is 0.04 (t-statistic $= 1.21$) when HKIPOMS_t is the dependent variable; the difference is statistically significant (F-statistic $= 7.37$).

Second, we eliminate observations with zero HKIPOMS, resulting in a sample with 221 observations. We do this to ensure that the investment banks are active at least in the HKIPO market so the zero HIPOMS are less likely to be cases where the investment banks strategically chose not to compete in the HIPO market in a given year. The results corresponding to panel C of Table 2 using this sample show that the coefficient on $\text{HIPOD1R}_{t-1,\,t-2}$ is -1.81 (t-statistic $= -2.88$) when HIPOMS_t is the dependent variable and the coefficient on $\text{HKIPOD1R}_{t-1,\,t-2}$ is 0.05 (t-statistic $= 1.36$) when HKIPOMS_t is the dependent variable; the difference is statistically significant (F-statistic $= 8.66$).

Overall, the results reported in panel C of Table 2 and the sensitivity analysis eliminating the observations with zero HIPOMS or HKIPOMS provide support for both hypothesis H1A and H1B and suggest that our results are not driven by the discussed assumption.[19]

[19] For both of the these samples, the tests of H2 are also similar to those reported in panel B of Table 3.

3.3. Initial vs. Later HIPO Deals, and the Relationship Between Investment Banks' Market Shares and Prior IPO Underpricing: Test of H2

Panel A of Table 3 presents the HIPO underpricing and the number of HIPOs handled by investment banks. We use the year 2000 as the cut-off year because in this year the quota system for choosing HIPOs was eliminated and the move toward a market-driven selection was initiated (see the discussion preceding H2). For the 1993–2000 (2001–2007) period, the mean IPO underpricing, i.e., the D1R, for the HIPOs of the investment banks that handle five or less HIPOs is 17% (27%) compared with 9% (13%) for the HIPOs of investment banks that handle more than five HIPOs. This provides initial support for H2. To test H2, we augment Equation (1) as follows:

$$\begin{aligned} HIPOMS_t = {} & \alpha + \beta_1 INITIAL * HIPOD1R_{t-1,\,t-2} \\ & + \beta_{1P} LATER * HIPOD1R_{t-1,\,t-2} \\ & + \beta_2 HKIPOD1R_{t-1,\,t-2} + \delta_i X_i, \end{aligned} \tag{2}$$

where INITIAL is measured using two proxies. The first proxy is based on the institutional regime change in 2000 that removed the quota system (see discussion of H2), i.e., INITIAL = PRE2000. The second proxy is based on the first five HIPO deals, i.e., INITIAL = FIRST5. Specifically, if the $\text{HIPOD1R}_{t-1,\,t-2}$ corresponds to the first five deals, INITIAL is 1. This measure directly captures the learning-by-doing and building expertise processes with respect to HIPOs. Correspondingly, when INITIAL is 0, LATER is 1, and vice versa. We expect β_1 to be negative based on H2.

There are two noteworthy points about the proxy for INITIAL. First, the measurement of the proxies does not have a look-ahead bias in the sense that in any given year we do not need information about the future success of the investment bank to code the measure. On the other hand, LATER is more likely to be correlated with investment banks that are more successful (in terms of larger HIPO market shares). However, this correlation between LATER and higher market shares by itself need not lead to the differential relationship between day-one returns and market shares stated in H2. Second, as noted in the discussion of H2, disentangling the learning-by-doing and regime-change effects is difficult, given the small number of initial HIPOs handled by investment banks after the elimination of the quota system, even though we have the total population of HIPOs.

Panel B of Table 3 provides the results of estimating Equation (2). The first (last) column presents the results for INITIAL = PRE2000(INITIAL = FIRST5). The coefficient estimate on HIPOD1R in the PRE2000

Table 3 Investment Banks' Market Shares and Prior IPO Underpricing, Initial vs. Later Deals/Periods

Panel A: IPO underpricing by number of HIPOs handled by investment banks

	China-based IBs	≤5 HIPOs handled	≥6 HIPOs handled	Total
HIPOs handled: All years	19	24	42	85
HIPOs handled: 93–00	1	17	23	41
HIPOs handled: 01–07	18	7	19	44
Mean D1R: All years	0.18	0.20	0.11	
Mean D1R: 93–00	−0.03	0.17	0.09	
Mean D1R: 01–07	0.19	0.27	0.13	

Panel B: Estimating Equation (2) based on OLS with clustered standard errors; dependent variable: $HIPOMS_t$ ($N = 520$)

		INITIAL = PRE2000 LATER = POST2000			INITIAL = FIRST5 LATER = AFTER5		
Variables	Pred. sign	Coef.	*t*-stat.	*p*-value	Coef.	*t*-stat.	*p*-value
Test variable							
$HIPOD1R_{t-1,t-2}$(INITIAL)	−	−1.36	−2.77	0.01	−1.11	−3.81	0.00
$HIPOD1R_{t-1,t-2}$(LATER)	?	0.28	7.49	0.00	−0.68	−1.01	0.31
$HKIPOD1R_{t-1,t-2}$	?	0.01	0.12	0.91	0.23	4.95	0.00
Controls							
$HIPOMS_{t-1,t-2}$	+	0.56	1.89	0.06	0.01	0.02	0.98
$HKIPOMS_{t-1,t-2}$	?	−0.24	−0.35	0.73	0.39	0.54	0.59
$HIPORET3_{t-1,t-2}$	?	0.01	0.42	0.68	−0.01	−0.17	0.86
$HKIPORET3_{t-1,t-2}$	?	−0.01	−0.40	0.69	0.01	0.53	0.60
$HIPOVOL3_{t-1,t-2}$	?	0.03	0.72	0.47	0.13	3.61	0.00
$HKIPOVOL3_{t-1,t-2}$	?	0.05	1.45	0.15	0.03	0.92	0.36
Year fixed effect			Yes			Yes	
Adjusted R^2			0.18			0.12	
INITIAL minus LATER		*F*-stat.	11.03		*F*-stat.	4.57	
		p-value	0.00		*p*-value	0.03	

Panel C: Estimating Equation (1) ($N = 40$) based on OLS

	Dependent variable: *HIPOMS*(POST2000)				Dependent variable: *HKIPOMS*(POST2000)			
Variables	Pred. sign	Coef.	*t*-stat.	*p*-value	Pred. sign	Coef.	*t*-stat.	*p*-value
			(I)				(II)	
Intercept	?	−0.02	−1.33	0.19	?	−0.01	−0.95	0.35
Test variable								
HIPOD1R(PRE2000)	−	−0.05	−2.71	0.01	?	−0.01	−0.53	0.60
HKIPOD1R(PRE2000)	?	0.36	1.09	0.28		0.70	2.05	0.05
Controls								
HIPOMS(PRE2000)	+	0.34	2.00	0.05	?	0.20	1.17	0.25
HKIPOMS(PRE2000)	?	0.09	0.70	0.49	+	0.77	6.02	<.01
HKIPORET3(PRE2000)	?	−2.65	−1.02	0.31	?	0.95	0.36	0.72
HIPORET3(PRE2000)	?	1.07	0.70	0.49	?	1.14	0.72	0.47
HKIPOVOL3(PRE2000)	?	14.46	2.13	0.04	?	−2.70	−0.39	0.70
HIPOVOL3(PRE2000)	?	2.22	1.18	0.25	?	0.20	0.10	0.92
Adjusted R^2			0.47				0.59	

period is −1.36 (*t*-statistic = −2.77) and on HIPOD1R in the POST2000 period is 0.28 (*t*-statistic = 7.49). The difference in the coefficients across PRE2000 and POST2000 is statistically significant (*F*-statistic = 11.03, *p*-value = 0.00). The coefficient estimate on HIPOD1R for the FIRST5 deals is −1.11 (*t*-statistic = −3.81) and on HIPOD1R for the later deals is −0.68 (*t*-statistic = −1.01). The difference in the coefficients across FIRST5 and AFTER5 is also statistically significant (*F*-statistic = 4.57, *p*-value = 0.03).

Repeating the analysis after eliminating observations with zero HIPOMS (160 observations), we find that (in untabulated results) the coefficient estimate on HIPOD1R in the PRE2000 period is −1.52 (*t*-statistic = −1.80), in the POST2000 period is 0.29 (*t*-statistic = 4.13), and the difference in the coefficients across PRE2000 and POST2000 is statistically significant (*F*-statistic = 4.54, *p*-value = 0.03); and the coefficient estimate on HIPOD1R for the FIRST5 deals is −1.13 (*t*-statistic = −2.19, for the later deals is

−0.75 (t-statistic = −0.63), and the difference in the coefficients across FIRST5 and AFTER5 is statistically significant (F-statistic = 2.65, p-value = 0.07). In addition, repeating the analysis after eliminating observations with zero HKIPOMS (221 observations), we find that (in untabulated results) the coefficient estimate on HIPOD1R in the PRE2000 period is −0.93 (t-statistic = −6.33), in the POST2000 period is 0.30 (t-statistic = 0.78), and the difference in the coefficients across PRE2000 and POST2000 is statistically significant (F-statistic = 9.44, p-value = 0.00); and the coefficient estimate on HIPOD1R for the FIRST5 deals is −3.38 (t-statistic = −3.88), for the later deals is −0.33 (t-statistic = −0.39), and the difference in the coefficients across FIRST5 and AFTER5 is statistically significant (F-statistic = 6.28, p-value = 0.01). Collectively these findings indicate that the results in Table 2 are driven by PRE2000 HIPOs and the FIRST5 deals, as predicted in H2.

We note that not all of the 40 investment banks in our sample exist in both the INITIAL and the LATER groups. The results could thus be a manifestation of the differences in unobserved investment bank characteristics in the INITIAL group only and those in both the INITIAL and the LATER groups. To control for this possibility, we estimate the results for panel B of Table 3 including only those investment banks that exist in both the PRE2000 (i.e., INITIAL) and POST2000 (i.e., LATER) samples. In total there are 10 (out of 40) investment banks that satisfy this criterion, with a resulting sample of 130 observations (10 banks × 13 years). Similarly, for the INITIAL = FIRST5 specification, we estimate the results by including only those investment banks that exist in both FIRST5 (i.e., INITIAL) and AFTER5 (i.e., LATER) in the test sample. In total there are eight (out of 40) investment banks that satisfy this criterion, with a resulting sample of 104 observations (eight banks × 13 years). Similar to the results reported in panel B of Table 3, results (not tabulated) show that the coefficients of $\text{HIPOD1R}_{t-1,\,t-2}$ (INITIAL) are −1.52 (t-statistic = −1.80) and −1.13 (t-statistic = −2.19) when INITIAL = PRE2000 and = FIRST5, respectively; the $\text{HIPOD1R}_{t-1,\,t-2}$(LATER) values are 0.29 (t-statistic = 4.13) and −0.75 (t-statistic = −0.63) when LATER = POST2000 and = AFTER5, respectively.

In panel C, we estimate Equation (1) by aggregating the market share in the POST2000 period and using the PRE2000 period averages for the explanatory variables. The unit of analysis in this specification is the investment banks, and thus there are 40 observations. For each investment bank we compute the market share for the 2001–2007 period, and for each of the explanatory variables we compute the average for the 1993–2000 period. We consider this specification because the results of estimating Equations (1) and (2), presented in Tables 2 and 3, panel B, may be driven by the presence of no HIPOs or HKIPOs in many of the years, especially for investment banks that have handled fewer IPOs. Therefore, we check the robustness of our results by aggregating them at the investment bank level. Second, this specification allows us to control for common trends in the HKIPOs and HIPOs. The left (right) column of panel C in Table 2 provides the estimation of HIPOs (HKIPOs). For HIPO market shares in the post-2000 period, the coefficient estimate on HIPOD1R(PRE2000) is −0.05 (t-statistic = −2.71); this is consistent with H2.

In the estimation using HKIPO market shares in the post-2000 period as the dependent variable, the coefficient estimate on HKIPOD1R(PRE2000) is 0.70 (t-statistic = 2.05). The difference in coefficients HIPOD1R(PRE2000) and HKIPOD1R(PRE2000) across the two estimations is statistically significant with an F-statistic of 4.83 (p-value = 0.03) based on the seemingly unrelated regression (SUR) procedures.

3.4. Additional Test: Probability of Winning IPO Businesses

As an additional test, we use the investment bank and the IPO as the unit of analysis to estimate the likelihood of a bank winning IPO business. This specification helps to sidestep measurement issues related to the allocation of the offer proceeds across investment banks if the IPO is handled by multiple banks. However, this analysis does not consider the overall competitive power in terms of larger market shares. As before, the assumption is that all of the investment banks compete for all of the HIPOs and HKIPOs. In this analysis, Win_HIPO (Win_HKIPO) is 1 for the investment bank that wins the HIPO (HKIPO) business and 0 for all of the other investment banks. We estimate Equation (1) using Win_HIPO (Win_HKIPO) as the dependent variable using the logit procedure. The sample for the HIPO estimation includes 40 investment banks and 70 HIPOs during the 1995–2007 period (N = 2,800), and the sample for the HKIPO estimation includes 40 investment banks and 178 HKIPOs during the 1995–2007 period (N = 7,120).

The results are reported in panel A of Table 4. The coefficient on $\text{HIPOD1R}_{t-1,\,t-2}$ is −4.41 (chi-square statistic = 3.06, p-value = 0.09), suggesting that investment banks with less prior HIPO underpricing are more likely to win HIPO business; this is after controlling for prior HKIPO underpricing, prior period market shares, future returns, and future price volatilities. As for the likelihood of winning HKIPO business estimation, we find that it is not related to prior years' underpricing, i.e., $\text{HKIPOD1R}_{t-1,\,t-2}$. We repeat the analysis after eliminating observations with zero $\text{HIPODIR}_{t-1,\,t-2}$ with 713 observations instead of

Table 4 Probability of Winning IPO Businesses and Prior IPO Underpricing

Panel A: Estimating augmented Equation (1) with a logit model

	Dependent variable: Prob(Win_HIPO_t)							Dependent variable: Prob(Win_HKIPO_t)						
Variables	Pred. sign	Coef.	Chi-sq.	*p*-value	Coef.	Chi-sq.	*p*-value	Pred. sign	Coef.	Chi-sq.	*p*-value	Coef.	Chi-sq.	*p*-value
			(I)			(II)				(III)			(IV)	
Test variable														
$HIPOD1R_{t-1,t-2}$	−	−4.71	2.72	0.09	−4.41	3.06	0.08	?	2.43	0.85	0.36	−0.26	0.01	0.92
$HKIPOD1R_{t-1,t-2}$	?	1.29	8.55	0.00	0.89	3.84	0.05	+	0.63	2.84	0.09	−0.34	0.50	0.48
Controls														
$HIPOMS_{t-1,t-2}$	+	2.04	7.30	0.01	1.40	2.62	0.11	?	1.51	3.57	0.06	0.25	0.08	0.77
$HKIPOMS_{t-1,t-2}$	?	3.74	13.92	0.00	2.86	7.43	0.01	+	2.17	15.42	0.00	0.74	1.49	0.22
$HIPORET3_{-1,t-2}$	?				0.19	0.18	0.67	?				0.19	0.57	0.45
$HKIPORET3_{-1,t-2}$	?				−0.58	2.26	0.13	?				−0.03	0.02	0.90
$HIPOVOL3_{t-1,t-2}$	?				1.53	5.16	0.02	?				1.10	8.36	0.00
$HKIPOVOL3_{-1,t-2}$	?				1.77	8.53	0.00	?				2.08	64.99	0.00
Year fixed effect			Yes			Yes				Yes			Yes	
N			2,800			2,800				7,120			7,120	
Likelihood ratio (*p*-value)			38.08 (0.00)			59.93 (0.00)				33.43 (0.01)			145.54 (0.00)	

Panel B: Estimating augmented Equation (2) with a logit model; dependent variable: Prob(Win_HIPO_t) ($N = 2{,}800$)

		INITIAL = PRE2000; LATER = POST2000			INITIAL = FIRST5; LATER = AFTER5		
Variables	Pred. sign	Coef.	*t*-stat.	*p*-value	Coef.	*t*-stat.	*p*-value
Test variable							
$HIPOD1R_{t-1,t-2}$(INITIAL)	−	−7.19	3.33	0.07	−5.38	3.44	0.06
$HIPOD1R_{t-1,t-2}$(LATER)	?	5.31	4.58	0.03	−2.79	0.55	0.46
$HKIPOD1R_{t-1,t-2}$	?	0.51	0.83	0.36	0.88	3.60	0.06
Controls			Yes			Yes	
Year fixed effect			Yes			Yes	
Likelihood ratio (*p*-value)			61.94 (0.00)			60.72 (0.00)	
INITIAL minus LATER		*F*-stat.	6.64		*F*-stat.	3.06	
		p-value	0.01		*p*-value	0.08	

2,800 observations and find that the coefficient on $HIPOD1R_{t-1,t-2}$ is −5.70 (chi-square statistic = 375, *p*-value = 0.05). These results support H1A.

We also test H2 using an augmented Equation (2), based on the logit procedure. The results reported in panel B of Table 4 show that $HIPOD1R_{t-1,t-2}$ (INITIAL), measured either by PRE2000 or by FIRST5, is negatively related to the likelihood of winning HIPO business in the current period; this is consistent with H2.

3.5. Entry into the HIPO Market and Subsequent Entry into the China Markets—A Case Study and Additional Empirical Analyses

Although the evidence thus far shows that investment banks that underprice HIPOs less will obtain higher subsequent HIPO market shares, there is no direct support for the argument that the knowledge they gain about China business helps them build their China business. In the development of the hypotheses we argue that one of the rationales for investment banks to underprice HIPOs to a lesser degree in the initial years is to gain expertise in doing business in China and to get a toehold in future lucrative business in China. In this section, we provide some direct evidence for the relationship between HIPO market shares and subsequent presence in the Chinese financial services market in two ways. First, we present a case study of a large Hong Kong investment bank that offered substantially lower HIPO underpricing in the initial years, and document three instances of this bank's subsequent gains in the Chinese financial services market. Second, we empirically examine whether an investment bank's greater market share in the HIPO market is related to a greater subsequent market share of Chinese company IPOs in the Chinese stock exchanges.

3.5.1. Case Study of a Large Investment Bank. We chose an investment bank from our sample that had one of the lowest HIPO underpricing in the initial years. We held informal discussions with top level vice presidents. The average HIPO underpricing by this investment bank was roughly −15% in the initial years, and the market share of the HIPOs in the later period was 11.4%, which was one of the largest; it was

four times the naïve benchmark of 2.5%, which was based on a uniform distribution of the IPO business across the 40 banks. In our discussion with the top-management team about their strategy for entry into the Chinese financial services market, they indicated that the subsequent gains were possible because of the expertise they gained handling HIPOs in the Chinese market in the initial years. They pointed to the following three benefits in the Chinese financial services industry. First, the case study bank was chosen as the lead underwriter for one of the largest global Chinese company IPOs in the early 2000s. Second, the case study bank was one of the first non-China based investment banks to obtain approval from the China Securities Regulation Commission (CSRC), the Chinese regulator, to participate in the Chinese underwriting market; a large rival bank obtained similar approval four years later. The rival bank's average HIPO underpricing was roughly 35.6% in the initial years, and its subsequent HIPO market share was 0.9%. Our discussion revealed that the timing advantage was a major factor contributing to the growth of the first bank's China-based business. Third, more recently the case study bank was among the first to obtain a stock trading and brokerage license, after the Chinese government lifted the ban on foreign banks' participation at the end of 2007. This case suggests that the strategy of obtaining initial business of Chinese company IPOs in Hong Kong not only helped them increase their market share of the Chinese company IPOs in Hong Kong in later years, but also enabled them to gain a competitive advantage over their rivals in the Chinese financial services market.

Our discussions with the investment bank's officials did not indicate that they had adopted an explicit strategy of lower underpricing in the initial years. The officials stated that they made all efforts to obtain the initial HIPO business by helping issuers raise much needed capital (also see De Jonge 2008). They confirmed that the experience they gained from the HIPO business during the initial period helped them gain expertise in China-related business practices and to develop key relationships in China.

3.5.2. HIPO Market Shares and Subsequent China IPO Market Shares in the Chinese Stock Exchanges. One of the case study investment bank's subsequent advantages was to obtain an underwriting license much earlier than its key rivals. We thus examine the relationship between HIPO market shares (in the Hong Kong Stock Exchange) and subsequent China IPO market shares in the Chinese stock exchanges. In particular, we examine the China IPO market shares of the 40 investment banks over the 1993–2007 period. We obtain data on the China IPOs (both A and B shares) handled by the 40 investment banks during the period in all of the Chinese stock exchanges from the CSMAR database. The sample consists of 147 China IPOs, handled by the 40 IBs. We estimate a similar model as in Equation (1) by substituting the China IPO market shares (ChIPOMS) as the dependent variable, using both A and B shares. Specifically, we estimate the following equation:

$$ChIPOMS_t = \alpha + \beta_1 HIPOMS_{t-1,t-2} + \beta_2 ChIPOMS_{t-1,t-2} + \delta_i Controls_i. \quad (3)$$

We use HIPOMS as the regressor instead of HIPOD1R because we propose that handling the HIPOs would have provided the investment bank with experience and expertise, and it is this expertise that is helpful in valuing China IPOs in Chinese stock exchanges. We expect the coefficient on the lagged HIPO market shares ($HIPOMS_{t-1,t-2}$) to be positively associated with the current China IPO market shares, after controlling for the lagged China IPO market shares ($ChIPOMS_{t-1,t-2}$). We control for the uncertainty and investor demand factors by including the future stock returns and stock return volatilities, as in Equation (1).

The results are reported in Table 5. In the first column, as expected, the coefficient on the lagged HIPOMS is positive, showing that IBs with HIPO higher market shares have a higher China IPO market share in later years. This is consistent with the notion that investment banks learn about the new market as they develop their HIPO market shares. In the second column, the results are similar after controlling for the future performance and price volatility of both the HIPOs and China HIPOs. In an unreported analysis, we include the investment banks' lagged HKIPO market shares as well, and find that they are not associated with the China IPO market share in the Chinese stock exchanges. Taken together the results suggest that getting HIPO market share enables investment banks to obtain financial services business in China.

Table 5 Investment Banks' Market Shares in the China-Based IPO Market in Hong Kong and Subsequent Market Shares in the IPO Market in China

Estimating Equation (3) ($N = 520$) based on OLS with clustered standard errors; dependent variable: $ChIPOMS_t$

Variables	Pred. sign	Coef.	t-stat.	p-value	Coef.	t-stat.	p-value
Test variable							
$HIPOMS_{t-1,t-2}$	+	0.11	1.87	0.06	0.11	2.11	0.04
$ChIPOMS_{t-1,t-2}$	+	0.50	12.59	0.00	0.26	7.69	0.00
Controls							
$HIPORET3_{t-1,t-2}$	?				−0.01	−0.47	0.64
$ChIPORET3_{t-1,t-2}$	?				0.18	5.84	0.00
$HIPOVOL3_{t-1,t-2}$	?				−0.04	−2.04	0.04
$ChIPOVOL3_{t-1,t-2}$	?				0.39	11.8	0.00
Year fixed effect			Yes			Yes	
Adjusted R^2			0.24			0.54	

3.6. Additional Test of H2 with HKIPO as the Benchmark

We conduct an additional test by using the HKIPO underpricing as the benchmark to test H2. We consider this alternative specification because the difference in IPO characteristics over time could drive the results. For example, previous studies show that underpricing is necessary to attract uninformed investors (see Rock 1986), and that underpricing can increase the uninformed individual investors' demand (see Benveniste and Spindt 1989, Derrien 2005). If investor demand for the HIPOs during the initial years is much greater than in later years, then HIPO underpricing could be a reflection of this trend. In general, if the demand from individual investors is systematically different for the HIPOs in the initial and later years, then this omitted variable could drive the results presented for Equations (1) and (2). We use the HIPOs and HKIPOs as the unit of analysis, and use the extensive literature on IPO underpricing to estimate the following equation:

$$DIR = \alpha + \beta_1 HIPO * INITIAL + \beta_{1P} HIPO * LATER + \delta_i X_i, \quad (4)$$

where X_i are control variables based on prior research on IPO underpricing; they are discussed briefly below. We include industry and year fixed effects to account for hot and cold periods and industries (Helwege and Liang 2004, Ljungqvist et al. 2006). We correct the standard errors by clustering by year and industry. The test variables in Equation (3) are the interactions terms HIPO $*$ INITIAL and HIPO $*$ LATER. The coefficient β_1 (β_{1P}) is the difference in underpricing between HIPO and HKIPO in the initial (later) years. Based on H2, we expect β_1 (β_{1P}) to be negative (zero).

The large theoretical and empirical literature on IPO underpricing shows that IPO underpricing is associated with (a) informational differences across the parties (i.e., the issuer, the investment bank, and the investors); (b) institutional reasons such as tax and legal liability regimes; (c) investor make-up and corporate control considerations; and (d) investor sentiment and recognition (see Ljungqvist 2006 for a review). We control for these as discussed below.

IPO-Specific Factors. Following previous studies on IPO underpricing, we control for the following IPO-related and institutional factors: (a) firm-size (LNSALE), measured as the log of past years' sales revenues, to control for information asymmetry, which is expected to be negatively related to underpricing (e.g., Ritter 1984, Smart and Zutter 2003); (b) first-day trading volume scaled by the number of shares offered (TURN), to control for investor recognition and sentiment, which is expected to be positively related to underpricing (Ofek and Richardson 2003); (c) float (FLOAT), measured as the number of shares offered scaled by the total number of shares after the IPO, to control for corporate control effects, which is expected to be positively related to underpricing (Ljungqvist 2006); and (d) offer price revision (Revisionpc), which is the final offer price minus the midpoint of the offer price range (or the initial offer price, as announced in the prospectus) divided by the initial offer price, to measure the information gathered by the investment banks during the book-building phase, which is expected to be negatively related to underpricing (Loughran and Ritter 2002, Lowry and Schwert 2002, Smart and Zutter 2003). We include the offer size (LnProceeds), measured as the logarithm of offer price times the number of shares offered, to control for the investment banks' marketing efforts, especially because the offer sizes of the HIPOs are much larger than those of the HKIPOs.

Profitability, Growth, and Risk Factors. The lower underpricing of the HIPOs compared to that of the HKIPOs could be due to the quota system that restricts the supply of HIPOs to "showcase" extraordinary performers (Ferguson et al. 2002). We address this potential alternative explanation for H1 by controlling for profitability, growth, and risk characteristics of the IPOs. Differences in profitability, growth, and risk characteristics across the HKIPOs and HIPOs are likely to be related to underpricing through their information difference effects and investor sentiment effects.

We measure the operations in China using an indicator variable, PRCops, that takes a value of 1 if the IPO has operations in China and 0 otherwise. Given the growth potential in China and the media attention, we expect it to be positively related to underpricing (see Cook et al. 2008). We control for profitability and growth using past years' return on sales (ROS) and the expected earnings in the IPO year provided in the prospectus and the last years' earnings (ΔExpNI), respectively.[20] We expect profitability and growth to be incorporated into the offer price valuation and thus to be negatively related to underpricing. FundUse is the percentage of total IPO proceeds to be used for capital expansion or working capital needs. FundUse measures growth potential and investor sentiment, and thus we expect it to be positively related to underpricing. The standard

[20] Disclosing the forecast net income in the IPO year in the prospectus is voluntary (see Hong Kong Exchanges and Clearing Limited 2010, rules 11.16–11.19 and paragraph 34(2) in part A of Appendix 1). Roughly 88% of the IPOs (361 out of 407) provide this forecast. For the 12% of IPOs that do not provide the forecast, we use the realized net income in the subsequent period to compute Δ*ExpNI*. As a robustness check, instead of realized net income in the subsequent period, we use industry growth; the results are similar.

deviation of return on sales over the past three years, STDROS, is a risk measure that is likely to influence investor sentiment negatively, and thus is expected to be positively related to underpricing.

Governance Factors. Although Hong Kong is regarded as one of "the world's freest economies" (Index of Economic Freedom website http://www.heritage.org/index/), China is ranked much lower in terms of legal protection, rule of law, and transparency (see, e.g., Goldie-Scott 1995, Chan 1996, Peng et al. 1998).[21] In contrast to Hong Kong, factors such as a lower rate of tax compliance, higher corruption, and the lack of a free press contribute to higher private benefits of control for Chinese firms.[22] Following Fan et al. (2007), we consider the following controls: (a) Govt_Official takes a value of 1 if the CEO or the Chairman is a government official; (b) Dual is an indicator variable that is 1 if the CEO and the chairman are the same; (c) TotalDIR is the total number of people on the board of directors; (d) IndepDIR is the number of independent directors on the board; and (e) Ownpc is the ownership percentage held by directors, families, and government. If good governance is positively related to investor sentiment, we expect good governance to be positively related to underpricing (see Filatotchev and Bishop 2002). However, if good governance is indicative of how well the firm monitors the investment bank for agency issues, then we expect good governance to be negatively related to underpricing.

Investment Bank Quality. Investment bank quality has been shown to be both positively and negatively related to IPO underpricing (see Hoberg 2007). The investment bank quality variable (IBQUAL) is based on the market share of the investment bank's IPO business (see, e.g., Fang 2005). IBQUAL is 1 if the investment bank handles more than 5% of all of the IPOs. Given the mixed results in previous studies, we do not provide an empirical prediction for this control variable.

Macroeconomic Variables. Given that the higher underpricing of HIPOs compared to HKIPOs in the later years could be due to increased investor recognition by foreign investors over time, we consider country-level/exchange-level macroeconomic variables. First, we include the extent of foreign capital attracted to China by the growth potential; for this purpose, we consider the data on foreign direct investment in China obtained from the World Bank (FDIChina). We also consider the changes in stock market capitalization in the Hong Kong market, using data obtained from the World Bank (ChMV-HK); the data for the H-share market is obtained from the Hong Kong Stock Exchange (ChMV-Hshare). These variables are included to control for trends in investor recognition across the two share types. We also include the changes in market capitalization in the Chinese stock exchanges (ChMV-China) to control for the evolution of China into a more market-based economy. In addition, we include a TREND variable to control for trends in underpricing in the Hong Kong Stock Exchange.

Empirical Analyses and Results. Panel A of Table 6 contains the descriptive statistics for the HIPOs and HKIPOs. Notably, the HIPOs and HKIPOs are different across many of the investigated characteristics. It is thus important to control for these differences. Panel B of Table 6 reports the result of estimating Equation (3); the left (right) column presents the results when INITIAL = PRE2000 (INITIAL = FIRST5). We present the results of the IPO characteristic control variables, and suppress the profitability, growth, risk, corporate governance, and macroeconomic variables, because they are in general not statistically significant.[23] When INITIAL = PRE2000, the coefficient on the HIPO in the PRE2000 period is -0.17 (t-statstic $= -13.42$) indicating that in the initial years, i.e., 1993 to 2000, the HIPOs are underpriced less than the HKIPOs. The difference across HIPO(PRE2000) and HIPO(POST2000) has an F-statistic of 3.78 (p-value $= 0.02$). This is consistent with H2.

When INITIAL = FIRST5, the coefficient on HIPO for the first five deals is -0.13 (t-statistic $= -2.09$) indicating that the first few HIPO deals handled by a given investment bank are underpriced less than the HKIPOs. The coefficient on the HIPOs for the later deals is 0.22 (t-statistic $= 1.58$), indicating that HIPO underpricing in later years is statistically similar (albeit weakly) to HKIPO underpricing. The difference in the coefficients HIPO(INITIAL) and HIPO(LATER) is also statistically significant, with an F-statistic of 2.97 (p-value $= 0.05$). Collectively, these results support H2.[24]

[21] These concerns are summarized in the prospectuses of HIPOs in boiler-plate risk disclosures that typically are of the following form: "you should pay particular attention to the fact that we are a PRC company and are governed by a legal and regulatory environment that in some respects differs from that which prevails in other countries." Paul Vibert, a China analyst for Baring Securities, says, "H-shares are fundamentally better than B shares, but still you cannot make a comparison between an H-share and a blue chip Hong Kong stock" (see Anonymous 1993). Also see Loong (1998), Lucas (1999), and Aharony et al. (2000).

[22] Dyck and Zingales (2004) provide examples of how these factors affect private benefits of control.

[23] Out of the control variables only Govt_Official is positive and significant in the estimation with INITIAL = PRE2000; all others are statistically insignificant at the 10% level.

[24] We have conducted a number of sensitivity analyses to ensure the robustness of these results. For example, we (1) match HIPOs with HKIPOs based on investment bank, industry, and size; (2) exclude

Table 6 IPO Underpricing Model

Panel A: Descriptive statistics

	HKIPO ($N = 236$)		HIPO ($N = 85$)		Difference = HKIPO − HIPO	
Variables	Mean	Med	Mean	Med	Mean test	Median test
D1R	0.24	0.12	0.15	0.07	2.02 (0.04)	−2.02 (0.04)
Profitability, growth, and risk						
PRCops	0.69	1.00	1.00	1.00	−10.26 (0.0)	5.82 (0)
ROS	0.12	0.11	0.13	0.09	−0.7 (0.49)	−1.23 (0.22)
ΔExpNI	0.60	0.39	0.49	0.29	1.1 (0.27)	−1.63 (0.1)
FundUse	0.86	1.00	0.83	0.92	1.2 (0.23)	−1.44 (0.15)
SDROS	0.04	0.03	0.04	0.03	−0.18 (0.86)	−0.11 (0.92)
Corporate governance						
Govt_Official	0.19	0.00	0.34	0.00	−2.53 (0.01)	2.73 (0.01)
Dual	0.59	1.00	0.48	0.00	1.77 (0.08)	−1.76 (0.08)
TotalDIR	8.58	8.00	11.27	11.00	−7 (0)	7.3 (0)
IndepDIR	0.20	0.25	0.21	0.23	−0.13 (0.9)	−0.14 (0.89)
Ownpc	0.49	0.61	0.54	0.56	−1.84 (0.07)	−0.88 (0.38)
Investment bank variable						
IBQUAL	0.13	0.00	0.16	0.00	−0.86 (0.39)	0.86 (0.39)
IPO variables						
Lsalem	1,709.9	571.4	11,304.5	2,595.9	−2.8 (0.01)	7.59 (0)
Lnsale	13.43	13.26	14.86	14.77	−7.88 (0)	7.59 (0)
TURN	0.41	0.23	0.55	0.26	−1.57 (0.12)	1.14 (0.25)
FLOAT	0.14	0.19	0.07	0.03	5.16 (0)	−3.53 (0)
Offer size	170.56	102.77	408.33	198.64	−2.46 (0.02)	5.38 (0)
Revisionpc	0.02	0.00	0.04	0.00	−1.6 (0.11)	1.57 (0.12)
Ret3	−1.18	0.48	−0.04	0.22	−0.78 (0.43)	−1.89 (0.06)
Pvol3	0.50	0.48	0.42	0.38	2.4 (0.02)	−1.81 (0.07)

Panel B: Estimating Equation (4) ($N = 321$) using OLS with clustered standard errors

		INITIAL = PRE2000; LATER = POST2000			INITIAL = FIRST5; LATER = AFTER5		
Variables	Pred. sign	Coef.	*t*-stat.	*p*-value	Coef.	*t*-stat.	*p*-value
Test variables							
HIPO(INITIAL)	−	−0.17	−13.42	0.05	−0.13	−2.09	0.04
HIPO(LATER)	?	−0.12	−2.41	0.25	0.22	1.58	0.11
Control variables							
LNSALE	−	−0.01	−0.40	0.76	−0.02	−0.73	0.47
TURN	+	0.36	5.58	0.11	0.37	5.74	< 0.01
FLOAT	+	0.33	1.32	0.41	0.39	1.17	0.24
TREND	?	4.69	0.95	0.51	3.77	0.36	0.72
LnProceeds	+	0.01	0.17	0.89	0.00	0.14	0.89
Revisionpc	−	−0.05	−0.19	0.88	−0.18	−0.94	0.35
Ret3	?	0.00	−0.03	0.98	0.00	−0.12	0.91
Pvol3	?	−0.04	−1.78	0.33	−0.03	−0.53	0.60
Investment bank variable			Yes		Yes		
Profitability, growth, and risk			Yes		Yes		
Corporate governance			Yes		Yes		
Macroeconomic variables			Yes		Yes		
Year and industry fixed effect			Yes		Yes		
Adjusted R^2			0.48		0.48		
HIPO(INITIAL) minus HIPO(LATER)		*F*-stat.	3.78		*F*-stat.	2.97	
		p-value	0.02		*p*-value	0.05	

4. Concluding Remarks

In our examination of the relationship between investment banks' IPO market shares and prior IPO underpricing in the new H-shares IPO market in the Hong Kong Stock Exchange, we find that the lesser the IPO underpricing of the H-shares by an investment bank, the greater its subsequent market share in the H-share IPOs. This result is driven by the initial deals/years. We also find that the greater an investment bank's market share in the H-share IPO market in Hong Kong, the greater its subsequent market share in the China IPO market in the Chinese stock exchanges.

non-SOE HIPOs; (3) include in the sample also HKIPOs handled by investment banks that do not have any experience in handling HIPOs. We obtained similar results.

Further, through a case study, we demonstrate that a large investment bank with substantially less HIPO underpricing and high HIPO market share in the initial years obtained important licenses for providing financial services in China in subsequent years. Collectively these results suggest that investment banks' initial market shares in new markets help them grow their market share in later periods.

Our evidence of lower HIPO underpricing for the initial deals is also consistent with the institutional feature of eliminating quotas for the HIPOs in 2000. Because it is not possible to separate the effect of the change in the institutional setting from the effect of the gain in investment bank expertise in valuing HIPOs, our results, specifically that the HKIPOs and HIPOs exhibit similar underpricing in later years, should be interpreted as a joint effect of both of these factors. However, to the extent that the elimination of the quota system helped investment banks compete by targeting potential HIPO firms that are within their expertise, our conclusion that investment banks use a strategy of lower underpricing in the initial years to gain expertise and compete is appropriate. Furthermore, although our finding that HIPO underpricing is lower in the initial years/deals is consistent with our hypotheses, it should be interpreted with caution. This result is also consistent with the explanation that investor demand for HIPOs was much less in the initial years than in later years. Future research can examine whether similar results are found in other new and emerging markets.

Acknowledgments

For helpful comments, the authors are grateful to Joseph Aharony, Y. C. Chan, June Cheng, Richard Chung, Jun Du, Mariassunta Giannetti, Qingchuan Hou, Yuan Huang, Robert Kieschnick, S. P Kothari, Alexander Ljungqvist, Mike Peng, Nancy Su, Judy Tsui, Anthony Tyen, Steven Wang, Yong Wang, Donghui Wu, Lijun Xia, and Jun Yao, as well as workshop participants at the Hong Kong Polytechnic University, Monash University Malaysia, and Standard Graduate School of Business. The work described in this paper was partially supported by the Research Grant Council of the Hong Kong SAR, China [General Research Fund B-Q17J].

Appendix. Variable Definitions

Variable	Definition
	Variables used in the investment bank level analysis
$HIPOMS_t$	An investment bank's (IB) market share of China-based company (H-share) IPOs (HIPO) in the Hong Kong Stock Exchange, computed as the offer proceeds of the HIPOs handled by an IB in year t, divided by the total offer proceeds of all of the HIPOs during that year, i.e., HIPOMS = (offer proceeds of HIPOs handled by that IB in year t)/ total offer proceeds of all of the HIPOs in year t. If there is more than one lead investment bank handling an HIPO, the offer proceeds are allocated equally among the lead IBs.
$HIPOMS_{t-1,t-2}$	The mean HIPOMS of an IB over the past two years.
$HIPOD1R_{t-1,t-2}$	For each HIPO, the day-one returns, D1R, is computed as the difference between end of first trading day stock price, P1, and offer price, P0, divided by the offer price, P0, i.e., D1R = (P1 − P0)/P0. $HIPOD1R_{t-1,t-2}$ is the offer size-weighted mean day-one returns, D1R, of the HIPOs handled by the investment bank during the past two years.
PRE2000	An indicator variable that is 1 for years prior to 2001 and 0 otherwise.
POST2000	An indicator variable that 1 for years after 2000 and 0 otherwise.
FIRST5	An indicator variable that 1 for the first five HIPO deals handled by an investment bank and 0 otherwise.
AFTER5	An indicator variable that 1 for the subsequent HIPO deals handled by an investment bank after the first five deals and 0 otherwise.
$HKIPOMS_t$	An investment bank's (IB) market share of Hong Kong company IPOs (HKIPO) in the Hong Kong Stock Exchange, computed as the offer proceeds of the HKIPOs handled by an IB in year t divided by the total offer proceeds of all of the HKIPOs handled during that year, i.e., HKIPOMS = (offer proceeds of HKIPOs handled by the IB in year t)/total offer proceeds of all of the HKIPOs in year t. If there is more than one lead investment bank handling an HKIPO, the offer proceeds are allocated equally among the lead IBs.
$HIPOMS_{t-1,t-2}$	The mean HKIPOMS of an IB over the past two years.
$HKIPOD1R_{t-1,t-2}$	For each HKIPO, the day-one returns, D1R, is computed as the difference between the end of first trading day stock price, P1, and offer price, P0, divided by the offer price, P0, i.e., D1R = (P1 − P0)/P0. $HKIPOD1R_{t-1,t-2}$ is the offer size-weighted mean day-one returns, D1R, of the HKIPOs handled by the investment bank during the past two years.
$HIPORET3_{t-1,t-2}$	For each HIPO, the cumulative abnormal returns are computed for the three years following the HIPO, HIPOCUMABRET3. For each IB in year t, $HIPORET3_{t-1,t-2}$ is the offer size-weighted mean HIPOCUMABRET3 computed for the HIPOs it handled in years $t-1$ and $t-2$.

Appendix. (Continued)

Variable	Definition
	Variables used in the investment bank level analysis
$HKIPORET3_{t-1,t-2}$	For each HKIPO, the cumulative abnormal returns are computed for the three years following the HKIPO, HKIPOCUMABRET3. For each IB in year t, $HKIPORET3_{t-1,t-2}$ is the offer size-weighted mean HKIPOCUMABRET3, computed for the HKIPOs it handled in years $t-1$ and $t-2$.
$HIPOVOL3_{t-1,t-2}$	For each HIPO, the coefficient of variation of stock prices is computed using the stock price data for the three years following the HIPO, HIPOVOL3. For each IB in year t, $HIPOVOL3_{t-1,t-2}$ is the offer size-weighted mean HIPOVOL3, computed for the HIPOs it handled in years $t-1$ and $t-2$.
$HKIPOVOL3_{t-1,t-2}$	For each HKIPO, the coefficient of variation of stock prices is computed using the stock price data for the three years following the HKIPO, HKIPOVOL3. For each IB in year t, $HKIPOVOL3_{t-1,t-2}$ is the offer size-weighted mean HKIPOVOL3 computed for the HKIPOs it handled in years $t-1$ and $t-2$.
Win_HIPO_t	An indicator variable that is 1 if the investment bank handles that HIPO in year t and 0 otherwise.
Win_HKIPO_t	An indicator variable that is 1 if the investment bank handles that HKIPO in year t and 0 otherwise.
$ChIPOMS_t$	An investment bank's (IB) market share of China company IPOs (ChIPO) in the Chinese stock exchanges (either A- or B-shares on the Shanghai and Shenzhen stock exchanges), computed as the offer proceeds of ChIPOs handled by an IB in year t divided by the total offer proceeds of all of the ChIPOs during that year, i.e., ChIPOMS = (offer proceeds of ChIPOs handled by that IB in year t)/total offer proceeds of all of the ChIPOs in year t. If there is more than one lead investment bank handling an ChIPO, the offer proceeds are allocated equally among the lead IBs.
$ChIPOMS_{t-1,t-2}$	The mean ChIPOMS of an IB over the past two years.
$ChIPOD1R_{t-1,t-2}$	For each ChIPO, the day-one returns, D1R, are computed as the difference between the end of first trading day stock price, P1, and the offer price, P0, divided by the offer price, P0, i.e., D1R = (P1 − P0)/P0. $ChIPOD1R_{t-1,t-2}$ is the offer size-weighted mean day-one returns, D1R, of the ChIPOs handled by the investment bank during the past two years.
$ChIPORET3_{t-1,t-2}$	For each ChIPO, the cumulative abnormal returns are computed for the three years following the ChIPO, ChIPOCUMABRET3. For each IB in year t, $ChIPORET3_{t-1,t-2}$ is the offer size-weighted mean ChIPOCUMABRET3, computed for the ChIPOs it handled in years $t-1$ and $t-2$.
$ChIPOVOL3_{t-1,t-2}$	For each ChIPO, the coefficient of variation of stock prices is computed using the stock price data for the three years following the ChIPO, ChIPOVOL3. For each IB in year t, $ChIPOVOL3_{t-1,t-2}$ is the offer size-weighted mean ChIPOVOL3 computed for the ChIPOs it handled in years $t-1$ and $t-2$.
	Variables used in the issuer level analysis
Test variables	
HIPO	An indicator variable that is 1 for H-share IPO and 0 otherwise.
PRE2000	An indicator variable that is 1 for years prior to 2001 and 0 otherwise.
POST2000	An indicator variable that is 1 for years after 2000 and 0 otherwise.
FIRST5	An indicator variable that is 1 for the first five HIPO deals handled by an investment bank and 0 otherwise.
AFTER5	An indicator variable that is 1 for the subsequent HIPO deals handled by an investment bank after the first five deals and 0 otherwise.
IPO-related variables	
P0	Offer price for the IPO.
P1	End of first trading day stock price.
LnProceeds	Offer size, measured as the log of offer price times the number of shares publicly offered in the issue (in millions HK$).
Revisionpc	The percentage of offer price revision, measured as the final offer price minus the midpoint of the offer price range (or the initial offer price, as announced in the prospectus), scaled by the initial offer price.
D1R	Day-one return computed as $[P1 - P0]/P0$ for an IPO.
Profitability, growth, and risk variables	
PRCops	An indicator variable that is 1 if the firm has operations in China and 0 otherwise.
ROS	Average return on sales for the previous three years.
$\Delta ExpNI$	Percentage increase in net income forecast for the IPO year, computed as net income forecast for the IPO year over last year's net income minus one. If the net income forecast is not available, the next period's realized net income is used.
FundUse	Percentage of total proceeds to be used in capital expansion and working capital.
SDROS	Standard deviation of return on sales over the previous three years.

Appendix. (Continued)

Variable	Definition
	Variables used in the issuer level analysis
Corporate governance variables	
Govt_Official	An indicator variable that is 1 if either the CEO and/or the chairman is a government official and 0 otherwise.
Dual	An indicator variable that is 1 if the CEO of the firm is also the chairman of the board and 0 otherwise.
TotalDIR	Total number of directors on the board.
IndepDIR	Percentage of independent nonexecutive directors on the board.
Ownpc	Percentage of concentrated ownership (by individual directors, families, or government).
Investment bank variables	
IBQUAL	An indicator variable that is 1 if the investment bank handles more than 5% of all of the IPOs in the sample period and 0 otherwise.
Macroeconomic variables	
FDIChina	Log of FDI to China for the year (from the World Bank).
ChMV-China	Change in log of China market capitalization (from the World Bank).
ChMV-HK	Change in log of Hong Kong market capitalization (from the World Bank).
ChMV-Hshare	Change in log of H-share market capitalization (from the Hong Kong Stock Exchange website).
Other variables	
Sales ($m)	Prior year sales (in millions HK$).
LNSALE	Natural log of prior year sales.
TURN	Day-one turnover/number of shares offered in Hong Kong.
FLOAT	Number of shares publicly offered/number of shares outstanding after the IPO.
TREND	Time trend variable, which takes the value of 1 for 1993, 2 for 1994, and so on up to 15 for 2007.
Ret3	The abnormal (market-adjusted) returns three years after the IPO.
Pvol3	The volatility of stock price, measured as the coefficient of variation of stock prices three years after the IPO.

References

Aharony J, Lee CJ, Wong TJ (2000) Financial packaging of IPO firms in China. *J. Accounting Res.* 38(1):103–126.

Anonymous (1993) The rise of the red chip. *Asiamoney* (Dec 93/Jan 94):23–27.

Anonymous (2008) *Hong Kong as a Preferred IPO Hub . . . Are We on the Right Track?* (Bauhinia Foundation Research Centre, Hong Kong).

Babich V, Sobel MJ (2004) Pre-IPO operational and financial decisions. *Management Sci.* 50(7):935–948.

Baron DP (1982) A model of the demand for investment banking advising and distribution services for new issues. *J. Finance* 37(4):955–976.

Baron DP, Holmström B (1980) The investment banking contract for new issues under asymmetric information: Delegation and the incentive problem. *J. Finance* 35(5):1115–1138.

Beatty R, Ritter JR (1986) Investment banking, reputation, and underpricing of initial public offerings. *J. Financial Econom.* 15(1–2):213–232.

Beatty R, Welch I (1996) Issuer expenses and legal liability in initial public offerings. *J. Law Econom.* 39(2):545–602.

Benveniste LM, Spindt PA (1989) How investment bankers determine the offer price and allocation of new issues. *J. Financial Econom.* 24(2):343–361.

Berg JE, Neumann GR, Rietz TA (2009) Searching for Google's value: Using prediction markets to forecast market capitalization prior to initial public offering. *Management Sci.* 55(3): 348–361.

Chan HL (1996) An alternative to privatization: The listing of H-shares in Hong Kong. *Internat. J. Public Sector Management* 9(3): 40–50.

Cook DO, Kieschnick R, Ness RAV (2006) On the marketing of IPOs. *J. Financial Econom.* 82(1):35–61.

De Jonge A (2008) *Corporate Governance and China's H-Share Market* (Edward Elgar, Cheltenham, UK).

Derrien F (2005) IPO pricing in "hot" market conditions: Who leaves money on the table? *J. Finance* 60(1):487–521.

Dunbar CG (2000) Factors affecting investment bank initial public offering market share. *J. Financial Econom.* 55(1):3–41.

Dyck A, Zingales L (2004) Private benefits of control: An international comparison. *J. Finance* 59(2):537–600.

Fan PH, Wong TJ (2002) Corporate ownership structure and the informativeness of accounting earnings. *J. Accounting Econom.* 33(3):401–425.

Fan JPH, Wong TJ, Zhang T (2007) Politically-connected CEOs, corporate governance and post-IPO performance of China's partially privatized firms. *J. Financial Econom.* 84(2):330–357.

Fang LH (2005) Investment bank reputation and the price and quality of underwriting services. *J. Finance* 60(6):2729–2761.

Ferguson MJ, Lam KCK, Lee GM (2002) Voluntary disclosure by state-owned enterprises listed on the stock exchange of Hong Kong. *J. Internat. Financial Management Accounting* 13(2): 125–152.

Filatotchev I, Bishop K (2002) Board composition, share ownership and underpricing of UK IPO firms. *Strategic Management J.* 23(10):941–955.

Fung SYK, Su L, Gul J (2013) Investor legal protection and earnings management: A study of Chinese H-shares and Hong Kong shares. *J. Accounting Public Policy* 32(5):392–409.

Goldie-Scott D (1995) *China's Financial Markets* (FT Financial Publishing, London).

Green S (2004) *The Development of China's Stock Market, 1984–2002: Equity Politics and Market Institutions* (RoutledgeCurzon, NY).

Gul FA, Kim JB, Qiu A (2010) Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: Evidence from China. *J. Financial Econom.* 95(3):425–442.

Helwege J, Liang N (2004) Initial public offerings in the hot and cold markets. *J. Financial Quant. Anal.* 39(3):541–569.

Hoberg G (2007) The underwriter persistence phenomenon. *J. Finance* 62(3):1169–1206.

Hong Kong Exchanges and Clearing Limited (2010) Main board listing rules—Rules governing the listing of securities on the Stock Exchange of Hong Kong Limited.

Junkunc MT, Eckhardt JT (2009) Technical specialized knowledge and secondary shares in initial public offerings. *Management Sci.* 55(10):1670–1687.

Krigman L, Shaw WH, Womack KL (2001) Why do firms switch underwriters? *J. Financial Econom.* 60(2–3):245–284.

Lee J, Chang V (2003) *IPO Activities in Hong Kong* (Securities and Futures Commission, Hong Kong).

Liaw KT (2007) *Investment Banking and Investment Opportunities in China: A Comprehensive Guide for Finance Professionals* (John Wiley & Sons, Hoboken, NJ).

Ljungqvist A (2006) IPO underpricing. Eckbo BE, eds. *Handbook of Corporate Finance: Empirical Corporate Finance*, Vol. 1 (North-Holland, Amsterdam), 375–422.

Ljungqvist A, Nanda V, Singh R (2006) Hot markets, investor sentiment, and IPO pricing. *J. Bus.* 79(4):1667–1702.

Logue D, Rogalski R, Seward J, Foster-Johnson L (2002) What's special about the role of underwriter reputation and market activities in IPOs. *J. Bus.* 75(2):213–243.

Loong P (1998) Finding trouble in the footnotes. *Euromoney* 350:227.

Loughran T, Ritter JR (2002) Why don't issuers get upset about leaving money on the table in IPOs? *Rev. Financial Stud.* 15(2): 413–443.

Lowry M, Schwert G (2002) IPO market cycles: Bubbles or sequential learning? *J. Finance* 57(3):1171–1200.

Lucas L (1999) Red chips back in the black. *Asian Bus.* 35:26–28.

Nanda V, Yun Y (1997) Reputation and financial intermediation: An empirical investigation of the impact of IPO mispricing on underwriter market value. *J. Financial Intermediation* 6(1):39–63.

Ofek E, Richardson M (2003) Dot-Com mania: The rise and fall of Internet stock prices. *J. Finance* 58(3):1113–1138.

Peng E, Gauthier JP, Lind B, Leitner J (1998) *China's Financial Markets: One Country, Two Systems* (Financial Times, London).

Peng M, Luo Y (2000) Managerial ties and firm performance in a transition economy: The nature of a micro-macro link. *Acad. Management J.* 43(3):486–501.

Ritter JR (1984) The "hot issue" market of 1980. *J. Bus.* 57(2): 215–240.

Rock K (1986) Why new issues are underpriced. *J. Financial Econom.* 15(1–2):187–212.

Seligman SD (1999) Guanxi: Grease for the wheels of China. *China Bus. Rev.* 26(5):34–38.

Shane S, Stuart T (2002) Organizational endowments and performance of university start-ups. *Management Sci.* 48(1):154–170.

Smart S, Zutter CJ (2003) Control as a motivation for underpricing: A comparison of dual and single-class IPOs. *J. Financial Econom.* 69(1):85–110.

Xin K, Pearce J (1996) Guanxi: Connections as substitutes for formal institutional support. *Acad. Management J.* 39(6):1641–1658.