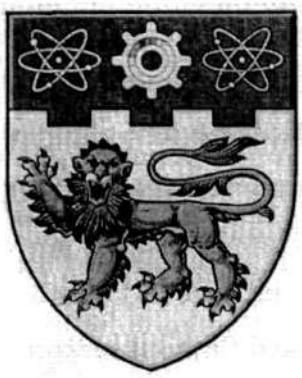
China's A-Share IPOs: Underpricing, Winner's Curse, and Aftermarket Price Trend



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Contents

List of Tables and Figures

Abstract

Rock's (1986) winner's curse model was tested in this study using the allocation data of China's open-sale IPOs. First, the loft initial returns are substantially reduced after the adjustment of allocation rates. The mean allocation-adjusted initial return is statistically positive, while its magnitude is not significant in terms of economic meaning. Thus, uninformed investors on average earn a tiny return by subscribing for the IPO shares. Second, there is indirect evidence that institutional investors tend to use financial leverage in share subscription and selectively participate more in the IPOs with greater underpricing. This enables them to grab a larger portion of the whole wealth left on the table. Third, this study suggests that the winner's curse model does affect the pricing strategy of the issuer and the regulatory authority. Underpricing occurs less in the IPOs that offer separate tranches to institutional investors and in the IPOs that are solely placed with secondary-market investors. In both these cases, the problem of winner's curse affects uninformed investors less.

Regarding the aftermarket performance of the sample IPOs, there is a moderate yet salient contrarian price trend in the short run. Over the long term, these IPOs tend to outperform others in the market, while the magnitude of calculated abnormal returns is sensitive to the selection of benchmarks, weighting schemes, and statistical approaches.

Chapter I: Introduction

1.1 Background

From January 1996 to December 2002, there was approximately one initial public offering (IPO) issued every three calendar days in China's A-share primary market[1], making the country one of the most active new issue markets in the world. These unseasoned equity offerings, however, appeared to be severely underpriced and posted an amazing average first-day return of 134 percent[2], leaving an immense multitude of wealth with the investors who were lucky enough to be allocated the new shares. This dissertation presents, for the first time, a systematic study of China's domestic A-share IPO market, and endeavors to incorporate China's unique offering arrangements into the understanding of this underpricing puzzle. On the whole, the dissertation summarizes major patterns in issuing activity, underpricing and rationing, and aftermarket price trends of privatized IPO companies in the world's largest emerging capital market.

In many capital markets around the world, the underpricing of unseasoned shares is a recurring and persistent phenomenon. Loughran, Ritter and Rydqvist (1994), for example, report a pattern of underpricing in 25 countries, and a higher degree of underpricing in emerging markets. A variety of theories have been proposed by financial economists to explain this underpricing anomaly, and are excellently summarized by Ritter and Welch (2002). While many of these underpricing theories are intensively examined in the US IPO market,

[1] As per the annual statistics from China Securities and Futures Statistical Yearbook (1996-2002).

relatively few tests have been conducted systematically for the rest of the capital markets – especially those emerging IPO markets whose offering and regulation mechanisms differ from the US offering practices.

The IPO underpricing in China is documented in some previous empirical studies, which are still inconclusive in explaining the reasons for the underpricing. Mok and Hui (1998) report an average initial return of 289 percent for 87 A-share IPOs during 1990-1993. They find that that the level of underpricing is linked to some issuing characteristics unique to China's IPO market, arguing that the information asymmetry caused by those characteristics may be the reason for the high underpricing. Su and Fleisher (1999) report an average initial return of 949 percent (with the median equal to 231 percent) using 308 A-share IPOs that include more earlier observations (starting from 1987 to 1995). Simply put, they argue that IPO underpricing is used as a strategy by the Chinese government to signal quality of the privatized IPOs to public investors.

Given the limited sample observations and the huge magnitude of the initial returns, however, it may not be likely that the above two findings can fully explain the astounding underpricing that persists in China's IPO market. In a nutshell, the underpricing puzzle in China can be partially explained by the country's institutional arrangements. China has an offering and regulation mechanism that differs from most of the other major primary markets in the world. First, almost all the IPOs in China are fixed-price open-sale offerings, with the final offering price pronounced to the public about one week before the

[2] As per the calculation of this study.

offering day. On the offering day, both individual investors and institutional investors simultaneously subscribe new shares with upfront deposits equivalent to the equity value subscribed. This is not usually the case in the US, where IPO managers premarket new shares through bookbuilding and have full discretion in allocating shares. Lack of the bookbuilding process may help explain lower underpricing in many mature new issue markets like the US, Canada, or Europe (Chowdhry and Sherman, 1996).

Second, compared with other emerging markets in Asia, pricing regulation is much more severe in China's IPO market. Although greatly liberalized since 1999, offering prices have still been set below the 20 multiples of P/E ratio (the ratio of offering price to the earnings per share of the issuing company) as stipulated by the regulatory body, while the average secondary-market P/E ratio in China usually maintains a level of 30-40 multiples. Therefore, the price regulation imposed by the regulatory body provides a rough explanation of the underpricing puzzle in China.

This sell-side underpricing in China provides a decent opportunity for testing the validity of Rock's (1986) winner's curse hypothesis, which has not been explored by the previous studies on China's IPO markets. When almost all the new issues are undoubtedly underpriced, and when both individual and institutional investors simultaneously subscribe the shares with equal allocation treatment due to the open-sale offering practice adopted in China, there is concern whether the problem of winner's curse or adverse selection matters to the uninformed, small investors. Rock (1986) predicts that new shares are usually rationed to uninformed investors and that rationing is more severe for

good than for bad shares. The participation of informed investors lowers uninformed investors' probability of receiving underpriced IPOs, so that the positive initial returns cannot be earned in practice because of the adverse selection pervasive in the primary market. In equilibrium, the initial returns weighted by the probabilities of obtaining an allocation should give uninformed investors a riskfree rate (Rock, 1986: pp. 205).

Notably, the strictly fair allocation rule in China's IPOs makes it convenient to calculate the expected return of a typical uninformed investor who subscribes every new offering. This simulation, however, is relatively difficult to conduct in the US market, where IPO managers usually use discretionary allocation during the bookbuilding process. Even in the countries with fixed-price offerings (such as many Asian emerging markets), balloting or pro-rata allocation is usually partial to small investors, and the allocation mechanism is disclosed after the subscription has been completed. In China, however, the allocation method is announced in advance, and allocation is on an equal basis and independent of order size and subscriber.

1.2 Research Scope

Using the IPO data from China's Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE), this study examines the implications of the winner's curse in three aspects. First, it examines the allocation rates and allocation-adjusted initial returns of new issues. Rationing is extremely severe in China's A-share IPO market. The mean allocation rate is only 1.65 percent for IPOs that are openly sold to primary-market investors. The initial return after adjusting the allocation rate reduces to only 1.08 percent, which is

statistically significant. Therefore, the apparently lofty initial returns can be partially explained by the slight chance of uninformed investors being allocated new shares. On the other hand, however, the positive mean allocation-adjusted initial return does suggest that underpricing is too excessive for the mere compensation of uninformed investors.

Second, this research investigates whether one major assumption in Rock's model (1986) is violated – that all subscribers order new shares using only their own money. Indirect evidence shows that institutional investors tend to borrow heavily to increase their subscription size, thereby raising the expected return of open-sale IPOs. It is also found that greater underpricing may induce informed investors to subscribe more. With higher borrowing capacity, informed investors can grab a major portion of the underpricing profit that is originally intended to compensate small, uninformed investors.

Third, two unique offering methods used in China provide an indirect test of the effectiveness of winner's curse in explaining underpricing. If winner's curse is an important consideration in IPO underpricing (either by the government or by the issuer), the magnitude of underpricing should be smaller in the IPOs with less informational asymmetry. Since 1999, many IPOs in China have been structured to have separate tranches that particularly target large institutional investors, who are assumed to be wealthier and better informed than small individual investors. Institutional investors who subscribe the private tranches are not allowed to participate in the selling of open tranches, thus mitigating the problem of winner's curse faced by uninformed investors. Also, many recent IPOs in China have been placed solely with secondary-market investors as

based on the market value of their held equity stakes at the offering time. In this way, the demand for new shares is to a greater extent exogenously determined, so that the need for underpricing is lessened. Using multivariate regressions, this study examines whether underpricing in the IPOs that use these two offering methods is less than in the open-sale IPOs. The results provide extra evidence that winner's curse does matter for the pricing of new shares in China.

Besides exploring short-run underpricing, this study contributes to current IPO empirical studies by investigating the aftermarket performance of IPO companies. In the short run, newly listed companies in China show a modest contrarian price trend by underperforming the market benchmark. However, long-run performance tests show that the degree of abnormal returns of IPO companies relies on the choice of benchmarks, weighting schemes, and statistical approaches. On a comprehensive basis, however, the results suggest that in the long run IPO stocks outperform seasoned stocks in China's capital market.

1.3 Motivation of the Study

Three motivations lead to the completion of this study. First, the studies of Loughran, Ritter, and Rydqvist (1994) and Chowdhry and Sherman (1996) highlight the importance of country studies on IPOs by showing that underpricing, offering regulations, and contractual mechanisms differ substantially across countries and over time. Therefore, this study aims to contribute to international IPO studies by probing into the fast expanding yes less explored Chinese IPO market.

Second, the study intends to expand upon previous studies by offering a broader and updated overview of the issuing activity in China. Using the latest sample data, this study draws conclusions that are different from many previous studies, and thus calls for more research attention to China's new issue market.

Third, from a practitioner's perspective, this study is instrumental to international investors who intend to invest in Chinese portfolios, as China is considered an ideal alternative for international investors to diversify their equity stakes. Given the current growth rate of its GDP and market capitalization, as well as the scale of its privatization programs, China is expected to become the third largest capital market in the world following the US and Japan by 2010. At the same time, gradual liberalization of capital accounts may make equity investment in China increasingly feasible in the following years.[3] This study helps provide a guide to international investors in forming their subscription decision in the primary market and their follow-on trading strategy after the listing of new shares.

The remainder of the dissertation is organized as follows: Chapter II surveys recent IPO studies related to the subject matters of the study. Chapter III offers a short introduction to China's new issue market and its special institutional arrangements. Chapter IV proposes the methodology and testable hypotheses. Chapter V describes the sample data and presents empirical results and interpretations. Finally, Chapter VI includes discussion and conclusions.

[3] Currently China's regulatory body has regulations that allow qualified foreign institutional investors (QFIIs) to invest in the domestic stock market. These regulations are expected to be further loosened in the next few years, suggesting that more and more foreign institutions or even individuals can get access to China's capital market.

Chapter II: A Survey of Relevant Literature

This chapter surveys major theoretical and empirical literature pertaining to the subject matter of the study. Section 2.1 summarizes extant theoretical models on short-run underpricing as well as related empirical evidence on the models. Section 2.2 surveys recent papers on the long-run aftermarket performance of IPO firms. Finally, previous empirical studies on China's IPO underpricing are reviewed in Section 2.3.

2.1 Theories and Evidence on IPO Underpricing

The underpricing of unseasoned equities is a well-documented anomaly in the literature of financial economics. Ibbotson (1975) reports that the average initial return was 11.4 percent for US IPOs during the 1960s. The underpricing phenomenon is reconfirmed by Ritter (1984) in a six-year US sample from 1977 to 1982. Ritter and Welch (2002), using their sample of 6,249 US IPOs during 1980-2001, report an average first-day return of 18.8 percent (excluding unit offerings and penny stocks – IPOs with an offering price of below US$5 per share). They state: "Approximately 70% of the IPOs end the first trading day at a closing price greater than the offer price, and about 16% have a first-day return of exactly zero" (Ritter and Welch 2002: pp. 1802). In the international setting, Loughran, Ritter, and Rydqvist (1994) show that underpricing is also a stylized fact for many other countries in the world. The underpricing puzzle has spawned an enormous amount of literature that tries to unravel what underlies this anomaly. This section surveys major theoretical and empirical papers that explain the persistent IPO underpricing puzzle.

2.1.1 Winner's Curse in the IPO Market

Rock (1986) observes that the rationing of new shares may prevent investors from earning a positive first-day return on an IPO. In a primary market where uninformed investors coexist with a group of investors with superior information about the realized value of IPO firms, pricing IPOs at the mean value discourages participation of uninformed investors. This is because informed investors, by knowing the realized value of each IPO, are able to subscribe more lucrative shares and avoid the lemons. As a result, profitable IPOs usually result in more severe rationing among share subscribers. In his original discussion, Rock (1986) shows that IPO underpricing could be an equilibrium solution to encourage the participation of uninformed investors in the IPO market. One prediction of Rock's model (1986) is the problem of winner's curse or adverse selection, that rationing occurs more often for good than for bad IPOs. Uninformed investors on average earn a zero risk-adjusted return: "If the model is correct, weighting the returns by the probabilities of obtaining an allocation should leave the uninformed investor earning the riskfree rate" (Rock 1986: pp. 205).

Beatty and Ritter (1986) extend Rock's (1986) model, arguing that as ex ante uncertainty increases, the winner's curse problem intensifies. The resulting equilibrium is enforced by investment banks that have their reputation at stake. Particularly, underwriters lose subsequent market share if the price of an IPO is not commensurate with its ex ante uncertainty. Carter and Manaster (1990) further show that the greater the dispersion of the issuer's true value, the higher the proportion of informed capital that participates in an IPO, so that the offering price must decrease to guarantee the participation of uninformed

investors. As underpricing is costly to the issuer, the issuer with a low dispersion has the incentive to communicate that feature by using a highly reputed underwriter. Using the sample of the 1980s IPOs, Carter and Manaster (1990) empirically document that prestigious underwriters are associated with IPOs that have lower initial returns.[4]

Direct empirical tests for Rock's (1986) model are difficult in the US IPO market for two reasons. First, US investment bankers employ the bookbuilding practice in issuing new shares and allocate shares to investors at their own discretion – an institutional feature differing from the assumption of Rock's (1986) model, in which applying for IPO shares is a fairly-handed lottery. Second, the availability of allocation data in the US remains to be an issue. Underwriters are reluctant to reveal these data, as they may reflect their allocation fairness and managing ability. Nonetheless, Michaely and Shaw (1994) find that IPOs with lower underpricing (Master Limited Partnership IPOs) involve less participation of institutional investors, which are usually assumed to be better informed than individual investors. In a like spirit, Aggrawal, Prabhala, and Puri (2002) find evidence that institutional investors have private information that allows them to minimize participation in the lemons in the IPO market.

In the countries where allocation data are available, Rock's (1986) proposal has been directly investigated, yet with inconclusive results. In a later influential study, Koh and Walter (1989) analyze 66 IPOs in Singapore during the period

[4] Beatty and Welch's 1996 study , however, shows that this relationship was reversed in the early 1990s. Loughran and Ritter (2001) report that during the Internet bubble period, bulge-bracket investment bankers left huge amounts of money on the table as well.

1973-1987 and find that the allocation-adjusted initial returns are positive but insignificantly different from zero. They are higher for small orders and lower for large orders, with the return-order relationship being nonmonotonic, having a saw-tooth pattern that reflects the allocation method in Singapore. Besides, rationing is applied much more stringently in underpriced than in overpriced IPOs, and large investors are more responsive to greater underpricing than small investors. All these results jibe with the prediction of Rock's (1986) model.

Levis (1990) analyzes 123 UK IPOs between 1985 and 1989, where issuers have discretion as to the method of allocation as a function of order size. The average allocation-adjusted initial return is positive and statistically significant. The return first increases according to order size and eventually decreases for larger orders, being insignificant for the largest orders above GBP2 million (US$3.5 million).

Keloharju (1993) studies 80 Finnish IPOs issued during 1984-1989 and finds that the allocation-adjusted initial return is a declining function of order size, being positive for small orders and negative for large orders. For the share applications between FIM5,000 and FIM200,000 (US$1,020 - US$40,816), the average allocation-adjusted return does not differ significantly from zero, while orders over FIM200,000 yield negative returns that are statistically significant.

Amihud, Hauser and Kirsh (2003) study 284 IPOs in the Israeli Tel Aviv Stock Exchange between 1989-1993, where equal allocation ensures that all subscribers receive the same proportion on his or her order. The researchers

find that underpricing is negatively related to the rate of allocation, consistent with the winner's curse hypothesis. Yet a statistically negative allocation-adjusted initial return is found, suggesting that IPOs are overpriced from the viewpoint of uninformed investors.

Table 1 summarizes four major studies that directly test Rock's winner's curse hypothesis by using the IPO allocation data, which are usually not available in the US new issue market. Details regarding sample size, offering schedule, and major findings are provided.

Table 1
Major studies on the direct test of Rock's (1986) model

Koh & Walter (1989)	
Sample Size	60 IPOs issued on the Singapore Stock Exchange between 1973-1987
Offering Schedule	• Real payment must be made when placing an order • Allocation takes the form of full allocation, pro-rata allocation, or balloting • Allocation system is selected after oversubscription • Although investors of the same order size have an equal chance of success, small investors are usually favored
Findings	Positive allocation-adjusted initial return, yet insignificantly different from zero
Levis (1990)	
Sample Size	123 UK fixed-price IPOs issued during 1985-1989
Offering Schedule	• Real payment must accompany an order • Allocation takes the form of scaling down, balloting, or a combination of the two • Issuers have discretion in the method and degree of allocation • Small investors are usually favored with higher allocation rates
Findings	Significantly positive allocation-adjusted initial return with a bell-shaped pattern at differing levels of application
Keloharju (1993)	
Sample Size	80 Finnish IPOs issued during 1984-1989
Offering Schedule	• Upfront payment is usually not needed in placing orders • Subscribers receive partial allocation on a pro-rata basis; balloting is rarely used • The number of shares allocated is generally a non-decreasing function of order size; however, the allocation rules are designed to favor small investors.
Findings	Allocation-adjusted initial returns decline with order size, being positive for small orders and negative for large orders
Amihud, Hauser & Kirsh (2003)	
Sample Size	284 IPOs issued on the Israeli Tel Aviv Stock Exchange between 1989-1993
Offering Schedule	• Subscribers deposit the full amount of their orders on the offering date • Allocation takes the simple form of pro-rata allocation • Allocation is strictly on a pro-rata basis
Findings	Negative allocation-adjusted initial return, with the mean marginally significant

2.1.2 Bookbuilding versus Fixed-Price Offering

In the US IPO market, the standard practice of pricing and allocating new shares is bookbuilding – an offering scheme substantially different from the fixed-price, even-handed offering method assumed in the winner's curse model. In a bookbuilding process, an underwriter builds a book by soliciting nonbinding contingent orders or indications of interest during road shows, and uses the solicited information for setting the final offering price. IPO managers have full discretion in allocating new shares to subscribers. Although not the principal method in Britain, the American practice of bookbuilding has recently gained increasing popularity among many European and emerging Asian markets, especially when it comes to international equity offerings.

Recently, several influential papers have studied the pricing and allocation schedules under the bookbuilding approach. Modeling the marketing of IPO shares as an auction-designing problem, Benveniste and Spindt (1989), for example, argue that underpricing and rationing are used as devices to entice selected investors to truthfully reveal the value of new shares. Sherman (2000) extends the original model to a repeated setting in analyzing bookbuilding IPOs, noting that bookbuilding allows the underwriter to form regular investor groups to reduce the average level of underpricing. Rather than assuming that investors possess information, Sherman and Titman (2002) consider the cost of gaining information and model the equilibrium degree of underpricing that compensates investors for acquiring costly information.

In support of the bookbuilding theory, Hanley (1993) reports that underwriters only partially adjust offering price when market demand is strong; upward price

adjustment from an original estimate is a good prediction for higher initial return. This higher underpricing is interpreted as compensation to induce investors to reveal their high demand for new shares. Hanley and Wilhelm (1995) show that institutional investors are favored in the allocation of hot IPOs, with the underwriter's expectation that they will participate in less attractive IPOs. Cornelli and Goldreich (2002) examine the books of 39 international equity issues and find that informed and regular investors receive favorable allocations. Investment bankers award more shares to bidders who provide more information in their bids or revise their bids. Aggrawal, Prabhala, and Puri (2002) use data on the proportion of the issue that is allocated to institutional investors and retailing investors, and report that institutional investors receive a larger proportion of shares in the IPOs that are more underpriced.

In countries other than the US, fixed-price offering still remains the major offering mechanism. In this practice, the final offering price is set in advance before much information is gleaned on the aggregate demand of new shares. Loughran, Ritter, and Rydqvist (1994) show that underpricing is greater in a fixed-price environment than when demand information is gathered before the final sale. Spatt and Srivastava (1991) show that in simultaneous play by both seller and bidders, bookbuilding generates higher expected proceeds and stochastically dominates the fixed-price method. Welch's 1992 model allows sequential selling in the fixed-price IPO process so that late-coming investors can base their decisions on the decisions of early investors. In this situation, pricing even just a bit high may leave the issuer with too high a probability of complete failure when he or she is not clear about market demand. By

underpricing IPOs, therefore, the fixed-price method uniquely offers the potential to lure early investors and generate an immediate buying frenzy.

Chowdhry and Sherman (1996) argue that in the fixed-price practice, relevant price information becomes public knowledge before investors have finished bidding for new shares. As a consequence, there are instances when all investors realize ex ante that an offering price is too low, resulting in a large oversubscription for the firm's shares, and there are instances when the investors realize that an offering price is too high, resulting in failure of the issue. Chowdhry and Sherman's (1996) model shows that IPOs are underpriced to reduce the likelihood of failure of the issue if the failure is costly. This is to compensate the uninformed investors for the adverse selection they face in the allocation of shares. Chowdhry and Sherman (1996) further argue that if an issuer collects an interest float on the funds deposited by investors for shares they bid, the interest revenue reduces the cost associated with underpricing and thus provides an incentive to underprice the issuer further.

Following the spirit of Welch (1992) and Chowdhry and Sherman (1996), Benveniste and Busaba (1997) compare fixed-price offering with bookbuilding when investors have correlated information and can observe each other's subscription decisions. Fixed-price method is a strategy that creates cascading demand; alternatively, bookbuilding generates higher expected process but exposes the issuer to greater uncertainty. Either method can be optimal, depending on the characteristics of the issuing firms – the degree of risk aversion and marketing cost.

2.1.3 Alternative Theories on Underpricing

In this sub-section, alternative theories other than the winner's curse explanation are reviewed in the order of their importance (from the author's viewpoint). These six theoretical streams include: signaling hypothesis, conflict of interest hypothesis, ownership structure hypothesis, aftermarket trading hypothesis, litigation-risk hypothesis, and finally, informational-cascade hypothesis.

A. Underpricing and Signaling

In contrast with the Rock's (1986) model, signaling-based models assume that the issuer is better informed than the investors. A problem thus surfaces: only issuers with below-average quality are willing to sell their shares at the average price. To distinguish themselves, high-quality issuers deliberately sell their shares at a price lower than what is expected by the market, deterring low-quality issuers from imitation. The model of Welch (1989) and Grinblatt and Hwang (1989) show that issuers signify their quality by underpricing to facilitate seasoned offerings at higher prices. Allen and Faulhaber (1989) present a model that underpricing signals favorable prospects for firms and results in favorable market responses to future dividend announcements. Chemmanur (1993) argues that underpricing induces information production from investors (for instance, in the form of analyst coverage) so that a more precise valuation of a firm in the secondary market is available.

Empirical tests show mixed results in favor of this type of model. Welch (1989) documents substantial post-market issuing activities by those IPO firms. Jegadeesh, Weinstein and Welch (1993), however, find that returns after the

first day are just as effective in inducing future issuing activity as the first-day return are. Moreover, Michaely and Shaw (1994) outright reject the signaling hypothesis: in a simultaneous equation model, no evidence is found that IPOs with more underpricing bear a higher propensity to return for seasoned equity offerings or to pay dividends.

B. Agency-Based Explanation

In the agency-based explanation of underpricing, the issuer can be less informed about the capital market than the underwriter, who performs the functions of underwriting, financial advising, and distribution. Baron (1982) argues that, due to this informational asymmetry, the issuer must permit some underpricing to induce the underwriter to effectively market the IPO shares, in that the issuer cannot monitor the underwriter without cost. However, Muscarella and Vetsuypens (1989) document that when investment banks themselves go public, the shares are just as underpriced even though no monitoring problem exists. For 38 investment banks' self-marketed IPOs during 1970-1987, the average underpricing is about seven percent, which is not significantly different from the initial return of typical IPOs of equivalent size. Habib and Ljungqvist (2001) similarly argue that underpricing is a substitute for costly marketing expenditures. Using a data set of IPOs during 1991-1995, they report that an extra dollar left on the table reduces other marketing expenditures by one dollar.

These trade-off theories, however, do not plausibly explain the severe underpricing of IPOs during the Internet bubble, when IPOs of many Internet firms were the easiest shares ever to sell because of the intense interest by many

investors (Ritter and Welch, 2002).Loughran and Ritter (2002) have developed a new agency theory that emphasizes the conflict of interest between the underwriter and issuer in the bookbuilding process. They argue that underwriters intentionally leave more money on the table than necessary, induce oversubscription from investors, and use their discretion to allocate shares to the favored buy-side clients in return for quid pro quos. In this fashion, discretion in share allocation is not used in the best interests of issuers, and underpricing becomes an indirect benefit for the underwriter.

Moreover, Loughran and Ritter (2002) use prospect theory to explain why issuers don't get upset about leaving so much money on the table. Entrepreneurs' tolerance may stem from higher aftermarket valuation than expected. Recent wealth increase, as revealed through bookbuilding, lessens the bargaining efforts of issuers in their negotiations with underwriters over the offering price. This agency, plus psychological explanation predicts that there should be sluggish adjustment to not only private but also public information during road shows, as there is no distinction about the source of favorable information. Lowry and Schwert (2002) present evidence that when the general market rallies during the road-show period, underwriters do not fully adjust their offering prices upward. In this way, the theory also explains the phenomenon of hot issue market.

C. Underpricing and Ownership Structure

The excess demand caused by underpricing may provide issuers and underwriters more flexibility in allocating new shares and help achieve a target ownership structure. Booth and Chua (1996) posit that underpricing is used to

increase investor dispersion and thereupon to increase aftermarket liquidity. In their model, the persistent benefit of increased liquidity emanates from the reduced required rate of return to investors. As broad initial ownership may cause more information cost to be borne by investors, the IPOs are intentionally underpriced to compensate for information cost incurred. Nonetheless, Brennan and Franks (1997) suggest that firms underprice shares to generate excess demand and ownership dispersion with a different end in mind. In a sample of 69 UK IPOs, they find that underpricing may serve as takeover-defense strategy by allocating shares widely rather than with a few powerful shareholders. This allows entrepreneurs to retain more corporate control and makes it more difficult to oust them after the companies go public.

Consistent with the conjecture of Brennan and Franks (1997), Field and Karpoff (2002) find that many firms deploy takeover defenses as early as the IPO stage, and that the presence of a defense is negatively related to subsequent acquisition likelihood. Also, Smart and Zutter (2003) find that dual-class IPOs experience less underpricing than single-class IPOs and that dual-class firms relinquish control through acquisitions less frequently than single-class firms.[5]

In contrast to the above arguments, Stoughton and Zechner (1998) relate IPO underpricing to the merits of blockholder ownership, arguing that the excess demand created by underpricing enables the allocation of shares to large blockholders, who can more efficiently supervise their management and create a positive externality for atomistic investors. In a like spirit, Mello and Parsons

[5] In a typical dual-class IPO, insiders issue ordinary common shares to public investors while retaining ownership of a class of shares with superior voting rights. Insiders thereby insulate themselves from outside control.

(1998) present a model pointing out that a two-portion issuing scheme may be more effectual – first with the IPO shares targeted at atomistic investors and then with a private placement aimed at blockholders.

D. Underpricing and Aftermarket Trading

It is argued that underpricing can increase short-run aftermarket liquidity of listed IPOs and bring additional trading revenue to the underwriters who make the market. Krigman, Shaw and Womack (1999) offer the evidence that greater underpricing leads to higher trading volume after the IPO. Ellis, Michaely and O'Hara (2000) report that market making is a profitable activity for the lead underwriter. Fishe (2002) also presents a model that flipping – the activity of immediately selling allocated IPO shares in the aftermarket – caused by underpricing creates artificial demand that is sometimes useful. One critique on this type of argument, however, is that it is unclear how an issuing firm benefits from the underpricing for long since the increased liquidity appears to be temporary.

A number of recent articles concentrate on the stabilization role of the lead underwriter when aftermarket trading starts. Aggarwal (2000) reports that if the underwriter anticipates weak demand, it will typically allocate up to 135 percent of the offering, taking a naked short position. The underwriter then buys back the incremental 20 percent and has the option of buying back the other 15 percent, treating the shares as if they were never issued in the first place. Aggarwal and Conroy (2000) document that the lead underwriter is typically the dominant market maker for Nasdaq-listed IPOs. The underwriter knows with whom shares are placed, and thus has a competitive advantage at

contracting investors if there is an order imbalance. Ellis, Michaely and O'Hara (2002) further report that market making activity in Nasdaq-listed IPOs continues to be concentrated long after an offering.

E. Underpricing and Litigation Risk

Under the litigation-risk hypothesis, issuers intentionally underprice their shares as a form of insuring against their future liability (Ibbotson, 1975; Tinic, 1988). Hughes and Thakor (1992) model the argument in a game-theory setting and show that a lower offering price decreases the likelihood of being sued by lowering the likelihood that the market price falls below the offering price after listing. The empirical support of this theory, however, is mixed. Drake and Vetsuypens (1993) find that underpricing does not protect the IPO firms from being sued since the sued IPOs actually have higher underpricing. In addition, comparable underpricing levels also occur in countries where the US-specific litigation risk is negligible (Keloharju, 1993). Lowry and Shu (2002) adjust for the endogeneity bias in previous literature by using a simultaneous equation framework, finding that higher underpricing lowers expected litigation cost (deterrent risk) and that firms with higher litigation risk underprice their IPOs by a greater amount (insurance effect).

F. Underpricing and Informational Cascade

The seminal work of Welch (1992) relates the pricing of new shares to herd behavior and cascade effect in a sequential-selling framework. When IPO shares are sold sequentially, late potential investors can learn from the purchasing decisions of earlier investors. This can lead rapidly to cascades in which subsequent investors optimally ignore their private information and

imitate earlier investors. Therefore, demand can be so elastic that even risk-neutral issuers underprice to ensure full subscription and completely avoid failure. In support, Amihud, Hauser and Kirsh (2001) find that IPOs in Israel tend to be either undersubscribed or hugely oversubscribed.

2.1.4 Summary

Existing literature demonstrates that underpricing is a persistent feature of the IPO market, and that its magnitude may vary over time and across countries. This section reviews major articles on short-run underpricing, with the focus on winner's curse models and the comparison of two popular offering methods (bookbuilding versus fixed-price offering). Overall, empirical studies at least partially support the validity of the winner's curse models that are based on the information asymmetry between informed and uninformed investors, while evidence on other explanations is still mixed. Ritter and Welch (2002) argue that it is more likely that a variety of reasons work simultaneously to cause the underpricing phenomenon. Therefore, the more important matter is to discern which models are more crucial given a particular context. This appears to be the new scope for financial economists to understand the magnitude and variation of IPO underpricing.

2.2 Long-Run Performance of the IPO Firms

In recent years post-IPO performance has attracted immense attention of both financial economists and investment practitioners. Such interest is instrumental in the formation of trading strategies of both the IPO subscribers who have been allocated shares at an offering price and the secondary-market investors who purchase new shares at much higher first-day closing prices. More importantly,

the studies on the subject are driven by the belief that stock prices adjust slowly to information, so that examining long-horizon returns may provide fresh insights into the traditional market efficiency hypothesis. This section reviews related empirical evidence, theoretical explanation, and methodologies concerning return metrics and statistical inference.

2.2.1 Evidence and Sources

Contrary to short-run underpricing, initial aftermarket prices of IPO firms appear to be overpriced as they show a downward price trend in the long run. Ritter (1991) and Loughran and Ritter (1995) report that the buy-and-hold returns of recent IPOs (which yield 16 percent) are 50 percent lower than they are for comparable size-matched firms (which yield about 66 percent). Brav and Gompers (1997) argue that IPO underperformance comes primarily from small, nonventure-backed IPOs. They find that venture-backed IPOs outperform nonventure-backed IPOs using equally-weighted returns, and that value weighting significantly reduces performance differences. Underperformance is not unique to firms issuing equity: firms of similar size and book-to-market ratio that have not issued equity perform as poorly as the IPO firms. Brav, Geczy and Gompers (2000) find that IPO long-run returns are similar to non-issuing firm returns matched on the basis of size and book-to-market ratios.

Ritter and Welch (2002) make an excellent summary of the empirical studies of IPO underperformance. "When public traded firms similar in market capitalization and book-to-market values are used as a benchmark, it becomes clear that the poor long-run performance of firms similar to the IPO firms

extends beyond the IPO market. IPOs are strongly tilted towards small growth firms, and this has been the worst-performing style category of the last several decades" (Ritter and Welch, 2002: pp. 1817). Using the US data from 1980-2001, the three-year average market-adjusted return on IPOs is -23.4 percent, whereas the average style-adjusted return is -5.1 percent. Seasoned firms matched by market capitalization and book-to-market underperform the broader market by almost as much as IPOs do.

This long-run underperformance is consistent with the Miller's (1977) heterogeneous-expectation hypothesis. When there are constraints on shorting IPOs, the most optimistic investors buy the IPO. As the heterogeneity of opinions decreases over time, the marginal investor's valuation converges towards the mean valuation of the firm. This theory is also consistent with the drop in share price at the end of the lock-up period as documented by Field and Hanka (2001).

In addition, some empirical findings help explain the poor long-run post-IPO performance, if the pattern exists at all. Jain and Kini (1994) and Mikkelson, Partch and Shah (1997) show that long-run underperformance is accompanied by poor financial accounting performance following the IPOs relative to pre-listing records or industry conditions. Moreover, Teoh, Welch and Wong (1998) attribute some of the underperformance to aggressive earnings management early in the life of a company. In a like spirit, Purnanandam and Swaminathan (2002) find that IPOs that are priced high relative to public market comparables tend to perform worse in the long-run even though they show higher initial returns. To a great extent, pre-IPO financial packaging may help the issuers

look more attractive and make it difficult to discern the hidden warning signals. Hence, poor long-run performance is due to investors who are unduly optimistic and unable to properly forecast tougher times ahead.

2.2.2 Methodology Discussions

In methodological terms, the studies on long-run aftermarket performance (Ritter, 1991; Loughran and Ritter, 1995; Brav and Gompers, 1997) use nothing more than the event-study technique involving long-run abnormal stock returns. There is considerable variation, however, regarding the metrics of abnormal returns, asset pricing models, and statistical tests that empirical researchers use to detect the magnitude of abnormal returns.

Barber and Lyon (1997) argue that long-run abnormal returns should be calculated as the long-run buy-and-hold return of an event firm less the long-run buy-and-hold return of an appropriate benchmark (which is called the buy-and-hold abnormal return or BHAR). Moreover, they document that there are significant biases in test statistics when long-run abnormal returns are calculated using a reference portfolio as the benchmark, for instance, a market index. The misspecification is due to three biases of calculating the abnormal returns in this fashion – the new listing bias, the rebalancing bias, and the skewness bias. The cumulative abnormal return (CAR) is most subject to the new listing bias while the BHAR is more affected by the rebalancing and skewness biases. Finally, when the three identified sources of misspecification are corrected by matching sample firms to control firms of similar size and book-to-market ratio, the control firm approach yields well specified test statistics in virtually all sampling situations.

The use of the BHAR metric, however, is criticized by Fama (1998) from the point of view of asset pricing. First, the severe skewness bias of BHARs is inconsistent with most of the asset pricing models that commonly assume normally distributed returns, such as CAPM (Sharpe, 1964) and ICAPM (Merton, 1973). Second, the empirical tests of asset pricing models and market efficiency typically use monthly returns rather than multi-year returns. Third, BHARs can give false impressions of the speed of price adjustment to an event, as BHARs can grow with the return horizon even when there is no abnormal return after the first period. On this account, Fama (1998) favors the shorter-interval return metric of CARs in testing any present abnormal return.

In terms of statistical inference, abnormal returns are usually neither independently distributed nor normally distributed. First, many of the sample firms overlap in calendar time as the horizon of a chosen event window lasts at least three years, causing the calculated abnormal returns of sample firms to lose independence. One method of solving the temporal dependence in returns is the time-series regression approach (Fama and French, 1993). Fama (1998) argues that many long-run return anomalies disappear as time-series regression models are employed (such as the Fama-French (1993) three-factor model). Despite this merit, Loughran and Ritter (2000) point out that the value-weighted three-factor time series regressions cause low statistical power when abnormal returns that follow managerial actions are estimated.[6] Brav (2000)

[6] Loughran and Ritter (2000) suggest that three reasons may cause the low power of the Fama-French (1993) three-factor model. The first reason is the equal weighting of each time period: "If there are time-varying misevaluations that firms capitalize on by taking some actions (a supply response), there will be more events involving larger misevaluations in some periods than in others" (pp. 362). The second reason is the scheme of value-weighting returns: "If percentage misevaluation is greater among small firms than among big firms, then tests that weight firms equally should find greater abnormal returns than tests that weight firms by market

tentatively addresses the problem of overlapping windows in a Bayesian approach framework. However, this elaborate methodology is subject to the assumption of ex ante belief on the return generating process, the knowledge of which is very limited in real cases.

Second, abnormal distribution of long-run abnormal returns also contributes to the misspecification of test statistics. The most common problem of abnormal distribution is the skewness bias, which usually causes a negative bias of test statistics, especially in the multi-year BHAR metric. Lyon, Barber and Tsai (1999) base the inference on a skewness adjusted t-statistic and the empirically generated distribution of long-run abnormal returns. Both of these approaches perform well in random samples; however, misspecification in nonrandom samples is pervasive. They conclude that analysis of long-run abnormal returns is treacherous.

On the whole, much caution should be used in calculating and understanding long-run aftermarket returns. Results are sensitive to the selection of return metrics and test statistics, the studies of which are still inconclusive among financial economists and statisticians. Moreover, the empirical results depend on the exact sample period chosen by researchers.

2.3 Previous Studies on the Chinese IPOs

A large number of international IPOs take the special form of privatization – either privatization sales or share issue privatization (SIP), both usually

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capitalization" (pp. 363). The third reason is benchmark contamination: "A test is biased towards high explanatory power and no abnormal returns if it uses a benchmark that is contaminated with many of the firms that are the subject of the test" (pp. 364).

demonstrating a greater degree of underpricing (Jenkinson and Mayer, 1998) than traditional IPOs in mature capital markets.[7] In current IPO literature, two hypotheses have been proposed to explain the deliberate underpricing by the government in privatization IPOs. In the reputation-building hypothesis, a selling government signals its commitment to current policy by temporarily retaining a stake in the firm while transferring managerial control; therefore, early sales may be deliberately underpriced to convince the market to absorb larger sales in the future.

In the constrained-capacity hypothesis, capital markets are capacity constrained in the short-run, implying a temporarily inelastic demand for stocks. Hence, a very large stock sale in a small segmented market may require investors to invest a large fraction of their wealth in the issue, and therefore demand a large risk premium. As will be discussed later, the first hypothesis has been tested in the Chinese IPOs, yielding inconclusive results.

Great IPO underpricing is documented in China's SIP programs since the mid-1980s. Mok and Hui (1998), in a sample of 87 A-share IPOs listed on the Shanghai Stock Exchange (SHSE) during 1990-1993, document an average 289 percent initial return after netting out the market effect. The mean initial return reduces to 178 percent in a later study by Chan, Wei and Wang (2001), yet remains higher than those in an international survey conducted by Loughran, Ritter and Rydqvist (1994). These findings are consistent with the international privatization studies of Jenkinson and Mayer (1988) and Perotti and Guney (1993). However, leaving so much money on the table is surprising for a

[7] In China, the IPOs dominantly take the form of SIP, in which the issuer offers new shares to

country which eagerly needs huge sums of capital to restructure and revitalize its many underperformed state-owned enterprises (SOEs).

Previous studies link severe underpricing to the argument of asymmetric information or signaling. Mok and Hui (1998) provide evidence that the level of underpricing is related to some Chinese characteristics: underpricing is positively related to the long interval between offering and listing date (with a mean of 307 days in their 1990-1993 sample)[8] and negatively related to the proportion of shares retained by the state or legal persons (both are nonnegotiable shares). Mok and Hui (1998) argue that the length of time between date of offering and listing date is a proxy for ex ante uncertainty of the issues, and that high state-owned stakes could be interpreted by domestic investors as governmental confidence and business guarantee and thus help reduce uncertainty of the offerings.

Interestingly, Su and Fleisher (1999) report a negative correlation between underpricing and retention ratio of the state and legal persons (approximately one less the ratio of negotiable shares to total shares).[9] They argue that underpricing is a strategy for the SOE companies to signal their quality to investors; the more stakes retained by the state and legal persons, the higher the

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public investors while continuing to hold its own shares.

[8] Many Chinese sample IPOs were issued before 1990 and later listed during 1990-1993. Most of those IPOs in the 1980s were issued at par or at a slight premium, thus causing a long interval between offering and listing dates and causing extremely high initial returns. This fact can help to explain the empirical findings of Mok and Hui (1998).

[9] There may be two explanations for this contradiction with Mok and Hui (1998). The first explanation is simply a difference in sample size, as Su and Fleisher (1999) use a larger sample from 1987-1995 (which also includes more earlier IPOs). Second, the contradiction may be result from different calculation methods of the retention held by the state and legal persons. The relative IPO size and the proportion of shares retained by the state and legal persons are not perfect complements due to the presence of employee shares, which may lead to different results in regression analysis.

quality of the companies and the higher the underpricing. As additional support, Su and Fleisher (1998) find that issuers with greater underpricing have a higher propensity to raise larger amounts of capital through follow-on rights offerings. However, neither of these explanations is sufficient to convincingly explain the magnitude of the underpricing in China.

Moreover, close scrutiny of China's institutional arrangement will cast doubt on the robustness of the signaling explanation. In China, the SIP program is implemented on a gradual basis and without the control of state assets being transferred to private sectors. The retention of state-owned and legal-person shares results more from political and ideological constraints on privatization than from the optimal signaling schedule designed by the state. The stakes of the state and legal persons are determined at the time of IPO, roughly around 2/3 of the total common equities. In practice, therefore, the signaling function of underpricing may not be feasible in practice to reveal the true quality of the issuer, as all of the SOE issuers are required to retain part of their shareholding.

Differing from previous Chinese IPO studies, this study tests the explanatory power of Rock's (1986) model by focusing on the information asymmetry between different investor groups rather than between investors and issuers. In a newly established primary market like China – where information asymmetry between different groups of investors is more severe than in the mature markets and where legal protection for individual or small investors is poorer – winner's curse could have a more vital role in affecting the IPO pricing strategy. The issuer or the state may have higher motivation of underpricing new shares to attract sufficient participation of individual investors, who in aggregate could

be critical for the sustainable growth of China's capital market in the long run. Ideally, the IPO allocation mechanisms and the availability of allocation data in China make this endeavor easier to conduct.

Chapter III: The Emerging Chinese IPO Market

It was China's partial-privatization strategy (officially called by the Chinese government the Corporatization Strategy) on the reform of the country's state-owned enterprises (SOEs) that gave birth to China's new issue market. This privatization strategy, which was tentatively and sporadically introduced in the mid-1980s, was formally implemented nationwide in the early 1990s. Since then, the IPO market in China has rapidly expanded and assumed the dual functions of capital raising and ownership restructuring for SOEs that are mandated to be privatized. The issuing of new shares to social/public investors results in partial privatization in China. For a rudimentary understanding of this emerging IPO market, this chapter discusses several key institutional factors about China's capital market. Section 3.1 introduces its unique equity ownership structure. Section 3.2 provides an overview of the domestic IPO market and its related institutional arrangements. Finally, current offering practices and allocation mechanisms are described in Section 3.3.

3.1 Ownership Structure of China's Listed Companies

Because of the country's partial-privatization strategy, the ownership structure of China's listed companies differs systematically from developed markets as well as most other emerging markets. In China, the SOEs are transformed to public companies through SIP, in which new shares are offered to social public investors. Unlike the conventional SIP in which original shareholders (like the state or institutions controlled by the state) are allowed to sell their old shares to the public, state ownership in China is strictly forbidden from being transferred to social investors at and after the SIP. Therefore, the state or state-related

enterprises or agencies hold a substantial amount of nonnegotiable equity stakes of the SOEs that have been listed on the stock exchanges. As those nonnegotiable shares have the same voting rights as the negotiable shares, the state or state-linked institutions retain substantial control of the management of the listed SOEs, while social public investors have only a minor management role.

From an institutional perspective, this ownership segmentation results from the fact that China has adopted a gradual and dual-track approach to its economic reforms. Adopting the strategy of crossing the river by touching stones, China's social and economic reforms have proceeded without complete market liberalization or political democratization. This ideological constraint has led to caution in developing China's capital market, causing the unique privatization procedure and ownership structure in this world's largest developing country.

Typically there are five types of common shares for a listed SOE company in China as shown in **Table 2**. In terms of negotiability, both the state-owned and legal-person shares are not allowed for public trading on the exchanges at this time. These two types of shares are created during the incorporation of the listed SOE before the IPO, when original capital contribution is made by the central or local government, quasi-government agencies, or legal persons (usually SOEs or collectively-owned enterprises) during incorporation.[10] On the

[10] Particularly, state-owned shares have been created in China to designate holdings in the SOEs by the central government, local governments, or wholly government-owned enterprises to preserve the economy's socialist structure. Legal-person shares are owned by domestic institutions, most of which are also owned by or connected to the central or local government. Legal persons are typically business agencies or enterprises of local governments that help public companies either by giving them permission to operate or by allowing resources under their control to be used for company start-up. The transferring of state-owned and legal-person

whole, these nonnegotiable shares comprise about 2/3 of the total outstanding shares of a listed company and thus allow the state and legal-person shareholders to possess a majority control. By contrast, negotiable shares are formed when new shares are sold directly to the public through the IPO. These negotiable shares start to trade in the open market as soon as the companies are listed on two nationwide stock exchanges – the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE).

Negotiable shares split into A-type shares and B-type shares. A-type shares are targeted to China's domestic public investors, with the denomination of RMB (Renminbi or Chinese yuan). B-type shares are issued to international investors while avoiding overseas listing, as a means of attracting indirect foreign investment without the full liberalization of capital account. B-type shares listed in the SHSE are denominated in US$ while B-type shares listed in the SZSE are denominated in HKD.[11] For most of the listed companies, A-type shares and B-type shares are minority shares, the combination of which constitutes about 1/3 of the total market capitalization.

Finally, employee shares are offered to the employees and executives of a listed SOE as an incentive mechanism. After the lock-up period that usually ranges from 6-12 months, they are converted to A shares and open to trade on the exchanges. Ironically, the evidence shows that the holders of employee shares are usually active flippers, who almost without exception sell their shares as

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shares is tightly regulated by the government, usually through private negotiations between the institutions, or through auctions organized by the government.

[11] The first B-type stock was issued by the Shanghai Vacuum Electron Devices Co., Ltd (SHSE stock code: 600602) in 1991, with a total offering size of 100 million shares. The offering price

soon as the lock-up period expires. Perhaps partially for this reason, with the promulgation of the Announcement on Abolishing the Issuance of Employee Shares (CSRC, November 1998), the issuance of this type of share has no longer occurred in China's capital market.

In summary, this mandatory division of negotiable and nonnegotiable shares is a pragmatic approach to developing China's capital market, while at the same time serving the political ends of China's SOE reforms. Under this institutional arrangement, the state still controls a considerable portion of state-owned and collectively-owned assets so that the socialist nature of the country is preserved. By adhering to this political correctness, the restructuring and privatization process can continue without redressing much of the current legal and constitutional framework – exactly reflecting China's gradualism nature in its social and economic reforms.

Of course, one side effect of this gradualism approach and mandatory division of negotiable and nonnegotiable shares is the popular "tunneling" phenomenon among listed companies (Johnson, La Porta, Lopez de Silanes and Shleifer, 2000). As the promoters or holders of nonnegotiable shares are usually the controlling shareholders, they have strong motivation to engage in related transactions with the listed company. For example, the listed company buys worthless assets from the promoters at illegitimately high prices, or lends to the promoters at favorable interest rates. Tunneling has given rise to many regulatory concerns for the government. Accordingly, the improvement of

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was set at RMB4.20 or US$0.74 per share. The global underwriter responsible for this B-share offering was the Union Bank of Switzerland (UBS).

corporate governance among listed companies has recently been heatedly discussed by policy makers and researchers.

Table 2
Equity types of a typical listed SOE in China

This table summarizes the main features of the different equity types of a typical listed SOE company based in China. The five equity types are state-owned share, legal-person share, A-type share, B-type share and employee share. They differ in terms of their shareholders and negotiability.

Equity Type	Shareholders	Negotiability
State-Owned	Held directly by the central government, local governments, or wholly state-owned enterprises	Tradable
Legal-Person	Held by domestic institutions, many of which are mainly owned by or connected to the government or government-linked agencies	Tradable
A-Type	Issued to domestic social public investors, either individual Chinese citizens or domestic institutions	Tradable in A segment
B-Type	Issued to foreign investors and investors from HK, Macao, and Taiwan	Tradable in B segment
Employee	Issued to employees and executives of a SOE to be listed; as of November 1998, employee shares are no longer issued	Tradable after the lock-up period of six to twelve months

3.2 An Overview of China's IPO Market

This section provides an overall picture of China's IPO market. First of all, it provides a short historical review of how the new issue market started from scratch and evolved to its current status quo. Next, China's securities regulatory system and regulatory authority are briefly introduced. Finally, this section discusses the new sponsorship system, introduce in February 2004, that has begun to regulate China's equity offering activities.

3.2.1 Historical Review

The IPO process in China serves as a vehicle through which the original SOEs raise new capital for restructuring and new projects, diversify state ownership by introducing new social shareholders, and in the long run build modern corporate governance among the SOEs. The past two decades have witnessed how China's new issue market has evolved from scratch and geared to the rapid development of the country's capital market.

The origin of the new issue market in China can be traced back to the mid-1980s. After the third plenum of the eleventh central committee of the Communist Party of China in December 1978, China's economic and political reforms were inaugurated and gradually implemented. The early focus of the reform was on the implementation of the "household contracting responsibility system" in the agricultural sector – that is, the peasants were granted full rights in cultivating the land allocated to them and retaining whatever profits were generated, while ownership of the land was retained by the state. This new system proved to be a great success in increasing peasants' income and standard of living.

In the mid-1980s, therefore, SOEs experimented with the analogous enterprise responsibility model. Managers of the SOEs assumed the operational responsibilities of these companies for several years with an annual profit target. Any profits above the target would be paid to management and employees as incentive bonuses. Unfortunately, this experiment failed to work out, as the arrangement only induced the myopic behavior of management and did not

improve the long-run efficiency of the enterprises. However, it was this failure that led to the ownership reform of the SOEs.

The deteriorating operating performance of industrial enterprises made China's policymakers realize the importance of clear property ownership in turning around the SOEs. During the mid- and late 1980s, a new round of SOE reform took the form of share ownership. The reform transformed the original SOEs or collectively-owned enterprises into limited-liability or joint-stock companies, allowing participating SOEs to raise capital by issuing new shares to the social public. As a result, the multiple classes of shares emerged for these companies, which are respectively tied to the state, state-related legal persons, and social public investors.

The ownership reform in the late 1980s preceded the eventual establishment of the new issue market in China. Although there was no formal nationwide primary market at the time, those issues were the prototype of later IPO activities. Most of those capital raisings were of a direct- or private-placement nature, in that target investors were mainly composed of issuers' employees, executives, and individuals or institutions of the places where the issuers were located. Most of the issues were priced at par value. Also, there was no standardized professional norm for equity offerings, for lack of either specialized intermediaries or proper regulatory framework. Part of these early offerings to social investors were later approved by the State Council and listed on the SHSE and SZSE.

The growing issuance to social investors finally led to the formation of the nationwide capital market, as marked by the establishment of the SHSE and SZSE in 1991. On August 21, 1991, Shanghai Xingye Housing Co., Ltd. issued China's first formal IPO and received total proceeds of RMB20 million (US$2.5 million), with the offering price of RMB60 (US$7.4) per share and par value of RMB10 (US$1.2). From 1990 through 1998, the domestic IPO market showed an impressive growth rate by pushing hundreds of SOEs onto the exchanges and attracting abundant funds from the public. Due to the vast magnitude of IPO underpricing, investor sentiment in the new issue market was very strong, resulting in severe oversubscription of almost every offering, which was one of the most distinctive features of China's domestic IPO market.

Before 1999, the IPO process in China was highly administration-oriented, and a so-called quota system guided the capital raising activities. At the very beginning of each year, the national IPO quota was approximately divided among the country's provinces and municipal cities. The purpose of the quota system was to guarantee an orderly sequence of IPOs so as to prevent supply shocks, creating unbeatable IPO demands and achieving a perfect environment for later SOE IPOs. However, the limited IPO quota made each permit very valuable, and created a huge opportunity for rent seeking, lobbying, and even bribing. The quota system also encouraged companies to commit financial fraud and earnings manipulation to acquire the scarce quota allocated to their provinces.

Meanwhile, to contain rampant financial fraud and to protect social investors, policymakers gradually enhanced regulations to create a primary market with

higher transparency and better information disclosure. The Interim Rules on Stock Issuance and Trading (CSRC, 1993) proscribed various miscreant practices and provided civil compensation for those who were financially injured as a result of issuers' frauds. More importantly, the Company Law promulgated in 1993 provided the basic support for shareholders' rights to seek compensation for damages due to financial fraud and market manipulation. Also, the functions of various intermediary services were strengthened. Specialized underwriters evolved from large securities companies and financial institutions, while other agencies like law firms and accounting firms participated more actively in the offerings.

Since 1999, China's domestic IPO market has experienced two fundamental changes. First, the market-supported mechanism has replaced the original quota system with the so-called verification system. Any company can issue new shares as long as it files with the regulatory authority and receives approval. Under this more liberalized mechanism, issuers and underwriters play a more vital role in the IPO process, while the central and local governments interfere less. Particularly, since 1999, issuers and underwriters have more discretion in determining the price and quantity of their offerings. Under the quota system that was in place before 1999, however, prices were pegged around a fixed P/E ratio recommended by the regulatory authority (for example, the fixed P/E ratio was 15 during 1996-1998). After the annulment of the quota system in 1999, free pricing was allowed during until 2001, and a maximum offering P/E ratio of 20 was recommended in 2002.

Second, investor protection has been further enhanced since 1999. The milestone event in this enhancement was the promulgation of the Securities Law in December 1998, which was China's first statute regulating the offering and trading of equities and other financial securities. More detailed complementary regulations were at the same time issued by the regulatory body under the Securities Law. Sounder regulatory and protection mechanism has attracted more investors to both the primary and secondary markets, including long-term institutional and strategic investors.

3.2.2 CSRC and Securities Regulation

Analogous to the country's economic reform, the establishment of China's centralized regulatory framework governing securities activities has also followed a trial-and-error approach. In the process, administrative practices have usually preceded securities legislation. The State Council Securities Commission (SCSC) and the China Securities Regulatory Commission (CSRC) were established in 1992, marking the formation of a two-tier regulatory system. At the time, the SCSC was the state authority responsible for exercising centralized market regulation, and the CRSC was the executive branch of the SCSC in charge of the supervision and regulation of the securities market. The scope of authority of the SCSC and the CSRC gradually expanded with the growth of the securities markets. The regulation was strengthened in August 1997, as the State Council decided to put the SHSE and SZSE under the supervision of the CSRC. Meanwhile, offices of the CSRC commissioners were set up in those two municipalities.

The regulatory system became less hierarchical because of the State Council reform started in April 1998. The SCSC and the CSRC were merged to form one ministry-rank unit directly under the State Council, and it was the CSRC that survived the merge. As a result, both the power and function of the CSRC were strengthened, thus eventually forming a centralized securities supervisory system. In September 1998, the State Council approved the Provisions Regarding the CSRC's Functions, Internal Structure and Personnel, further confirming the CSRC as one of the enterprise units directly under the State Council and the authorized department governing the securities and futures markets of China.

Currently, the major functions of the CSRC in the regulating securities market are: [1] To establish a centralized supervisory system for securities markets; [2] To strengthen the supervision over securities business, stock exchange markets, listed companies, fund management companies, and other financial intermediaries; [3] To raise the standard of information disclosure and to prevent and handle financial crises; and [4] To organize the drafting of laws and regulations for securities markets and to formulate development plans and annual plans for securities markets.

The Department of the Public Offering Supervision (DPOS) and the Issuance Examination Commission (IEC) under the CSRC specialize in the supervision and approval of domestic security offerings. Specifically, the DPOS conducts preliminary examinations of the authenticity of filing documents and prepares initial reports on offering applications. The IEC further verifies the filing documents and the preliminary reports prepared by the DPOS. The IEC consists

of 25 directors, five of which are insiders of the CSRC and 20 of which are outside directors. They put forward their examination opinions and approve or veto the application for issuance through voting. The CSRC eventually determines whether to approve an offering application based on the voting results of the IEC.

3.2.3 IPO Sponsorship System

In February 2004, the CSRC established the IPO sponsorship system as the principal criteria in regulating issuer and lead underwriter's activities during the offering process. Having originated in Britain and developed in the Hong Kong capital market, the sponsorship system requires that an underwriter and its IPO managers assume joint and continued legal obligations for the issuance of securities. Before engaging in any IPO business, a security company and its IPO managers must first be qualified by the CSRC to serve as the sponsoring institution and sponsoring representatives.

The certified sponsoring institution and sponsoring representatives mainly conduct two responsibilities for the IPOs – due diligence and continued supervision. First, in recommending the new offerings, the sponsoring institutions should conduct operational, legal, and financial due diligence of the issuers (including promoters, large shareholders, and real corporate controllers) based on related statues and regulations of the CSRC, and prepare filing materials and recommendation files with their prudent verification.

Second, the sponsoring institution must conduct continued supervision even after the securities are listed on the exchanges, with a period of "the rest of the

current fiscal year plus another two fiscal years." Major items for continued supervision include the internal control, fairness and legitimacy of connected transactions, information disclosure, use of IPO proceeds, and third-party guarantee by the issuer. By implementing the sponsorship system, the CSRC hopes to enhance information disclosure, raise the quality of listed companies, and improve the protection of public investors, especially small investors.

3.3 Current Offering Practices

Under the current legal and regulatory environment, a China-domiciled enterprise typically undergoes three stages in going public by issuing negotiable A-share equities, whether it is a SOE, collectively-owned enterprise, privately-owned company, or even Sino-foreign joint venture. The first stage is the pre-IPO reorganization, which is officially called the period of "Shangshi Fudao" or the IPO nurturing period. The IPO nurturing usually lasts for one year and is conducted by the lead underwriter. During this period, the lead underwriter is responsible for advising the issuer's reorganization in the following respects: [1] Guaranteeing the legitimacy and validity of the incorporation of the joint-stock company as well as of its historical evolution; [2] Providing legal training to the issuer's directors, supervisors, and senior executives, as well as the shareholders whose shares stakes are over five percent of the total shares outstanding; [3] Establishing sound corporate governance that regulates the functioning of shareholders' meetings, board of directors, and board of supervisors; [4] Establishing an effective information disclosure and internal control system; and [5] Regulating the relationship between the issuing company and other connected parties.

The pre-IPO reorganization is of great importance in China's partial privatization process, in that the majority of A-share issuers are SOEs that lack the fundamental components of a modern corporate system and the corresponding corporate governance. In terms of the procedures, a typical SOE is first transformed into a joint-stock company by the promoters or majority shareholders, which are typically also large SOEs, government affiliated agencies, or legal persons. Carve-outs are the major form of this transformation, in which the main operating assets of the original enterprise are spun off to establish a new joint-stock company. Subsequently, the transformed or newly established joint-stock company will become the issuer for the coming public offering. The capital contributed by the promoters forms the so-called state-owned or legal-person shares, which cannot be traded on the SHSE and SZSE after listing. The IPO thus takes the form of issuing invitation shares to public investors, while the nonnegotiable shares are retained by the state or legal persons and are subject only to privately negotiated transfer.

The second stage deals with filing with the CSRC for verification and approval of an IPO application. Within three years after IPO nurturing, a prospective issuer can apply to the CSRC for public offering through the lead underwriter. The lead manager will help the issuer prepare the filing documents and preliminary offering prospectus, and submit them to the CSCR for examination and verification. The length of the filing period is usually 3-5 months.

A well-justified offering price is one key consideration of the CSRC review of the filing materials. As mentioned previously, during 1996-1998, the IPO price was set around 15 times the P/E ratio and usually within the rage of 13-16 times.

Since 1999, the primary market has been partially liberalized, and both issuer and underwriter have gained more discretion in determining the offering price. Nevertheless, administrative regulation over offering price stills plays an important role in determining CSRC approval of an IPO. For instance, the CSRC recommended that the offering P/E ratio not be over 20 times for IPOs in 2002. Actually, most of the issuers followed that recommendation in 2002.

Third, when final approval is granted by the CSRC, the stage is set for offering and listing. About one or two weeks before the offering date, the final offering prospectus is published in the designated newspapers, announcing without further revision the final offering price and quantity of shares, as well as the allocation method. On the offering or subscription date, investors subscribe new shares in accordance with the rules specified in the final prospectus.

As all the A-share IPOs in China are heavily oversubscribed, the final allocation is usually determined by evenly-handed balloting. This fixed-price offering practice differs significantly from the US bookbuilding process, in which IPO mangers have discretion in the allocation of new shares. In recent years, pre-market bidding has been used in some IPOs to determine the final offering price. In this practice, investors bid the price above the floor and indicate interested quantities. The underwriter determines the final offering price based on the information gathered from all bidders.

When subscription and allocation are done (usually in four days), the new shares will wait for listing on the SHSE or SZSE. Currently, the interval between offering and listing is usually 15-30 days, which is longer than in the

US. Follow-on financing is not unusual in China, and usually takes the form of rights offerings and seasoned equity offerings (SEOs) as long as a profitability requirement is satisfied.

At present, a domestic A-share IPO can be sold directly to primary-market investors (PM open-sale IPO), or be placed with secondary-markets investors (SM placement IPO), or a combination of both. The PM open-sale IPO is the traditional method, although it has been used less frequently since 2002. This method requires subscribers to fully deposit upfront subscription funds equal to the value of their subscribed shares. By contrast, under SM placement, only those individuals or institutions that currently hold stocks in the secondary market are allowed to subscribe new shares, and the subscription size is determined by the market value of its stocks on a date specified in the IPO prospectus. Experimented with in 2000, this method has been widely used since 2002, as it is believed by the CSRC to help foster investor sentiment in the secondary market, reduce speculation in the primary market, and introduce more fairness to small investors.

In addition, both a PM open-sale and SM placement IPO can be escorted by a separate tranche that exclusively targets large institutional investors. Usually, these institutional investors include securities investment funds, general legal persons, or institutions that have strategic relationships with issuers. Preceding the selling of public tranche, this separate institutional tranche sometimes involves pre-market bidding that generates information in determining the final offering quantity and price.

The allocation of A-share IPOs is strictly based on fairness. Balloting is used in online PM open-sale IPOs or SM placement IPOs, while pro-rata allocation used to be adopted in those early offline IPOs when online technology has not been applied to share subscription. For the allocation of private tranche shares, however, underwriters have more discretion on allocation, with full allocation, pro-rata allocation, or balloting all possible methods. A detailed discussion of various offering methods adopted in China's new issue market is provided in Appendix A of this dissertation.

Chapter IV: Methodology and Hypotheses

This chapter develops the methodology and hypotheses regarding the short-run underpricing and long-run price trends of China's A-share IPOs. The first three sections discuss the winner's curse hypothesis from three related angles. Specifically, Section 4.1 discusses the assumption and calculation of allocation-adjusted initial returns, which constitutes a direct test of Rock's (1986) model. Section 4.2 explores finance leveraging behavior in IPO subscription, as it violates one critical assumption of Rock's (1986) original model. In Section 4.3, regression analyses indirectly test the presence of the winner's curse by examining the cross-sectional determinants of underpricing and allocation patterns. The final part of this chapter, Section 4.4 utilizes standard event-study techniques to explore the short and long-run price performance of the sample IPOs.

4.1 The Winner's Curse and Allocation Adjusted Initial Return

A direct test of the winner's curse hypothesis requires information on both underpricing and share allocation. From the viewpoint of an uninformed investor, high initial returns may not necessarily be earned in practice when rationing occurs during the offering. Greater underpricing may encourage uninformed investors to use a larger portion of their wealth to apply for new shares (Rock, 1986), as well as attract larger orders from informed investors, who usually have a higher level of wealth (Chowdhry and Sherman, 1996). Therefore, the winner's curse model predicts a negative correlation between the degree of underpricing and the severity of share rationing. For a risk-neutral uninformed subscriber, when the probability of new share allocation is taken

into account, the expected return on subscribing new shares may be reduced to the riskfree interest rate that compensates for the opportunity cost of using his or her own wealth to order new shares. Specifically, this central hypothesis is stated as follows:

Hypothesis I: *In the presence of the winner's curse, the initial return adjusted by the allocation rate and other opportunity costs is zero for an uninformed investor who participates in an evenly-handled balloting IPO.*

This hypothesis is directly tested in China's new issue market as part of this research. With almost no exception, all of the IPOs in China are heavily oversubscribed by public investors, making it impossible for the raw initial returns to be earned in reality. The current study uses the allocation-adjusted initial return ($AAIR_i$) to simulate the real return that can be earned by an uninformed investor who subscribes open-sale IPO shares (excluding the IPOs solely placed with secondary-market investors).

In the calculation of $AAIR_i$, it is assumed that the subscriber participates in all the IPOs only with his or her own wealth (that is, no borrowing activities). It is also assumed that the order size does not exceed the allowable maximum subscription amount as stipulated in the IPO prospectus. In China, the ceiling for the total shares subscribed by one investor is typically 1/1000 of the total open tranche offered.[12] Subscribing new shares by opening multiple brokerage accounts or borrowing funds for subscription is illegal in China (here, borrowing funds mainly refers to institutional investors), and these behaviors

[12] The maximum application limit is set to satisfy the listing liquidity requirement that each public company must have at least 1,000 shareholders who possess at least 1,000 shares.

usually involve higher transaction cost for small investors than for institutional investors.

Particularly, underpricing is measured by raw initial return (IR_i) and market-adjusted initial return ($MAIR_i$), which are defined as follows:

$$IR_i = \frac{P_{i,0}}{P_{i,OFFER}} - 1 \quad (1)$$

$$MAIR_i = IR_i - MR_{i,0} \quad (2)$$

where $P_{i,0}$ is the first-day closing price for the IPO company i, $P_{i,OFFER}$ is the offering price, and $MR_{i,0}$ is the value-weighted market return on the first listing day of the new issue.

The degree of rationing or excess demand is gauged by the allocation rate (AR_i) of the oversubscribed offering, which is disclosed in each IPO listing announcement. For the selling of open tranche of each IPO, new shares are strictly allocated through fair pro-rata allocation or balloting. AR_i is defined as the total open shares offered divided by the total shares effectively subscribed by public investors. Subscription is deemed as effective when the subscription price bid by investors is equal to or higher than the fixed offering price pre-specified in the IPO prospectus. If the expectation is rational as described by Rock (1986), the realized allocation rate should be equal or close to the ex ante allocation rate believed by uninformed investors.

Finally, the $AAIR_i$ for either pro-rate allocated or balloting IPOs is computed in the following equation:

$$AAIR_i = AR_i \times (IR_i - RF1_i) - TC_i/P_{i,OFFER} - RF2_i \quad (3)$$

The $AAIR_i$ incorporates the items of initial return, allocation rate and interest income loss, as well as other transaction costs incurred during the subscription of new shares. Particularly, the $RF1_i$ is the interest income lost between the closing day of share offering and the listing day, which must be sacrificed as long as the subscriber is successfully allocated new shares. The $RF2_i$ is the loss in interest income during the offering process. The TC_i is the transaction cost for each share subscribed when the subscriber places his or her order.

For open-sale A-share IPOs with offline pro-rata allocation, which was used in the offerings prior to 1999, the transaction cost is usually RMB0.10 (US$0.012) per share, and the offering process takes six to seven days.[13] Therefore, it is assumed that six days of riskfree interest income is lost on average. For the open-sale A-share IPOs with online balloting, the transaction cost is zero and the offering process takes five days. Typically, the four days of interest income must be lost. It is worth noting that, in addition to the case of pro-rata allocation, this equation also applies to balloting IPOs. In a fair balloting IPO, an investor can increase his or her probability of being allocated new shares simply by subscribing more. This action, however, must be accompanied by depositing more upfront funds in the corresponding brokerage account. Mathematically, it can be demonstrated that the expected return of participating in the lottery is

independent of the order size for the subscriber who does not borrow subscription funds from others, which is a reasonable assumption for small or individual investors.

For a strong test of Rock's (1986) model, the mean value of $AAIR_i$ should be statistically not different from zero. When interpreted in weaker terms, the mean value with no significant economic meaning can imply the validity of the winner's curse in explaining underpricing, at least partially. The author would define insignificant economic meaning as a return magnitude within 1-2 percent.

In addition, one interesting question is whether the $AAIR_i$ is predictable, inasmuch as it is a reasonable metric for the gains expected by uninformed investors who subscribe all or most of the IPOs. Rock's (1986) model predicts that $AAIR_i$ should not be predictable by other variables. However, Amihud, Hauser and Kirsh (2003) introduce the concept of minimal information conditioning (MIC) investors, who are uninformed of the real value of the issues yet can condition their subscription decision on available public information unrelated to the firm's value. In some aspect, this concept resembles the scenario described by Welch (1992), where investors ignore private information and rely completely on information inferred from the previous decisions of others.

Given the sample data of this paper, the MIC strategy is examined with China's A-share IPO samples. The dependent variable in the regression is $AAIR_i$. The ex-ante variables to be conditioned on are the $PREMKT\text{-}RET20_i$, PREMKT-

[13] There are some rare cases where the transaction cost for pro-rata allocation deviates from RMB0.1 per share. However, these deviations have little statistical impact on the current study.

$STD20_i$, LAR_i, $PROCEEDS_i$, and $INSTIT_i$ (where $PREMKT\text{-}RET20_i$ is the cumulative return over the 20 trading days preceding the subscription day; $PREMKT\text{-}STD20_i$ is the standard deviation estimated from the daily market returns over the 20 trading days preceding the subscription day; LAR_i is the logistically transformed allocation rate; $PROCEEDS_i$ is the gross offering proceeds; and $INSTIT_i$ is the dummy variables for the IPOs with a separate allocation tranche to institutional investors). As the distribution of allocation rates is highly non-normal with many observations close to zero, the logistic transformation LAR_i of the original variable AR_i, as suggested by Cox (1970), is used to accommodate this problem in the regression (N is the sample size in the regression):

$$LAR_i = \log[[AR_i + 0.5/N]/[1 - AR_i + 0.5/N]] \qquad (4)$$

4.2 IPO Subscription and Financial Leverage

One major assumption of Rock's (1986) model is that subscribers use their own wealth to order new shares in an evenly-handled balloting IPO. The underpricing then appropriately compensates the uninformed investors. However, a group of investors can increase their expected initial return by aggressively using financial leverage during the subscription of new shares. Usually, greater underpricing can stimulate more aggressive financial leveraging by the investor group that has the advantage in acquiring additional funds.

Paradoxically, if informed investors are principally institutional investors with strong borrowing capacity, they can actually acquire a vaster portion of the

whole money left on the table, which should have gone to uninformed investors for compensation for their informational disadvantage. This violation of the model assumption is very likely in China's IPO market, where almost all the IPOs are severely underpriced and where protection for small investors is poor. Anecdotal news tells that many Chinese institutional investors illegally open multiple accounts and leverage short-term positions of wealth to subscribe as many new shares as possible. Therefore, the related hypothesis is developed as follows:

Hypothesis II: *There is a positive correlation between aggregate issuing activity and financial leverage by institutional investors in China's IPO market.*

A direct test of this hypothesis is difficult due to the lack of detailed share subscription data for each brokerage account. To roughly examine this hypothesis, the monthly aggregate transaction value of the SHSE open-market treasury bond repurchase agreements ($REPO_t$) during 1998-2002 is employed as a proxy for the financial leveraging of institutional investors, while the proxy for equity issuing activity is the monthly aggregate IPO proceeds ($PROCEEDS_t$). Time-series regressions using monthly data are utilized to examine the relationship between the two variables after controlling other related factors. A positive coefficient is expected between the two proxies, in that larger IPO issue size may spur institutional investors to borrow more short-term funds through the repurchase market.

The use of financial leverage allows those informed investors with large borrowing capacity to participate more in the IPOs with greater underpricing.

Chowdhry and Sherman (1996) posit that informed investors tend to place larger orders than do uninformed investors, even when they have the same wealth level. In China, the maximum subscription amount is usually 1/1000 of the total shares offered. This barrier, however, can be partially circumvented when investors open multiple subscription accounts. Discussions with professionals in China's securities industry show that this practice, though illegal in principle, is not uncommon in China's IPO market. With higher wealth level and borrowing power, informed investors are able to apply for more shares and squeeze out the demand from small investors. Hence, the next hypothesis is stated below:

Hypothesis III: *There is a positive correlation between the number of subscription accounts and the degree of underpricing in China's IPO market.*

To examine the scenario that informed investors participate more in more underpriced shares, logarithm of the number of IPO subscribers ($SUBSCRIBERS_i$) is regressed on $MAIR_i$ and other control variables. Supposing that the number of uninformed investors is relatively fixed for a given period (which is a major assumption of Rock's (1986) model), the variation in the number of subscribers may result to a great extent from multiple account application by informed investors, or from their selective participation in the IPOs with higher underpricing. Accordingly, a positive coefficient before $MAIR_i$ is expected.

4.3 Regression Analysis on Underpricing and Allocation

For those IPOs for which there is a priori knowledge of higher information homogeneity, the winner's curse problem is more mitigated and there is less need for underpricing to compensate uninformed investors. The two particular offering practices adopted in China's IPO market allow for a test of this indirect conjecture. First, since 1998, many A-share IPOs have had two separate offering tranches that are respectively targeted to general investors (open-sale tranche) and to institutional investors (private tranche). Legal-person entities are encouraged to apply for the private-tranche shares; also, those who have applied for shares in the private tranche are not legally allowed to subscribe new shares in the open-sale tranche. By limiting the participation of institutional investors in open sales, the offering method reduces the information heterogeneity among the investor groups who apply for open-sale shares, thus alleviating the problem of the winner's curse. The hypothesis is established as follows:

Hypothesis IV: *Assuming other conditions remain the same, the IPOs with separate placement to institutional investors will be less underpriced in the presence of the winner's curse.*

Second, since 2000, many A-share IPOs have also been placed partially or fully to secondary-market investors. Under this offering mechanism, demand for new shares is exogenously determined by the aggregate market value of tradable stocks held by secondary-market investors during the offering time. Therefore, underpricing becomes less material in attracting the participation of uninformed investors. The hypothesis is established as follows:

Hypothesis V: *Assuming other conditions remain the same, the IPOs that are solely placed with secondary-market investors will be less underpriced in the presence of the winner's curse.*

Hypotheses IV and V are tested using multivariate regressions after controlling other variables that may otherwise affect underpricing. The dummy variables $INSTIT_i$ and SM_i are respectively assigned to IPOs that offer a separate tranche to institutional investors and to IPOs that are fully placed to secondary-market investors. The dependent variable $MAIR_i$ is regressed on these two dummy variables and other independent variables as deemed relevant by previous IPO literature. Specifically, the other independent variables are:

[1] Offering size. The offering size of an IPO is represented by the logarithm of its gross proceeds ($PROCEEDS_i$), which is calculated by multiplying offering price by the total shares offered. The effect of offering size on underpricing can emanate from the supply side or the demand side. If offering size is a good proxy for ex ante uncertainty of the IPO (Beatty and Ritter 1986), it should have a negative effect on underpricing if asymmetric information is one driver for the underpricing. From the demand perspective, offering size can be related to the short-run equilibrium price if investors bear a downward-sloped demand curve for stocks with unique attributes (Shleifer 1986; Harris and Gurel 1986). In this situation, a negative coefficient is predicted when the pricing of new shares fails to take into account the offering size.

[2] Premarket conditions. The level of underpricing may be affected by the general market conditions prior to the offering (Lowry and Schwert 2002). For this reason, the cumulative market return over 20 trading days before the disclosure date of the final prospectus ($PREMKT\text{-}RET20_i$) is calculated to capture the market condition before the final offering price is determined. Hanley (1993), Lowry and Schwert (2001), and Loughran and Ritter (2002) all report that the initial return reflects only partial adjustment to recent market conditions. This could also be the case in China as a result of tight price regulation by the state. In addition, the cumulative market return over five trading days before listing day ($PREMKT\text{-}RET5_i$) is used to examine the impact of hot or cold market conditions on initial returns. Positive coefficients in both cases are expected, as hotter pre-market conditions may lead to higher first-day returns, especially when the IPO pricing mechanism fails to fully absorb the latest market intelligence.

[3] Aftermarket volatility. A proxy for the uncertainty of the issuer's true value, the aftermarket volatility ($SDIPO_i$) is estimated as the standard deviation of the stock's aftermarket daily return over 20 trading days immediately following the listing day. Ritter (1984) proposes that the variable has a positive effect on underpricing. The greater the uncertainty about the true price of new shares, the more severe the problem of asymmetric information in either a winner's curse or signaling situation, and the more motivation the issuer has to underprice his or her shares (Beatty and Ritter, 1986; Welch, 1992).

[4] Promoters' equity holdings. Previous studies of Chinese IPOs have found that promoters' holdings have a positive effect on underpricing (Su and Fleisher, 1999). In theory, Grinblatt and Hwang (1989) argue that the initial return is positively related to the fraction held by insiders for a given variance level, as underpricing is used to signify the true quality of an IPO. In this study, promoters' holdings ($PROMOTER_i$) are calculated as the ratio of state-owned shares plus legal-person shares to total shares outstanding. If signaling theory helps explain the underpricing in China's IPO market, a positive coefficient is expected.

[5] Industry effect. The industry effect is controlled by $IND(k)_i$,[14] which are a set of indicator variables for each industry k other than the manufacturing industry, which is represented by the regression intercept. Ritter (1984) has shown that underpricing varies dramatically across industries. It is likely that there may be changing fads about the industrial characteristics of the IPO companies, which could affect the issuer's pricing ability. However, in a highly regulated IPO market, the dummy variables may still be significant.

[6] Time effect. For each year from 1996 to 2002 a dummy variable is used to include any time effect of underpricing IPO shares.

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[14] The listed companies in China are classified into thirteen industries in this study. The value of k represents the following industries respectively:

[01]. Agriculture
[02]. Mining and Quarrying
[03]. General Manufacturing
[04]. Utilities
[05]. Construction
[06]. Transportation and Warehousing
[07]. Telecommunications
[08]. Wholesale and Retail
[09]. Banking and Insurance
[10]. Real Estate
[11]. Social Services
[12]. Mass Media
[13]. Conglomerates

Despite the documentation of previous literature (Carter and Manaster, 1990; Michaely and Shaw, 1994), the underwriter reputation is ignored in the regression analysis. The investment banking industry is still in its initial development in China, and the reputation differences among securities companies are not really substantial. As offering price of new shares is still tightly regulated by the CSRC, the role of underwriters in determining the final offer price is to some extent limited, and issuers may simply choose their underwriters based on location, clientele relationship, or previous cooperation.

In addition, during the sample period, many major securities companies underwent dramatic restructuring and consolidation, and new joint-venture securities companies are now entering the industry. All these factors make it very difficult to choose an appropriate ranking procedure, and there is no reason to believe that underwriter reputation would matter in the underpricing of the Chinese IPOs.

Finally, the winner's curse model also suggests a negative correlation between underpricing and allocation rate. For one thing, informed investors have the capability of screening which IPOs are more underpriced, and then applying for more shares in these offerings, leaving uninformed investors with smaller allocation rates in these more lucrative IPOs. Also, with a higher expected initial return, uninformed investors may increase the level of their IPO subscription relative to their personal wealth. A sixth hypothesis is thus established:

Hypothesis VI: *Rationing occurs more severely for the IPOs with greater underpricing, leading to a negative correlation between allocation rates and initial returns.*

This hypothesis is tested by regressing the allocation rate of open-sale IPOs on market-adjusted initial return $MAIR_i$ and other control variables (it is noted that the allocation rates of the IPOs placed with secondary-markets investors are mainly exogenously determined so that Rock's (1986) model does not apply). The control variables in the regression include offering size, premarket conditions, aftermarket volatility of a listed company, promoters' equity holdings, and the dummy variables for the IPOs with institutional tranche and industry effect, whose definitions are the same to the independent variables used in the previous regressions of IPO underpricing.

4.4 Aftermarket Price Performance

The lofty initial returns in China's A-share IPOs raise the intriguing question whether those IPO companies post salient price adjustments in the short or long run. Answers to this query contribute to the market efficiency studies on this largest emerging capital market in the world. From a practitioner's viewpoint, the presence of particular price trends may suggest feasible active trading strategies that produce superior returns to investors who trade IPO shares in the secondary market. Performance tests of the IPO companies in the short and long run are conducted in this section.

The short-run returns of the IPOs are examined over a span of 20 trading days (approximately one month) immediately following the listing day. There is

growing empirical evidence of salient price trends following certain corporate events (Ikenberry, Lakonishok and Vermaelen, 1995; Michaely, Thaler and Womack, 1995). The IPOs in China bear the unique characteristics of extremely high oversubscription and initial returns. For this reason, the standard event-study technique is employed to investigate whether there is a momentum or contrarian price trend or whether the market is simply near efficiency. Specifically, the cumulative abnormal returns (CARs) and buy-and-hold abnormal returns (BHARs) over the 20 trading days immediately following the listing day are calculated against the equally and value-weighted market returns. The abnormal returns are computed as follows:

$$AR_{i,t} = R_{i,t} - E[R_{i,t}] \tag{5}$$

$$CAR_{i,\tau} = \sum_{t=1}^{\tau} AR_{i,t} \tag{6}$$

$$BHAR_{i,\tau} = \prod_{t=1}^{\tau}[1+R_{i,t}] - \prod_{t=1}^{\tau}[1+E[R_{i,t}]]^{15} \tag{7}$$

where $AR_{i,t}$ is the abnormal return of company i at event time t, and $E[R_{i,t}]$ is the expected return of company i at event time t.

The long-run performance after a listing is measured with an investment horizon of up to three years (36 months). Similarly, both CARs and BHARs are calculated to measure the long-run abnormal returns. For the long-run event study, the CAR or BHAR metric have both pros and cons of their own (Barber and Lyon, 1997). CARs are less subjective to skewness bias, offer more

[15] The symbol $\prod$ means the product of the whole series in the following square brackets.

conservative performance estimates, and assume periodic portfolio rebalancing, whereas BHARs are more meaningful to an investor adopting the buy-and-hold strategy, yet tend to magnify the level long-term performance.

This author prefers to use CARs to interpret the empirical results in this study, in that in addition to their conservativeness, CARs are more appropriate for testing market efficiency (Fama, 1998). Moreover, as short sell is not currently allowed in China, the abnormal return measured by BHARs may not really be earned by investors who purchase new shares after first-day trading and hold them for three years. Therefore, CARs are more appropriate in interpreting the abnormal returns from the perspective of market efficiency.

Both the event-time approach and the regression approach are used in calculating abnormal returns of the IPO companies. In the event-time performance test, the equally and value-weighted market returns that include all SHSE and SZSE stocks are used as proxies for the expected returns $E[R_{i,t}]$. In addition, to understand the impact of size and book-to-market ratio characteristics on price performance, 16 size/BM-ratio portfolios are constructed each year and an equally-weighted return of each portfolio is used as benchmark to gauge the abnormal return of sample IPOs.[16] Companies with

[16] Construction of the reference portfolios that control size and B/M ratio follows the spirit of Fama and French (1992). In June of year t the companies listed on the SHSE and SZSE are sorted by size and by BM ratio independently (excluding the companies with negative book value and the companies with listing histories shorter than twelve months). For the size sort, total market capitalization is measured at the end of June of year t. For the BM-ratio sort, the book value of year t-1 is used, while the market capitalization is measured at the end of the June of year t. This procedure guarantees that computed BM ratios are known to the public at the time of sorting, in that companies' annual reports are disclosed during the first half of the year. Thus, 16 portfolios are created from the intersections of the size and BM-ratio quartiles, each of whose equally-weighted monthly returns are computed from July 1996 to June 1997. This portfolio sorting is repeated each June from 1997 to 2002. At the same time, the sorting procedure also creates the breakpoints that are used to assign each sample IPO to the corresponding size/BM-ratio portfolio at the time of the offering. For the IPOs, the size is

less than a two-year listing history are excluded from the size/BM-ratio portfolios to reduce the possibility of new-listing bias (Barber and Lyon, 1997). Furthermore, for each IPO company a matching company is selected based on size and industry. According to Barber and Lyon (1997), this control-firm approach yields well-specified test statistics in virtually all sampling situations considered, as it alleviates the new listing, rebalancing, and skewness biases. These multiple choices of differing benchmarks are necessary, as to date there has been no convincing asset pricing models documented that well describe the price generation process in China's stock market.

In the framework of event-time analysis, results are presented using both equal and value weighting schemes to highlight cross-sectional differences in abnormal performance. Loughran and Ritter (1999) point out that the choice of weighting scheme is important for power consideration. If small stocks are likely to be mispriced more than large stocks, the power consideration alone suggests the employment of equal weighting. If the research goal is to quantify investors' average wealth change after the IPO, however, it follows that value weighting is the appropriate method.

Alternatively, the time-series approach is utilized by regressing monthly returns of the IPO portfolio on monthly returns of the three factors proposed by Fama and French (1993). One desirable feature of this alternative test is that it eliminates the overlapping problem with BHARs that span long-period event windows. Also, this factor-based approach is potentially useful in capturing systematic patterns in average returns. A disadvantage of the time-series

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calculated based on the market capitalization at the end of the first trading month. The book

regression is that by forming portfolios, power is sacrificed. The three-factor regression model is set as follows:

$$RP_t - RF_t = a + b \times [RM_t - RF_t] + s \times SMB_t + h \times HML_t + \varepsilon_t \qquad (8)$$

where RP_t is the IPO portfolio return (equally or value weighted) in calendar month t, RF_t is the riskfree interest rate in calendar month t, SMB_t (return of small-minus-big portfolio) is the difference between the returns on a portfolio of small and big companies in calendar month t, and HML_t (return of high-minus-low portfolio) is the difference between the returns on a portfolio of high book-to-market ratio stocks and low book-to-market ratio stocks in calendar time t, respectively. If the intercept of the estimated equation is not significantly different from zero, then IPO companies do not systematically underperform or outperform the market.

Construction of the Fama-French explanatory variables obeys the procedure of Fama and French (1993). The BM ratios are calculated and sorted based on the book value of equity for the most recent fiscal year ending in December of year t-1, and the market value of equity at the end of December of year t-1. According to the CSRC regulations, listed companies must release their annual financial reports in several major newspapers from the middle of March to the end of April, so it is reasonable to assume that investors are able to obtain relevant financial information by the end of June. Similarly, the market value of equity at the end of June of each year t is used as the company size. Returns of

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value of the IPO companies is taken from the first annual report after listing.

the BM-ratio portfolios and size portfolios are calculated on a value-weighted basis.

Chapter V: Data and Empirical Results

This chapter presents the empirical results drawn from the methodology and hypotheses established in Chapter IV. Section 5.1 describes the sources and major summary statistics of the sample data, and Section 5.2 reports the results of the tests on the winner's curse hypothesis. Section 5.3 includes short and long-run event studies and reports aftermarket price trends of the sample IPOs. Finally, Section 5.4 summarizes the empirical results of this chapter.

5.1 Data Source and Summary Statistics

This research employs an IPO sample that is larger and more updated than the previous studies on China's new issue market. The sample IPO observations were first identified in the China Securities and Futures Statistical Yearbook for the period 1996-2002. There were altogether 830 domestic A-share IPOs in the initial sample. The final inclusion contained 822 IPOs for which detailed offering information was available, including subscription date, issuing mode, allocation rate, gross proceeds, listing date, and initial return. This offering information was gleaned from various sources, including IPO prospectuses, listing announcements, the Shanghai Stock Exchange Statistics Annual, and the Shenzhen Stock Exchange Fact Book, as well as the China Securities and Futures Statistical Yearbook for each year. In addition, stock prices and returns of the market and IPO companies were collected from the DataStream terminal, while related financial data were collected from annual reports of the listed companies.

This study excludes IPOs before 1996 to reduce the possible bias caused by the extremely low offering prices of those earlier issues. The IPOs before 1992 were offered mostly at par value or at a very small premium, which led to astonishingly lofty first-day returns during the early years of China's stock market. Moreover, the institutional arrangement of the primary market before 1996 was vastly different from that during the sample period of this study. Mok and Hui (1998) and Su and Fleisher (1999) report the patterns of China's IPO underpricing using the early samples. By using a larger and more updated IPO sample, this study helps reexamine the conclusions of previous studies.

Table 3 presents the composition and summary statistics of the sample IPOs. Panel A depicts three offering methods for the sample IPOs: open sale with primary-market investors, placement with secondary-market investors, and the combination of both (with separate tranches). For the primary-market open-sale IPOs there are two subcategories: offline offering by pro-rata allocation (or scaling-down allocation), which was used before 1998 (116 IPOs), and online offering by balloting, which has dominated since 1999 (625 IPOs). In the sample, only 46 IPOs are purely placed to secondary-market investors (in 2002), and 35 IPOs combine the method of primary-market open sale and secondary-market placement (in 2000). In Panel B, IPO observations are grouped based on their target investors: 663 IPOs are fully sold to the public, and 153 IPOs are accompanied by a private tranche that particularly targets institutional investors.

Table 3
Sample composition and summary statistics

The offering method in Panel A includes open sale to primary-market investors, placement with secondary-market investors, and the combination of both. Primary-market open-sale IPOs take two forms. In the earlier years offline pro-rata (or scaling-down) allocation was adopted, which was completely replaced by online offering through balloting in 1999. For Panel B, some public offerings are accompanied by a private tranche that is particularly targeted to institutional investors. Regarding the characteristics of the IPO companies in Panel C, the gross proceeds (in millions of RMB) are adjusted based on the price level of 1996. The promoters' holding is the ratio of state-owned shares plus legal-person shares divided by the total shares outstanding. The offering-listing interval is the number of days elapsed from the offering day to the listing day.

Year of Issue	1996	1997	1998	1999	2000	2001	2002	
Panel A: Grouping by Methods of Offering								Total
PM Open Sale Only								
1. Offline Offering by Pro-Rata Allocation	50	61	5	0	0	0	0	116
2. Online Offering by Balloting	119	126	97	92	104	67	20	625
SM Placement Only	0	0	0	0	0	0	46	46
PM Open Sale + SM Placement	0	0	0	0	35	0	0	35
Total IPOs	169	187	102	92	139	67	66	822
Panel B: Grouping by Target Investors								Total
Public Tranche Alone	169	187	70	24	95	60	64	669
Public Tranche + Private Tranche	0	0	32	68	44	7	2	153
Total IPOs	169	187	102	92	139	67	66	822
Panel C: Characteristics of the IPOs								Mean
Raw Initial Return	1.15	1.47	1.32	1.14	1.55	1.35	1.28	1.34
Gross Proceeds	131	340	403	551	606	825	752	446
Company Age	2.83	1.68	1.99	2.53	3.23	3.61	4.07	2.66
Promoters' Holdings	0.53	0.58	0.64	0.60	0.61	0.63	0.59	0.59
Offering-Listing Interval	22	24	58	59	28	29	17	32

The characteristics of the IPO companies in Panel C reveal some basic facts about the issuing activity in China. First of all, high IPO underpricing appears to be a persistent phenomenon in China's domestic stock market with a mean of 134 percent. The average initial return peaks at 155 percent in 2000 and then gradually declines in the following two years. The magnitude reported here, although less than the findings using earlier sample IPOs, is still much higher than the underpricing in most of the countries reported by Loughran, Ritter and Rydqvist (2002).

Second, the average company age is only 2.7 years for the IPO companies listed during the sample period. This figure reveals the fact that most of the IPOs in China are newly incorporated after being carved out from the original SOEs, this being one of the key characteristics of the SIP program in China.

Third, the promoters' retention ratio, which refers to the proportion of nonnegotiable equities retained by the state and legal persons that incorporate the IPO companies, reaches a mean of about 56 percent. That is to say, the newly issued A-shares comprise only one third of the total shares outstanding of an IPO company.

Finally, the average interval between the offering and listing date is about one month or 32 days, relatively longer than the practice of many developed capital markets. Mok and Hui (1998) find that this longer interval explains part of the IPO underpricing in China. For their early IPO observations, however, the interval between offering and listing is much longer and underpricing is more severe than since 1996.

In **Table 4**, the P/E relatives (ratio of offering P/E to the P/E of a comparable listed company) computed from the IPO observations during 1996-2001 reconfirm that underpricing comes overwhelmingly from the supply side of the primary market.[17]

Table 4
P/E relatives and offering P/E ratios

The P/E relative of each sample IPO during 1996-2001 is calculated based on the offering price and the first-day closing price. The median value for each year is reported. The calculation procedure follows the approach of Purnanandam and Swaminathan (2002). Also reported are the medians of the offering P/E ratios as well as the median market P/E ratio of all the listed companies in the offering month.

Year	Median of P/E Relative		Offering P/E	Market P/E
	At Offering Price	At First-Day Close		
1996	0.4841	0.9222	14.92	29.61
1997	0.3788	0.8826	15.00	34.73
1998	0.3922	0.8808	14.50	35.33
1999	0.4040	0.8461	17.00	40.58
2000	0.4987	1.2812	32.51	58.51
2001	0.5260	1.1678	32.78	65.24
1996-2001	0.4243	0.9435	15.82	43.52
	[23.334]***	[0.136]		

*** represents the significance level at 1%.

The median P/E relative at the offering price is only 0.4243, which is significantly different from one; by contrast, the median P/E relative at the first-day closing price (0.9435) is insignificantly different from one. These figures suggest that new shares are substantially underpriced by the issuers and that

[17] The P/E relative is calculated as the ratio of the offering P/E ratio of an IPO company to the P/E ratio of the industrial median of the existing listed companies in the offering month of that IPO company (Purnanandam and Swaminathan, 2002). The formula is as follows: P/E Relative = PE_{IPO}/PE_{MEDIAN}. If the IPO pricing is relatively fair towards the intrinsic value expected by the secondary-market investors, the P/E relative is not expected to be significantly different from one. This fair-value-based metric sheds particular light on the degree of underpricing when the

first-day closing prices on average reflect the valuation expected by the secondary-market investors. In addition, during 1999-2001 the median P/E ratio shows a bullish market condition, which partially explains why IPO underpricing in China is still persistent, although issuers have vastly increased their offering prices since 1999.

To summarize, the vast supply-side underpricing raises the question whether there exists the problem of winner's curse in China's emerging new issue market, where almost all the investors know that IPO shares are underpriced.

5.2 Evidence on Winner's Curse

In this section, results on three types of empirical tests conducted on Rock's (1986) winner's curse model are reported. In the first test, the allocation-adjusted initial returns that simulate the expected gains of uninformed share subscribers are computed. In the second test, the role of financial leverage in the subscription of open-sale IPOs is examined. In the third, multivariate regressions are employed to explore the cross-sectional determinants of underpricing and allocation, simultaneously testing six hypotheses related to the winner's curse model.

5.2.1 Test by Allocation Adjusted Initial Returns

The winner's curse model predicts that in equilibrium, uninformed subscription should not produce either positive or negative initial returns in a frictionless market with rational investors (Hypothesis I). **Figure 1** and **Figure 2** present the histograms for the raw initial returns and allocation rates of the sample IPOs,

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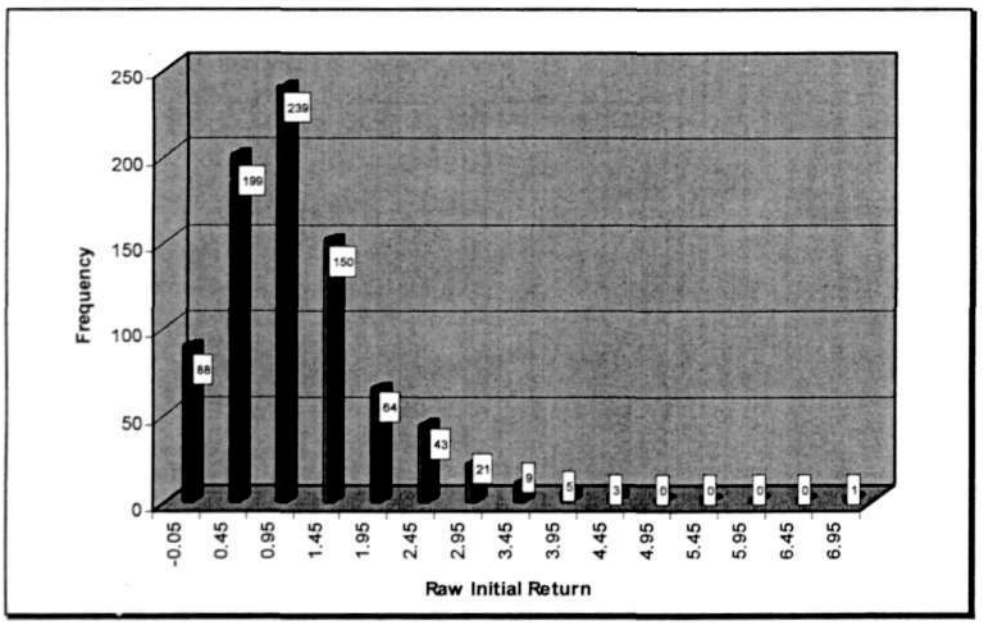
secondary market is likely to be speculative and when the initial returns may fail to reflect the

which determine the allocation-adjusted initial returns with interest and transaction costs involved in IPO subscription. Summary statistics for raw initial returns, allocation rates and allocation-adjusted initial returns are presented in **Table 5**.

As shown in **Figure 1**, the distribution of raw initial returns is positively skewed, with extremely high first-day returns in a few IPO cases. Most of the IPOs concentrate on the bins ranging from 45 percent to 200 percent, while there are about nine IPOs with initial returns over 400 percent. In **Table 5**, the mean of the raw initial returns is 133.64 percent and the median is 119.44 percent. This degree of underpricing, although high in absolute terms, is lower than reported in previous studies.

Figure 1
Empirical distribution of the raw initial returns

The raw initial return is computed according to the formula $IR_i = P_{i,0}/P_{i,OFFER} - 1$, where $P_{i,0}$ is the first-day close price of that IPO on the listing day, and $P_{i,OFFER}$ is the offering price of the IPO.



true value of the IPO companies.

Table 5
Summary statistics for allocation-adjusted initial returns

Major summary statistics of raw initial return (IR_i), allocation rate (AR_i) and allocation-adjusted initial return ($AAIR_i$) are calculated based on different components of the sample IPOs. "PM Open Sale Only" IPOs are new issues offered to primary-market investors, including both offline offering by pro-rata allocation and online offering by balloting. "SM Placement Only" IPOs are new issues that are exclusively placed with secondary-market investors. "Open Sale + SM Placement" IPOs refer to new issues that combine both by splitting the new shares into two tranches. "Public Tranche Alone" IPOs refer to the IPOs that are exclusively offered to primary-market or secondary-market investors, while "Public Tranche + Private Tranche" IPOs are offerings that are combined with a separate private tranche to institutional investors.

Variable	Obs	Mean	Median	Std. Dev.	Skewness	Minimum	Maximum
Panel A: Raw Initial Return							
PM Open Sale Only	741	1.3278	1.1877	0.8358	1.6614	-0.0617	8.3021
1. Offline Offering by Pro-Rata Allocation	116	1.5020	1.3882	0.8058	0.9326	0.3076	3.8905
2. Online Offering by Balloting	625	1.2955	1.1595	0.8379	1.8112	-0.0617	8.3021
SM Placement Only	46	1.2860	1.1696	0.8176	1.7806	0.2478	4.2825
PM Open Sale + SM Placement	35	1.5836	1.4686	0.8627	1.4447	0.3269	4.6907
Public Tranche Alone	669	1.4081	1.2462	0.8548	1.7345	-0.0617	8.3021
Public Tranche + Private Tranche	153	1.0227	0.8801	0.6692	0.7405	0.0028	2.9679
Full Sample	822	1.3364	1.1944	0.8366	1.6510	-0.0617	8.3021
Panel B: Allocation Rate							
Open Sale	776	0.0165	0.0056	0.0541	11.1140	0.0005	0.9058
1. Offline Offering by Pro-Rata Allocation	116	0.0351	0.0235	0.0386	2.0954	0.0030	0.1906
2. Online Offering by Balloting	660	0.0132	0.0046	0.0558	11.8968	0.0005	0.9058
SM Placement	81	0.0012	0.0008	0.0030	8.5967	0.0003	0.0275

Table 5 (continued)
Summary statistics for allocation-adjusted initial returns

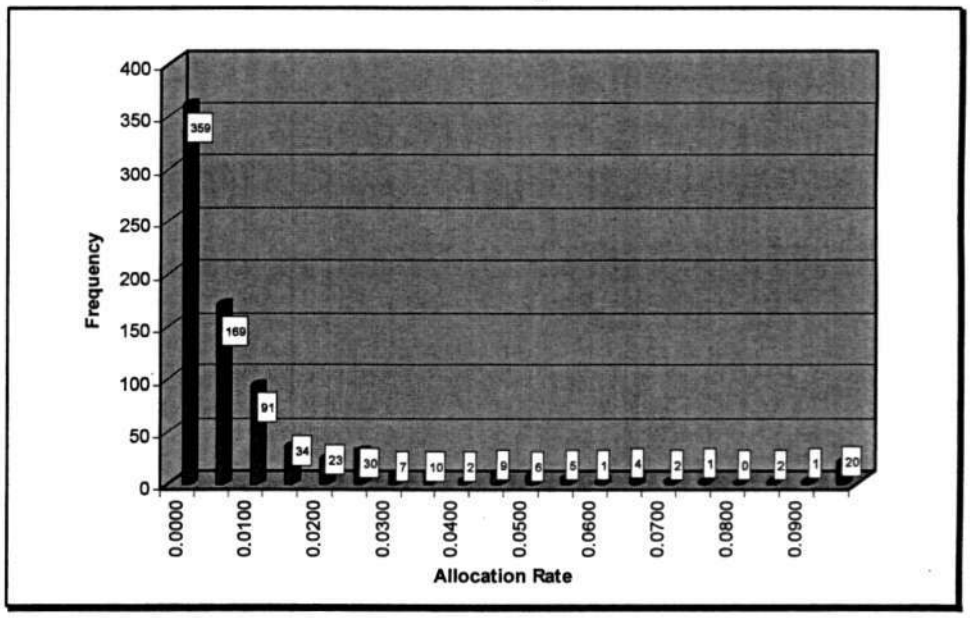
Variable	Obs	Mean	Median	Std. Dev.	Skewness	Minimum	Maximum
Panel C: Allocation-Adjusted Initial Return							
PM Open Sale	776	0.0108 [0.0000]	0.0050 [0.0000]	0.0233	4.9075	-0.0268	0.2571
1. Offline Offering by Pro-Rata Allocation	116	0.0288 [0.0000]	0.0079 [0.0000]	0.0522	1.7335	-0.0194	0.2571
2. Online Offering by Balloting	660	0.0076 [0.0000]	0.0049 [0.0000]	0.0099	4.9063	-0.0268	0.1171
SM Placement	81	0.0012	0.0009	0.0010	2.9752	0.0068	0.0002

P-values of the mean and median are presented in square brackets.

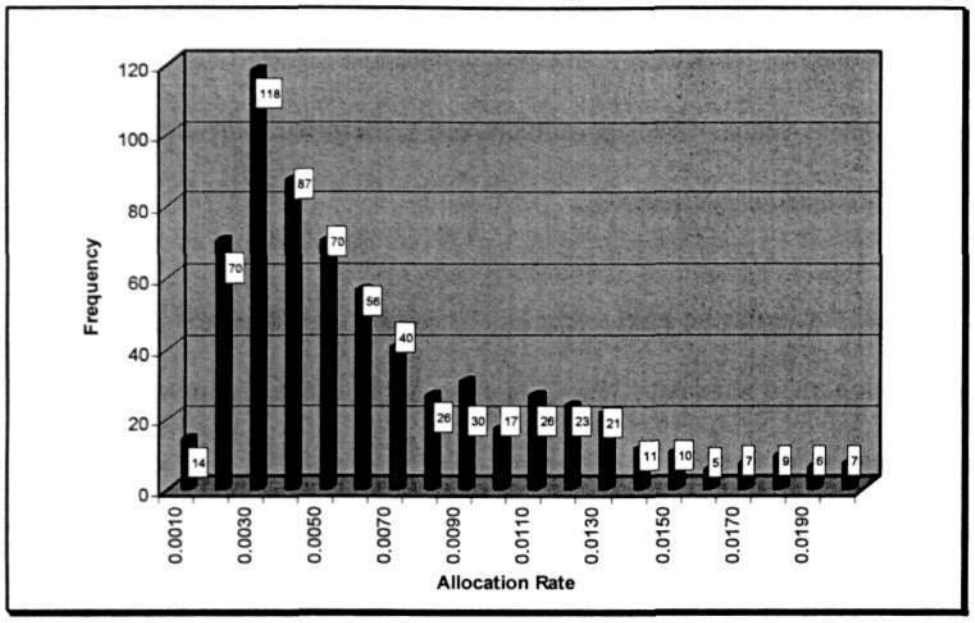
In **Figure 2**, the two histograms (Panel A and Panel B) reveal that the allocation rates of China's A-share IPOs are extremely small. Panel A presents the distribution of allocation rates of the full-sample open-sale IPOs, while Panel B presents the distributions of the open-sale IPOs with allocation rates lower than two percent. Apparently, a majority of the open-sale IPOs bear an allocation rate of less than one percent, suggesting that small investors have difficulty being allocated new shares through balloting because of extremely high excess demand.

Figure 2
Empirical distribution of allocation rates

Panel A: Distribution of the allocation rates in 776 open-sale A-share IPOs



Panel B: Distribution of the allocation rates below two percent



The results show that uninformed investors on average earn a small positive allocation-adjusted initial return through subscribing new shares. The means and medians of $AAIR_i$ are significantly positive for all offering or allocation methods. Specifically, for the IPOs with offline pro-rata allocation, the mean is 2.88 percent (with t value 5.933) and the median is 0.79 percent (with Wilcoxon signed-rank test 4.558). The magnitude is vastly reduced for the IPOs with online offering through balloting (with mean 0.76 percent and median 0.49 percent) and for the IPOs with secondary-market placement (with mean 0.12 percent and median 0.09 percent). This magnitude is not very meaningful in economic terms, especially after the consideration of the risks and other implicit costs (like personal effort and time devoted) involved in IPO subscription.

On the whole, the figures show that the apparently high initial returns are substantially adjusted towards zero when the probability of receiving new shares is taken into consideration, which is consistent with the Rock's (1986)

conjecture. On the other hand, this result is contradictory in statistical terms to the more stringent prediction of zero allocation-adjusted initial returns, suggesting that A-share IPOs are a bit more underpriced for the sake of attracting uninformed subscribers.

Finally, **Table 6** reports the effectiveness of several conditioning strategies in the subscription of open-sale IPOs. The preceding analysis shows that the Chinese investors who are uninformed of the true values of IPO shares on average earn a small positive return after adjusting the allocation rate and opportunity costs of subscribing new shares. If the allocation-adjusted initial returns can be predicted by certain public information, uninformed investors may thus improve their investment performance without costly investigation of the intrinsic value of an offering. In this way, the winner's curve problem may be circumvented to some extent.

Table 6
Conditioning strategies in IPO subscription

The regressions include all primary-market open-sale IPOs. The independent variable $AAIR_i$ is regressed on several dependent variables that are publicly known before or at the offering. $PREMKT\text{-}RET_i$ is the 5-day cumulative market return immediately before the public offering day. $PREMKT\text{-}STD_i$ is the standard deviation of daily market returns immediately before the public offering day (estimated using the 10-day daily market returns prior to the offering day). LAR_i is the logistically transformed allocation rate (because of the abnormal distribution of allocation rates). $PROCEEDS_i$ is the logarithm of gross proceeds. $INSTIT_i$ is the dummy variable for the IPOs that are accompanied by separate tranches to institutional investors.

Variable	Model [1]	Model [2]	Model [3]	Model [4]	Model [5]	Model [6]
CONSTANT	0.0106	0.0004	0.0005	0.0713	0.0408	0.0897
	[0.0000]	[0.7477]	[0.6698]	[0.0000]	[0.0279]	[0.0000]
PREMKT-RET	-0.0323		-0.0042			-0.0105
	[0.0814]		[0.8036]			[0.4454]
PREMKT-STD		0.5572	0.5528			0.0858
		[0.0000]	[0.0000]			[0.2295]
LAR				0.0125		0.0117
				[0.0000]		[0.0000]
PROCEEDS					-0.0015	-0.0012
					[0.1155]	[0.1581]
INSTIT					-0.0055	-0.0021
					[0.0000]	[0.0231]
Observations	769	769	769	776	776	769

The p-values are in square brackets and standard errors use White's (1980) robust estimation.

As shown in **Table 6**, the regression results show that having public information is only moderately helpful in predicting allocation-adjusted initial returns. In Models [2-3], higher pre-offering market volatility has a significant positive coefficient. Allocation-adjusted initial returns increase in this situation as demand for new shares greatly decreases when the market is more volatile before the offering date. Model 4 strongly suggests that uninformed investors should avoid hot IPOs to improve expected returns when subscribing new shares. Model 5 shows that IPOs bundled with placement tranches to secondary-market investors usually result in lower $AAIR_i$, as these IPOs post less underpricing. Model 6 employs all the information variables, and only the coefficients of LAR_i and $INSTIT_i$ are significant.

5.2.2 Evidence on Financial Leveraging

When some investors are able to use financial leverage cheaply in subscribing new shares, one major assumption of the winner's curse model is violated. The motivation of borrowing money is especially strong when the IPO shares are severely underpriced. Actually, many anecdotes in China tell that institutional investors do aggressively leverage short-term funds to enlarge their IPO subscriptions. Hypothesis II previously established predicts a positive correlation between aggregate issuing activity and financial leverage used by institutional investors.

In **Table 7**, time-series regressions explore the possible relationship between financial leveraging and IPO activities. Particularly, the logarithm of the monthly aggregate trading value of open-market treasury-bond repurchase agreements ($REPO_t$) on the SHSE during 1998-2002 is used as the proxy for the

level of financial leveraging by institutional investors, which is regressed on the logarithm of the monthly aggregate IPO gross proceeds ($PROCEEDS_t$). Other control variables include time trend (T_t), logarithm of the number of monthly trading days ($DAYS_t$), and finally one-period lag of $REPO_t$ ($REPO_{t-1}$).

Table 7
Correlation between IPO activities and financial leverage

This table reports the time-series regressions of the monthly aggregate trading value of open-market treasury-bond repurchase agreements ($REPO_t$) on the variables of time trend ($TREND_t$), monthly aggregate IPO gross proceeds ($PROCEEDS_t$), logarithm of the number of trading days ($DAYS_t$), and one-period lag of the repurchase trading value ($REPO_{t-1}$). Unit root tests show that all the series are stationary. The regressions are based on three sample periods that are based on the change of IPO issuing mode. The full sample starts from January 1998 to December 2002. The first regression covers the span from January 1998 to June 2001, during which a majority of the IPOs are open-sale. The second regression covers the span from July 2001 to December 2002, during which all the IPOs are placed with secondary-market investors.

Variable	Sample Periods		
	01/1998-06/2001	07/2001-12/2002	01/1998-12/2002
CONSTANT	17.1238	10.6908	11.2910
	[0.0000]	[0.0731]	[0.0000]
TREND	-0.0005	0.0222	0.0071
	[0.7927]	[0.0786]	[0.0002]
PROCEEDS	0.0171	0.0103	0.01359
	[0.0203]	[0.1387]	[0.0126]
DAYS	1.0078	0.7885	0.9637
	[0.0000]	[0.0060]	[0.0000]
REPO(-1)	0.1942	0.4451	0.4266
	[0.0289]	[0.0622]	[0.0000]
Observations	41	18	59
Adjusted R^2	69.72%	70.31%	71.22%

The p-value of each estimate is proved in the square bracket.

Regression results confirm the conjecture that open-market bond repurchase is used as the financing tool for IPO subscription. There is a significantly positive correlation between the transaction value of open-market bond repurchase agreements and open-sale IPO activities. For the regression using data from

January 1998 to June 2001, the coefficient of the variable $PROCEEDS_t$ is significantly positive at the 5% level (with t value 0.0171). By contrast, for the sample period from July 2001 to December 2002, in which the IPOs are placed with secondary-market investors, the corresponding coefficient is insignificant.

These regressions suggest that in China's A-share IPO market, institutional investors use repurchase agreements to leverage their IPO subscription and thereby increase their expected returns, which can thus be higher than the allocation-adjusted initial returns that are earned by typical uninformed investors.

While financial leverage allows informed investors to participate more in the IPOs with greater underpricing, most of the IPOs in China protect small investors by stipulating a maximum subscription level (one thousandth of the total shares offered). In the real world, this limit can be circumvented by investors who open multiple accounts with brokerage companies. To explore the possibility of this adverse-selection behavior in the new issue market, the correlation between the number of subscribers and the degree of underpricing is examined. The positive correlation is expected as stated in Hypothesis III.

Specifically, the logarithm of the number of subscribers $SUBSCRIBERS_i$ is regressed on $MAIR_i$ after controlling other factors that may affect the participation of IPO subscription, which are offering size, pre-offering market conditions, uncertainty of the IPO value, dummy variables respectively for IPOs with institutional placement and for IPOs with pro-rata allocation, and dummy variables for each calendar year. **Table 8** presents the regression results.

The observations are split between the primary-market open sales and secondary-market placements.

Table 8
Correlation between underpricing and number of subscribers

The dependent variable SUBSCRIBERSi, is the logarithm of the number of IPO subscribers (proxied by the number of subscription accounts). $MAIR_i$ is the market-adjusted initial return. $PROCEEDS_i$ is the logarithm of gross proceeds. $PREMKT\text{-}RET_i$ is the 5-day cumulative market return immediately before the public offering day. $PREMKT\text{-}STD_i$ is the standard deviation of daily market returns immediately before the public offering day (estimated using the 10-day daily market returns prior to the offering day). $SDIPO_i$ is the standard deviation of the individual stock return estimated using 10-day daily returns immediately following the listing day. $INSTIT_i$ is the dummy variable for the IPOs that are accompanied by separate tranches for institutional investors. $PRO\text{-}RATA_i$ is the dummy variable for the IPOs with pro-rata or scaling down allocation. The first regression is applied to the observations of primary-market open-sale IPOs, while the second regression is applied to the observations of secondary-market placement. In addition, the dummy variables for each calendar year are used in the first regression.

Variable	PM Open Sale	SM Placement
CONSTANT	13.6366	14.2700
	[0.0000]	[0.0000]
MAIR	0.1720	-0.0549
	[0.0002]	[0.4954]
PROCEEDS	0.0198	0.0523
	[0.7014]	[0.6274]
PREMKT-RET	1.1350	0.8274
	[0.0550]	[0.4277]
PREMKT-STD	-8.4163	-7.5023
	[0.0224]	[0.4773]
SDIPO	0.3798	-3.5690
	[0.8611]	[0.3620]
INSTIT	-0.1815	-0.1065
	[0.0301]	[0.2723]
PRO-RATA	-3.8053	
	[0.0000]	
Observations	760	37
Adjusted R^2	82.09%	10.03%

The p-value is provided in the square bracket and standard errors use White's (1980) robust estimation.

Regression results highly support the conjecture that greater underpricing induces more investors to subscribe the open-sale IPOs. For the regression of primary-market open-sale IPOs, the coefficient for $MAIR_i$ is 0.1720, which is significantly different from zero. In contrast with open-sale IPOs, this positive correlation is not robust for the regression model with the secondary-market placement IPOs, suggesting that the winner's curse problem of uninformed investors is alleviated when the IPOs are made available directly to secondary-market investors.

The positive correlation between the number of subscribers and IPO underpricing for open sales can be interpreted in the following manner. Rock's (1986) model assumes that the number of uninformed investors is fixed, which is a legitimate assumption for a short time period. In the above regression models that control time trends and offering methods, the increase in the number of subscribers led by underpricing is mainly a result of more involvement by well-informed investors. As the informed investors have the ability to identify which IPOs are more underpriced, they can concentrate on the offerings with more severe underpricing to increase their expected returns. Moreover, with higher leveraging capacity, informed investors can even increase their subscription by opening multiple subscription accounts to circumvent the maximum subscription amount specified in the IPO prospectus.

5.2.3 Tests by Cross-Sectional Regressions

This sub-section examines the cross-sectional determinants of IPO underpricing and allocation. In the framework of multivariate regressions, market-adjusted initial return ($MAIR_i$) is treated as the function of allocation methods ($INSTIT_i$

and SM_i), the logarithm of the gross proceeds ($PROCEEDS_i$), pre-IPO market returns ($PREMKT20_i$ – 20-day cumulative market return before the announcement date of final prospectus, and $PREMKT5_i$ – 5-day cumulative market return before the listing date), uncertainty of the true IPO value ($SDIPO_i$), and promoters' equity holdings in the IPO company ($PROMOTER_i$). The regression results are reported in **Table 9**. Based on Hypothesis IV and V, less underpricing should be expected for the IPOs with separate placement to institutional investors and for the IPOs solely placed with secondary-markets investors.

Table 9
Cross-sectional determinants of IPO underpricing

The dependent variable is the market-adjusted initial return $MAIR_i$. $INSTIT_i$ is the dummy variable for IPOs that are accompanied by allocation to institutional investors. SM_i is the dummy variable for IPOs that are exclusively placed with secondary-market investors. $PROCEEDS_i$ is the logarithm of gross proceeds. $PREMKT20_i$ is the 20-day cumulative market return immediately before the publication date of the final prospectus. $PREMKT5_i$ is the 5-day cumulative market return immediately before the listing date. $SDIPO_i$ is the standard deviation of the individual stock return, estimated using 10-day daily returns following the listing date. $PROMOTER_i$ is the ratio of promoters' shares to the total shares outstanding. The unreported variables are the industry dummy variables for telecommunications IPOs and year dummy variables for the full-sample regressions [Model 1 to Model 6]. Models 7 and 8 use the IPO observations from 1999-2002, when the pricing was relatively liberalized. Year dummy variables are not used for Models 7 and 8.

Variable	Full Sample 1996-2002						Sample 1999-2002	
	Model [1]	Model [2]	Model [3]	Model [4]	Model [5]	Model [6]	Model [7]	Model [8]
CONSTANT	1.2560	14.3806	14.1323	14.4426	13.6993	13.7194	1.5262	13.6762
	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
INSTIT	-0.5683	-0.1853	-0.1936	-0.2017	-0.2010	-0.1996	-0.5054	-0.3122
	[0.0000]	[0.0106]	[0.0091]	[0.0060]	[0.0052]	[0.0054]	[0.0000]	[0.0003]
SM	0.0022	-0.2490	-0.2498	-0.2613	-0.2567	-0.2535	-0.2792	-0.3253
	[0.9910]	[0.0784]	[0.0855]	[0.0762]	[0.0810]	[0.0864]	[0.0292]	[0.0006]
PROCEEDS		-0.6552	-0.6410	-0.6563	-0.6297	-0.6332		-0.6233
		[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]		[0.0000]
PREMKT20			1.2473	1.3338	1.3870	1.3841		1.0158
			[0.0000]	[0.0000]	[0.0000]	[0.0000]		[0.0084]
PREMKT5				3.1763	3.3005	3.2972		1.7007
				[0.0000]	[0.0000]	[0.0000]		[0.0581]
SDIPO					10.2739	10.2966		7.0245
					[0.0000]	[0.0000]		[0.0783]
PROMOTER						0.0783		0.0238
						[0.6476]		[0.9327]
Observations	822	822	746	746	746	746	364	342
Adjusted R^2	9.47%	34.08%	34.35%	37.96%	40.75%	40.68%	11.19%	39.25%

The p-value of each estimate is provided in the square bracket, and standard errors use White's (1980) robust estimation.

Models [1-6] use the full-sample observations from 1996 to 2002, and Models [7-8] use the sample observations from 1999 to 2000, during which time IPO pricing was relatively liberalized. For all the full-sample regressions, dummy variables for each year are used, although they are not reported in the table. In addition, for the parsimony of the models, only the industry dummy variable for the telecommunications sector is used, which has shown significant impact in all the regression models.

Regression results substantiate the original hypotheses that adverse selection in China's primary market affects underpricing. Particularly, the coefficients for $INSTIT_i$ and SM_i are significantly negative in the corresponding regressions. For the full-sample regression in Model 6, IPOs are underpriced by about 20 percent less when public offerings are accompanied by private allocations to institutional investors. Analogously, IPOs with standalone secondary-market placement are also underpriced by approximately 25 percent less. These negative impacts on underpricing are even greater in the more recent sample from 1999 to 2002. From the issuer's perspective, the participation of informed investors is relatively limited when offerings are combined with separate allocation to institutional investors, or when offerings are fully placed with secondary-market investors. As a result, less underpricing is needed to compensate uninformed investors in China's A-share market.

Besides the offering and allocation methods, other variables in the regressions also show significant effects on the level of underpricing, principally in a fashion predicted by extant literature. First of all, it appears that large offerings post much less underpricing than small offerings, which is proven to be

statistically significant in all the regressions. Two interpretations can be offered to explain this. First. this finding is consistent with the hypothesis that the demand curve for new shares is downward sloped rather than horizontal. Also, when adverse selection is present in the primary market, larger offerings could be less underpriced to compensate uninformed investors, as a larger offer size suggests less ex ante uncertainty of the company value.

Second, the market returns before the announcement date of the final prospectus and before the listing date both have a strong positive effect on underpricing. This suggests that pricing of IPOs is less responsive to the general market situation during the filing period, and that market sentiment just before listing matters to first-day performance of new issues. Third, the aftermarket volatility of IPO companies has a significantly positive impact on underpricing, consistent with the findings of Ritter (1984) and Amihud, Hauser and Hirsh (2003). As a caveat, this finding does not exclude the possibility that higher volatility is caused by greater first-day returns rather than vice versa. Fourth, though not reported here, the dummy variable for the telecommunications industry ($TELECOM_i$) is very significant in all models, showing that these IPOs are hot in China's capital market in a similar way to the late 90's Internet bubble in the US market. Finally, the regression results show that promoters' retained equities have no significant impact on IPO underpricing using the sample 1996-2002. This is contradictory to the findings of Mok and Hui (1998) and Su and Fleisher (1999), thereby calling into doubt the relationship between the insider retention ratio and the degree of underpricing as posited by the signaling hypothesis.

Furthermore, the winner's curse theory implies a negative correlation between initial returns and allocation rates to open-sale IPO investors (Hypothesis VI). Rationing should be more severe when underpricing is higher and less severe when new shares are fairly priced or overpriced. The correlation between $MAIR_i$ and AR_i for open-sale IPOs is -0.1731, which is consistent with the winner's curse hypothesis. **Table 10** reports the regression results on the relationship between allocation rate and underpricing. The dependent variable LAR_i is regressed on $MAIR_i$ and other control variables. Models [1-6] are for the IPOs with primary-market open sale and Models [7-8] are for the IPO observations with secondary-market placement. In Models [1-6] dummy variables for each year are used.

Table 10
Cross-sectional determinants of IPO allocation

The dependent variable LAR_i, is the logistically transformed allocation rate based on AR_i. $MAIR_i$ is the market-adjusted initial return. $PROCEEDS_i$ is the logarithm of gross proceeds. $PREMKT\text{-}RET_i$ is the 5-day cumulative market return immediately before the offering day for public subscriptions. $PREMKT\text{-}STD_i$ is the standard deviation of daily market returns immediately before the offering date for public subscriptions [estimated from the 10-day daily market returns prior to the offering date]. $INSTIT_i$ is the dummy variable for IPOs that are accompanied by separate allocations to institutional investors. $PRO\text{-}RATA_i$ is the dummy variable for the IPOs with pro-rata or scaling down allocation. The sample for regressions splits into two parts: Models 1-6 deal with the IPOs of primary-market open sale, and Models 7-8 deal with the IPOs of secondary-market placement. Some of the observations in the two sub-samples overlap as some IPOs combine both of these methods. All the regressions with open-sale IPOs use dummy variables for each issuing year.

Variable	PM Open-Sale IPOs						SM Placement IPOs	
	Model [1]	Model [2]	Model [3]	Model [4]	Model [5]	Model [6]	Model [7]	Model [8]
CONSTANT	-5.4793 [0.0000]	-13.2544 [0.0000]	-13.2044 [0.0000]	-13.06266 [0.0000]	-13.1465 [0.0000]	-13.65281 [0.0000]	-4.8736 [0.0000]	-10.28883 [0.0000]
MAIR	-0.3864 [0.0000]	-0.2272 [0.0000]	-0.2345 [0.0000]	-0.244336 [0.0000]	-0.246316 [0.0000]	-0.2685 [0.0000]	-0.0481 [0.1473]	0.0695 [0.0228]
PROCEEDS		0.3776 [0.0000]	0.3746 [0.0000]	0.356595 [0.0000]	0.360868 [0.0000]	0.3882 [0.0000]		0.2669 [0.0041]
PREMKT-RET			-2.0752 [0.0008]	-1.273177 [0.0707]	-1.244237 [0.0787]	-0.8117 [0.2035]		-0.4596 [0.2420]
PREMKT-STD				12.9829 [0.0019]	13.15334 [0.0017]	12.6131 [0.0015]		-2.1134 [0.2514]
INSTIT					-0.044706 [0.5842]	-0.0555 [0.4882]		0.1153 [0.0276]
PRO-RATA						0.9248 [0.0000]		
Observations	776	776	769	769	769	769	81	81

The p-value of each estimate is provided in the square brackets, and standard errors use White's (1980) robust estimation.

Regression analyses confirm the negative correlation between allocation rates and initial returns. For the regressions of Models [1-6] with primary-market open-sale IPOs, the coefficient before $MAIR_i$ is significantly negative. This finding is consistent with the Koh and Walter's (1989) study in the Singapore market. By contrast, the negative correlation between rationing and underpricing is not detected when the samples of secondary-market placements are used. In Model 7, the negative coefficient (-0.0481) is not statistically significant, and in Model 8, the correlation appears to be positive (0.0695). This disparity, which is due to the use of different IPO samples, suggests that the winner's curse has been alleviated in recent years during which the IPOs were placed with secondary-market investors.

In addition, independent variables other than $MAIR_i$ show predictive power of the excess demand. First, the coefficient before the logarithm of the gross process is significantly positive, showing that large IPOs are less favored by investors than small IPOs. As previous regressions show a negative correlation between $MAIR_i$ and $PROCEEDS_i$, investors appear to anticipate the effect of a larger offering size and devote less of their wealth to larger IPOs.

Second, higher pre-offer market returns usually predict lower allocation rates, as investors may anticipate that market conditions may raise the aftermarket value of the IPOs. On the other hand, higher pre-offer volatility usually leads to less investor participation in the new issue market.

Third, separate allocation to institutional investors has no effect on excess demand, which jibes with the prediction of adverse selection. As this offering

method alleviates the problem of winner's curse, less underpricing is needed to compensate uninformed investors, as they already participate more than the pure open-sale mode.

Finally, the allocation rate is much lower when IPOs are conducted by pro-rata allocation, because online offerings greatly increase the size of the investor base for new shares.

5.3 Evidence on Aftermarket Price Performance

This section reports empirical results on the short and long-run price performance of China's A-share IPOs after listing on the stock exchanges. The study finds that in the short run, the sample IPOs post a modest yet salient contrarian price trend. Over the long horizon, by contrast, evidence implies that the IPO portfolio tends to outperform the market on the whole.

5.3.1 Short-Run Contrarian Trend

One concern about underpricing is whether the lofty price premium on the first listing day of an IPO is just a speculative phenomenon. If it takes more than one day for the market price to reflect the consensus estimates of the value of an IPO, there could be further material price adjustments following the first day of trading. **Table 11** presents the abnormal returns of the sample IPOs over a span of 120 trading days (approximately six months) following the first-day trading.

Table 11
Event study on short-run price trends

This table presents the short-run price performance of the IPOs for the sample period 1996-2002. The whole event window covers a span of 120 trading days immediately following the first listing day (Day 0), which are approximately equal to six months. ARs are the mean abnormal returns of the IPO portfolio for each even day. CARs and BHARs are the mean values of cumulative abnormal returns and buy-and-hold abnormal returns against the corresponding value-weighted market returns for each event day.

Event Day	Obs	ARs	CARs	BHARs
1	821	-0.0067 ***	-0.0067 ***	-0.0067 ***
2	821	0.0012	-0.0061 **	-0.0060 **
3	821	-0.0003	-0.0066 **	-0.0064 **
4	818	-0.0006	-0.0070 **	-0.0066 **
5	821	-0.0035 ***	-0.0106 ***	-0.0103 ***
6	821	-0.0008	-0.0114 ***	-0.0110 ***
7	821	-0.0003	-0.0117 ***	-0.0113 ***
8	821	-0.0018 *	-0.0135 ***	-0.0129 ***
9	818	-0.0020 **	-0.0154 ***	-0.0146 ***
10	820	-0.0019 **	-0.0173 ***	-0.0167 ***
11	818	-0.0011	-0.0180 ***	-0.0175 ***
12	819	-0.0041 ***	-0.0223 ***	-0.0219 ***
13	820	-0.0006	-0.0231 ***	-0.0230 ***
14	820	0.0002	-0.0229 ***	-0.0227 ***
15	818	0.0002	-0.0227 ***	-0.0229 ***
16	818	-0.0003	-0.0229 ***	-0.0230 ***
17	817	0.0004	-0.0225 ***	-0.0230 ***
18	816	-0.0006	-0.0232 ***	-0.0235 ***
19	817	0.0005	-0.0230 ***	-0.0232 ***
20	816	0.0005	-0.0223 ***	-0.0224 ***
30	815	-0.0010	-0.0237 ***	-0.0256 ***
40	812	-0.0008	-0.0248 ***	-0.0280 ***
50	807	0.0002	-0.0212 ***	-0.0251 ***
60	805	0.0020 **	-0.0158 **	-0.0192 **
70	799	0.0004	-0.0107	-0.0123
80	795	0.0002	-0.0076	-0.0084
90	789	-0.0005	-0.0012	-0.0025
100	790	-0.0005	0.0043	0.0001
110	779	0.0015 **	0.0106	0.0058
120	777	0.0004	0.0126	0.0067

***, **, and * represent the significance level at 1%, 5%, and 10% respectively.

A salient aftermarket contrarian price trend is detected in the event study. In the first twenty trading days, the stock prices of the IPO portfolios decline as shown by the significantly negative CARs and BHARs. On the first event day, the CAR is -0.67 percent. The value of the CAR decreases to -2.23 percent by the twentieth event day. The contrarian trend arrives at the nadir after about 40 trading days (equivalent to two months), with the CAR and BHAR equal to -2.48 percent and -2.80 percent respectively. After 60 trading days, the price performance of the IPO portfolios starts to converge to the market performance, and the negative abnormal returns become insignificant. After about half a year of trading, abnormal returns become positive. For instance, on the 120th trading day, the CAR and BHAR are 1.26 percent and 0.67 percent respectively. Overall, the statistics from **Table 11** suggest that it may not be wise to buy new shares immediately after trading, in that the first-day close price is slightly overvalued by the secondary-market investors. Rather, the market price of the new shares would be more reasonable after they have been traded for about 2-3 months.

Second, the average 2-3 percent loss for the first two trading months, though statistically significant, is still relatively small compared with the average initial return. This can serve as additional evidence that IPO underpricing is caused mainly by supply rather than speculation in the secondary market. The negative abnormal returns, when transaction costs and arbitrage risks are considered, are

not necessarily meaningful in feasibly formulating profitable trading strategies.[18]

5.3.2 Long-Run Price Performance

Long-run performance tests on the IPO portfolios are conducted using both the reference-portfolio and the regression approach. **Table 12** reports abnormal returns against various benchmarks and with differing weighting schemes. The reported time horizons are one, six, twelve, eighteen, twenty-four, thirty, and thirty-six months following the listing month (that is, the month covering the listing day is excluded from the calculation). From Panel A to Panel D, four benchmarks are selected for the calculation: SHSE/SZSE congregated value-weighted market returns, SHSE/SZSE congregated equally-weighted market returns, size/BM-ratio control portfolio returns, and matching-firm returns. For each benchmark, both equal and value weighting schemes are used in calculating the IPO portfolio returns.

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[18] Although not reported here, this paper also measures short-run abnormal returns using the Ibbotson RATS method – Returns Across Time and Securities (Ibbotson, 1975) with the formula as follows:

$$R_{i,t} - RF_{i,t} = a_t + b_t \times (RM_{i,t} - RF_{i,t}) + \varepsilon_{i,t}$$

$$CAR_\tau = \prod_{t=1}^{\tau} [1 + \hat{a}_t] - 1$$

where $R_{i,t}$ is the return of the IPO company, $RF_{i,t}$ is the riskfree return, and $RM_{i,t}$ is the market return. For each measure, the cross-sectional regression produces the estimate $\hat{a}_t$ for each time period. The CARs thus derived are also statistically significant, with magnitude similar to the standard event study.

Table 12
Long-run performance using reference portfolios

This table presents results of the long-run event studies on the Chinese IPO portfolio. Four benchmarks are used to proxy the expected return, which are SHSE/SZSE value-weighted market returns, SHSE/SZSE equally-weighted market returns, size/BM-ratio control portfolio returns, and matching-firm returns. The CARs and BHARs are calculated on the 1, 6, 12, 18, 24, 30 and 36-month basis, in terms of equal and value weighting. The wealth relative of each period is calculated as: $\sum(1+R_{i,t})/\sum(1+R_{BENCHMARK,t})$, where $R_{i,t}$ is the holding period return on the individual IPO company i, and $R_{BENCHMARK,t}$ is the return on the benchmark portfolio over the same period.

Event Month	Equallyl Weighted Returns				Value Weighted Returns			
Panel A: SHSE&SZSE VW								
	Obs	CARs	BHARs	Relative	Obs	CARs	BHARs	Relative
M01	818	-0.0110***	-0.0110***	0.99	791	-0.0074**	-0.0074**	0.98
M06	781	0.0304***	0.0324***	1.03	781	0.0532***	0.0569***	1.01
M12	753	0.0573***	0.0592***	1.05	753	0.1030***	0.1209***	1.06
M18	729	0.0934***	0.1104***	1.09	729	0.1513***	0.2051***	1.15
M24	676	0.1294***	0.1657***	1.13	676	0.2017***	0.2935***	1.22
M30	589	0.1653***	0.2206***	1.16	589	0.2630***	0.4452***	1.32
M36	539	0.1729***	0.2558***	1.16	539	0.3068***	0.5637***	1.32
Panel B: SHSE&SZSE EW								
	Obs	CARs	BHARs	Relative	Obs	CARs	BHARs	Relative
M01	818	-0.0147***	-0.0147***	0.99	791	-0.0121***	-0.0121***	0.99
M06	781	0.0030	0.0048	1.00	781	0.0202**	0.0220**	1.02
M12	753	-0.0071	-0.0113	0.99	753	0.0297**	0.0381**	1.03
M18	729	-0.0151	-0.0183	0.99	729	0.0399***	0.0701***	1.05
M24	676	-0.0186	-0.0413	0.98	676	0.0555***	0.0865***	1.06
M30	589	-0.0234	-0.0668**	0.96	589	0.0719***	0.1494***	1.09
M36	539	-0.0499**	-0.1518***	0.93	539	0.0724***	0.1386**	1.06

Table 12 (continued)
Long-run performance using reference portfolios

Event Month	Equallyl Weighted Returns				Value Weighted Returns			
Panel C: Size and BM								
	Obs	CARs	BHARs	Relative	Obs	CARs	BHARs	Relative
M01	815	-0.0081 *	-0.0081 *	0.991	789	-0.0045	-0.0045	0.98
M06	778	0.0518 ***	0.0589 ***	1.048	778	0.0767 ***	0.0832 ***	1.04
M12	751	0.0813 ***	0.0948 ***	1.067	751	0.1401 ***	0.1666 ***	1.08
M18	727	0.1239 ***	0.1402 ***	1.094	727	0.2036 ***	0.2557 ***	1.16
M24	674	0.1608 ***	0.1942 ***	1.118	674	0.2614 ***	0.3567 ***	1.22
M30	588	0.2120 ***	0.2519 ***	1.142	588	0.3437 ***	0.5279 ***	1.31
M36	538	0.2165 ***	0.3094 ***	1.150	538	0.3970 ***	0.6989 ***	1.32
Panel D: Matching Firm								
	Obs	CARs	BHARs	Relative	Obs	CARs	BHARs	Relative
M01	816	-0.0101 *	-0.0101 *	0.99	816	-0.0037	-0.0037	0.97
M06	778	0.0113	0.0179	1.00	778	0.0539 ***	0.0588 ***	0.99
M12	750	0.0109	0.0310	0.99	750	0.0870 ***	0.1182 ***	1.00
M18	725	0.0041	0.0406	0.99	725	0.1212 ***	0.1902 ***	1.04
M24	673	-0.0060	0.0186	0.97	673	0.1239 ***	0.2133 ***	1.05
M30	586	-0.0188	-0.0024	0.96	586	0.1311 ***	0.2785 ***	1.09
M36	533	-0.0657 **	-0.0825	0.92	533	0.0869 ***	0.2443 ***	1.06

***, ** and * represent the significance level at 1%, 5% and 10% respectively.

Although the sign and magnitude of the abnormal returns are sensitive to benchmark selection, the overall evidence favors the conclusion that Chinese IPOs outperform the market in the long run. The evidence is particularly consistent when the returns of the IPO portfolio are value weighted: all of the abnormal returns are significantly positive regardless which of the four benchmarks is used. Using the value-weighted congregated market returns and size/BM-ratio, the reference portfolio returns yields the highest CARs and BHARs, with the wealth relatives equal to about 1.32 in both the scenarios. When equally-weighted congregated market returns and matching-firm returns are used under the value weighting scheme, the abnormal returns become relatively small, yet still remain positive. For the benchmark of equally-weighted market returns, the 36-month CAR is 0.0724 and the 36-month BHAR is 0.1386; for the benchmark of matching-firm returns, the 36-month CAR is 0.0869 and the 36-month BHAR is 0.2443. It is worth noting that in all situations the absolute value of BHAR is greater than CAR.

Nevertheless, the evidence in favor of positive abnormal returns is less consistent when the equal weighting scheme is used to calculate the return of an IPO portfolio. For the SHSE/SZSE value-weighted market returns, the 36-month CAR and 36-month BHAR are respectively 0.1729 and 0.2558 when IPO companies are equally weighted, which are significantly smaller than the value-weighted IPO portfolio returns. When SHSE/SZSE equally-weighted market returns are used instead, the 36-month CAR and 36-month BHAR respectively reduces to -0.0499 and -0.1518. However, when benchmarked against the size/BM-ratio portfolios, significant positive abnormal returns are again detected, with a 36-month CAR of 0.2165 and a 36-month BHAR of

0.3094, both of which are statistically significant. Finally, the use of matching-firm returns yields negative abnormal returns when an IPO portfolio is equally weighted. The 36-month CAR and 36-month BHAR are -0.0657 and -0.0825 only. Nonetheless, most of the abnormal returns in Panel D do not have high statistical significance.

As an alternative long-run performance test, **Table 13** presents the results of time-series regressions of monthly IPO portfolio returns on the returns of Fama and French's (1993) three-factor model. Specifically, IPO portfolio returns are calculated by including the IPOs issued over the past three years, which are regressed on market excess returns, SMB returns and HML returns.

Table 13
Long-run performance using time-series regressions

Each regression uses 72 monthly observations from January 1997 to December 2002. The scope of the sample is SHSE/SZSE listed companies for which the monthly return, market capitalization, and book value are available. $RP_t - RF_t$ is the excess return over the riskfree rate in month t on a portfolio of IPOs that have gone public during the past 36 months. $RM_t - RF_t$ is the market risk premium in month t. SMB_t is the return on a portfolio of small stocks minus the return on a portfolio of big stocks in month t. HML_t is the return on a portfolio of high BM-ratio stocks minus the return on a portfolio of low BM-ratio stocks in month t. Calculation of the factor returns follows Fama and French's (1993) procedure).

Sample	VW Returns on IPO Portfolios					EW Returns on IPO Portfolios				
	a	b	s	h	R^2	a	b	s	h	R^2
Full Sample	-0.0002	0.9597	0.0492	-0.1434	97.36%	-0.0002	0.9550	0.2654	-0.1038	96.64%
	[-0.14]	[50.81]	[1.08]	[-2.04]		[-0.11]	[45.10]	[5.20]	[-1.32]	
Size Small	0.0024	0.9331	0.5797	0.0594	76.88%	0.0022	0.9280	0.6713	0.1350	80.14%
	[0.46]	[15.22]	[3.92]	[0.26]		[0.47]	[16.58]	[4.97]	[0.65]	
Size 2	-0.0011	0.9476	0.3689	-0.2167	93.99%	0.0000	0.9528	0.4619	-0.1221	93.77%
	[-0.44]	[33.18]	[5.35]	[2.04]		[-0.01]	[32.49]	[6.53]	[-1.12]	
Size 3	0.0027	0.9831	0.1481	-0.3423	94.94%	0.0014	0.9650	0.2907	-0.2327	95.32%
	[1.16]	[36.19]	[2.26]	[-3.38]		[0.65]	[37.90]	[4.73]	[-2.45]	
Size Big	-0.0013	0.9447	-0.1608	-0.0129	96.33%	-0.0021	0.9583	-0.0120	0.0176	96.22%
	[-0.70]	[42.50]	[-3.00]	[-0.16]		[-1.08]	[42.30]	[-0.22]	[0.21]	
BM Low	-0.0021	0.9724	0.1047	-0.4016	96.81%	-0.0019	0.9538	0.2977	-0.2752	96.07%
	[-1.87]	[45.87]	[2.05]	[-5.08]		[-0.95]	[41.46]	[5.36]	[-3.21]	
BM 2	-0.0029	0.8979	0.1177	0.0058	95.08%	-0.0019	0.9179	0.3072	-0.0216	95.48%
	[-1.37]	[37.04]	[2.01]	[0.06]		[-0.95]	[38.69]	[5.37]	[-0.24]	
BM 3	0.0014	1.0042	0.0972	-0.0007	94.96%	-0.0005	0.9773	0.3001	0.0793	93.87%
	[0.58]	[36.52]	[1.47]	[-0.01]		[-0.19]	[32.98]	[4.20]	[0.72]	
BM High	-0.0010	0.8839	0.1409	0.0561	80.23%	-0.0003	0.9205	0.2452	0.1066	82.44%
	[-0.22]	[17.05]	[1.13]	[0.29]		[-0.77]	[18.33]	[2.02]	[0.57]	

The t value of each estimate is provided in the square brackets.

Results of the time-series regressions fail to detect any abnormal performance of the IPO portfolios, which is inconsistent with the findings in the preceding event-study tests. For the full sample, size quartiles, and BM-ratio quartiles, results cannot detect abnormal returns, as the coefficients of the regressions are not statistically significant regardless of whether the IPO portfolio returns are equally or value weighted. For the regressions using complete IPO observations, the adjusted R^2 is 97.36 percent for the value-weighted IPO portfolio and 96.64 percent for the equally-weighted IPO portfolio, both having statistically insignificant abnormal monthly returns of about -0.0002. The pattern of the adjusted R^2s and coefficients for the rest of the regressions are quite analogous to the full-sample regression. However, most of the regressions of the book-to-market ratio have low explanation power while size has strong explanation power on the generation of portfolio returns. This may question the validity of the Fama-French (1993) three-factor model in interpreting the stock returns in the Chinese capital market.

Although the long-run performance tests vary with differing benchmarks and statistical approaches, a comprehensive review of the mixed evidence leads to a guarded conclusion that the IPOs in China tend to outperform the market on the whole, as well as outperform the old listed companies. A great portion of the outperformance is contributed by large IPOs or market capitalization. Sun and Tong (2003) report that recently privatized IPOs are of higher quality and indicate more improvement after privatization. Actually, a great of number of these higher quality IPOs concentrate on the very large-scale enterprises that have been privatized in recent years, particularly since 1999. The good business

prospects of these large IPOs may explain the suggested outperformance of the IPO companies during the sample period.

5.4 Summary of the Empirical Results

Finally, for the sake of readers' convenience, empirical results on the short-run underpricing and aftermarket performance of the sample IPOs are summarized in **Table 14.**

Table 14
A brief summary of the empirical findings on the underpricing and aftermarket performance of the sample IPOs

Short-Run Underpricing
• **Hypothesis I:** o Average initial return of the sample is 134%; average allocation rate is only 1.65% o Average allocation-adjusted initial return reduces to only 1.08%, which is statistically significant • **Hypothesis II:** o There is a significantly positive correlation between IPO market issuing activity and financial leverage used by institutional investors (proxied by the trading volume of treasury bond repurchase agreements) • **Hypothesis III:** o There is a significantly positive correlation between degree of underpricing and number of subscription accounts, suggesting that informed investors selectively devote more funds to subscribe for the IPOs with higher underpricing • **Hypothesis IV:** o IPOs with separate tranche to institutional investors are less underpriced by about 20%, given other conditions the same • **Hypothesis V:** o IPOs solely placed with secondary-market investors are less underpriced by about 25%, given other conditions the same • **Hypothesis VI:** o There is a significantly negative correlation between the degree of underpricing and allocation rate, given other conditions the same
Aftermarket Performance
• A salient yet modest contrarian pattern is detected regarding the short-run aftermarket price performance of the sample IPOs • Sample IPOs in the long run appear to outperform the market, yet measurement of long-run performance is sensitive to the choice of benchmarks, weighting schemes, and statistical approaches

Chapter VI: Conclusion and Discussion

This study investigates the underpricing puzzle and aftermarket performance of China's A-share IPO market. With a sample of 822 IPO observations listed during 1996-2002, it reports an average raw initial return of 134 percent. This level of underpricing is lower than the figures documented in previous studies, yet in absolute terms the figure is still astonishing when compared to those of most mature markets. The study points out that the price regulation imposed by the Chinese government is one important reason for such high underpricing.

Using the allocation data available in China, this study examines the winner's curse hypothesis by testing the validity of Rock's (1986) model in this emerging IPO market. Mixed yet favorable evidence is found to jibe with several implications of the winner's curse model. First, the research finds that great IPO underpricing begets huge excess demand for unseasoned shares, causing severe rationing in all the offerings. The mean of the allocation rates is 1.65 percent for the open-sale IPOs and 0.12 percent for the IPOs placed with secondary-market investors. Accordingly, the allocation-adjusted initial returns average only 1.08 percent for open-sale IPOs and 0.12 percent for IPOs that are placed with secondary-market investors. Although statistically significant, these numbers are not large enough to prove that investing in open-sale IPOs is a profitable activity for a typical uninformed investor.

Second, this dissertation explores the scenario that informed investors may subscribe more shares that have high underpricing. As indirect evidence, it reports a positive correlation between the aggregate trading value of open-

market treasury-bond repurchase agreements and the total offering proceeds of the same month. This finding suggests that informed investors use financial leverage to order more new shares and thus increase their expected returns during IPO subscription. It is also found that IPOs with greater underpricing involve more subscribers, hinting that informed investors may selectively participate more in the issues that have a higher level of underpricing. This adverse selection behavior of using financial leverage heavily hints that underpricing in China may not be the best way of compensating uninformed investors, in that a majority of returns on an IPO can actually be taken by large informed investors.

Third, cross-sectional regression analyses on underpricing and allocation find strong evidence in support of the winner's curse hypothesis. Underpricing occurs less in the IPOs that offer separate tranches to institutional investors and in the IPOs that are solely placed with secondary-market investors. In both offering methods, the winner's curse behavior of institutional investors is limited to some extent, causing less motivation to underprice new shares to compensate uninformed investors. Moreover, a negative correlation between allocation rates and initial returns is found after controlling other factors, showing that rationing is more severe in more highly underpriced IPOs. This is consistent with the results of Koh and Walter (1988) and Amihud, Hauser and Kirsh (2003). On the other hand, no correlation between underpricing and equity retention by the state and legal persons is detected, which is inconsistent with the signaling hypothesis as proposed by previous studies.

Finally, this study explores the aftermarket performance of China's A-share IPOs. The sample IPOs show a contrarian price trend in the short run and tend to outperform market benchmarks in the long run. First, the one-month (20 trading days) cumulative abnormal return is -2.23 percent and buy-and-hold abnormal return is -2.24 percent, suggesting that first-day closing prices of the IPOs are slightly overvalued by the secondary-market buyers of the new shares. Second, the magnitude of long-run aftermarket performance is sensitive to the choice of the benchmark, weighting scheme of the IPO portfolio, and statistical approach. When value weighting is used to calculate returns of an IPO portfolio, the abnormal returns against all the benchmarks are significantly positive. Therefore, the author suggests a guarded conclusion that China's newly listed A-share IPOs – and especially those large IPOs - outperform the market on the whole.

The simultaneous existence of initial underpricing and long-run outperformance suggests that A-share IPOs in China may be underpriced too much for the sole purpose of compensating uninformed investors. Lofty first-day returns goad institutional investors to aggressively borrow extra funds to subscribe new shares, reducing the probability of allocation to smaller investors. On the other hand, the IPO pricing in China may underestimate the value of growth options for many of the newly privatized companies, which are very likely to post improved productivity and business prospects in this world's largest developing market.

The deliberate underpricing by the government raises an interesting query: why are the policy makers and practitioners who shape China's capital market so

tolerant of leaving so much money on the table? One possible explanation is that political concerns may cause policy makers to be more cautious in pricing and selling the SOEs, which diverts their focus from short-run economic inefficiency. More importantly, since only about 1/3 of the state assets are privatized, great initial returns and substantially increased value of the stakes held by the state may satisfy the policy makers. This is consistent with the prediction of the prospect theory in behavioral economics (Kahneman and Tversky, 1979; Loughran and Ritter, 2002).

The author predicts that the degree of IPO underpricing in China's A-share market may decline in the future. First, regulations on IPO pricing have been gradually relaxed over time, so that both issuer and underwriter have increasing discretion in pricing new shares based on true business prospect and market demand. Second, with secondary-market placement in IPO subscription and rationing, the problem of winner's curse is partially solved, causing less motivation to favor uninformed investors by discounting offering prices. Third, with the integration of China's stock market into the world's capital market, the country's secondary market is expected to be less speculative in the years to come. If the average market P/E ratio reduced to about 15-25 multiples from the current level of 30-40 multiples, the segmentation between the primary market and secondary market would be substantially mitigated, leading to less underpricing for new issues.

This study, together with the previous empirical studies, has only approached the informational-asymmetry aspect of China's IPO market and its underpricing puzzle. The constrained-capacity hypothesis in the privatization literature

remains largely untested. Intuitively, the short-run constrained capacity of an emerging market like China can at least partially account for the price regulation from the government's perspective. Hence, this argument may be further explored by understanding the issuing activity and following aggregate performance of the stock market.

On a final note, this study calls for more follow-up studies on China's IPO market. This new issue market is still a young and rapidly evolving market. Given its current scale and rate of growth, the market is expected to be among the most active in the world in the next ten years. Focus on the institutional characteristics and issuing activities of this promising capital market can not only help test current mainstream models, but also generate new insights into the theoretical and empirical literature of financial economics.

Appendix A: China's A-Share IPO Market

A1. General Offering Procedures

This section briefly discusses the qualification for and procedure of China's domestic A-share offerings. For a China-based company to conduct an IPO and eventually get listed on the stock exchanges, it must first receive official approval from the CSRC and other related ministries or departments under the State Council.

According to current CSRC regulations and Securities Law, a company that applies for an IPO must meet the following eight conditions: [1] The operation and production of the company shall comply with the industrial policy of the state; [2] The issued common shares must confine to only one type – one share for one voting right; [3] Equities contributed by the promoters (founding shareholders) shall not be lower than 35 percent of the total shares issued to public investors; [4] Preceding the IPO year, the net assets of the company shall not be less than 30 percent of the total assets, and the intangible rights (excluding the rights of land use) shall not be higher than 20 percent of the total net assets; [5] The total equity in the company shall not be lower than RMB50 million (US$6.2 million); [6] The proportion of public shares shall usually not be lower than 25 percent of the total equity; however, for offerings over RMB400 million (US$49.3 million) there is an allowance for a lower proportion (with a minimum ratio of 15 percent); [7] Promoters must have no record of substantial default in the past three years; and [8] The company must have a track record of profitability over the past three years.

Substantial pre-IPO reorganizations are used in most cases to assure the above conditions are satisfied, whether the company seeking to offer shares is a state-owned enterprise (SOE), collectively-owned enterprise, privately-owned company, Sino-foreign joint venture, or even a wholly foreign-owned enterprise. These reorganizations are especially important and complicated for a SOE, which will be partially privatized through the public offering. Typically, a new joint-stock company is incorporated by segregating the core business from the original SOE, with the former to be listed and the latter to be the promoter of the offering.

The reorganization program is often documented in a reorganization agreement, the structure of which is determined by the issuer, accountants, appraisers, investment bankers, and lawyers. As a major result of pre-IPO organization, the carved assets from the parent SOE are incorporated into the new corporation in order to issue new shares to public investors. The original capital contributed by the parent company and other co-promoters forms the nonnegotiable shares. The year preceding the offering is currently called the period of Shangshi Fudao (IPO nurturing period), during which the issuer must sign a one-year advisory agreement with a securities company (usually the eventual lead underwriter), which aids the issuer in pre-IPO preparations to make sure all the offering qualifications are satisfied.

When the pre-IPO period is over, the issuer can sign the underwriting agreement with the lead underwriter and prepare filing materials. Drafting IPO prospectus is quite analogous to the practice in most of the mature capital markets, except that in China the issuer and underwriter have less discretion in

determining the final offering price of the IPO. Rather, the CSRC usually has more power in this regard. When all the documentation work is due, the issuer must first receive the approval of the provincial government and other related governmental agencies under the State Council. Finally, the filing materials can be submitted to the CSRC.

The Equity-Issue Verification Procedure by the CSRC, promulgated in March 2000, is made up of two stages. First, the CSRC makes a preliminary verification after receiving the submitted materials and informs the issuer and underwriter of its initial opinion within 30 days. The issuer and the underwriter must submit amended documents to the CSRC within 10 days after receiving the initial opinion letter. These amended materials are reviewed again by the CSRC.

Second, the amended materials, together with the initial opinion, are submitted to the Issuance Examination Committee under the CSRC, which has the final vote on the offering. The maximum duration from receipt of the application to final decision is three months. The company whose application is refused by the CSRC is able to appeal for a review within 60 days after receiving the final opinion. The CSRC must give its opinion within 60 days upon receiving the review appeal.

Upon verification by the CSRC, the planned IPO can eventually start up. The road show is conducted and the IPO prospectus publicized in the financial press stipulated by the CSRC. On the offering date, subscriptions are received from investors and the balloting is done on an equal basis to allocate shares to the

subscribers. After that, the stock exchanges arrange the exact listing date for the company.

A2. Offering and Allocation Methods

This section describes major offering and allocation methods used in the A-share IPOs. Since the inception of China's IPO market, huge demand from public investors has far exceeded issuers' supplies. Extraordinarily high oversubscription has been a sure bet for all IPOs. The new shares are so hot that the term undersubscription has actually no use in the country. For this reason, the government and the regulatory body have experimented along the way to seek an equitable and efficient offering and allocation method that can handle the excess demand from social investors. The various offering and allocation methods are introduced in the following paragraphs, in detail and in chronological order.

Despite the variety of offering methods that have been used over time, commonalities among these methods should be noted. First, offering and allocation methods are always announced before formal subscription, which is not always the case for the rest of the world (Koh and Walter, 1989). Second, the allocation in China is strictly on an evenly-handled basis for both balloting and scaling-down allocation, and thus the allocation rate is independent of subscription size. Because of these two features, it is relatively easy to stimulate the expected return that is earned by uninformed investors by subscribing new shares, allowing for a direct test of Rock's (1986) proposition.

A. Lottery Based on Subscription Forms

As the first adopted allocation method, the lottery based on subscription forms was employed from 1991-1993. Under this mechanism, investors who would subscribe new shares were first required to purchase so-called subscription forms, each giving its holder the right to subscribe a particular amount of new shares and the right to participate in the lottery for the allocation. During 1991-1992, the quantity of issued subscription forms was fixed in advance, making the lottery rate of new shares allocated for each form also predetermined. Starting in late 1992, the forms issued were unlimited, depending on the demand from public investors. As a result of this change, the lottery rate became unknown to the subscribers at the time of purchase.

This allocation method had a planned-economy nature and obvious drawbacks. Most importantly, the pricing and allocating the subscription forms themselves was a daunting task. In fact, speculation on subscription forms soon became commonplace, and inevitably led to turmoil among investors and jobbery among insiders. In addition, it required quite a long period (about one month at least) from the time subscription forms were issued and sold to the time the issuer eventually received the proceeds. Furthermore, the money used in buying subscription forms constituted an unnecessary cost for social and small investors, which was no good for a growing capital market. For these reasons, this practice has been abandoned.

B. Deposit-Linked Lottery

The Deposit-Linked Lottery was introduced in 1993. Investors' rights in the lottery were proportionate to the amount of funds deposited in a special savings

account of a banking institution as authorized by the lead underwriter. The deposits were divided into units, for each of which a certificate of deposits was issued to the investor as a lottery ticket. The deposits could not be withdrawn until the lottery was completed. Interest rates for these special accounts were usually low. Though lowering the cost to primary-market investors, the method often caused huge fund transfers during the offering period and thereby was replaced by other methods as well.

C. Offline Pro-Rata Allocation (Scaling-Down Allocation)

A frequently used allocation method in the past, pro-rata allotment can still be occasionally applied today (mostly for the offering tranche to institutional investors). Investors deposited their subscription funds into dedicated accounts as stipulated by the lead underwriter during an application period. At the same time, they mailed their share orders directly to the issuers (this explains why the method is called "offline"). The shares ordered by institutional investors could not be over five percent of the offering, and that of individual orders could not surpass 0.5 percent of the offering. After the verification of acceptable orders, the allocation rate was determined by the formula:

$$\text{Allocation Rate} = \frac{\text{Total Shares Issued}}{\text{Total Shares Effective Subscribed}} \qquad (1)$$

Based on the allocation rate, the lead underwriter allotted to every subscriber a number of shares as determined by:

$$\text{Shares Alloted} = \text{Shares Effective Subscribed} \times \text{Allocation Rate} \qquad (2)$$

After the allotment the corresponding funds were subtracted and the balances were returned to subscribers.

D. Online Fixed-Price Offering by Balloting

Prior to 2002, online fixed-price offering was the most common method of issuing new shares. The lead underwriter accomplished the offering through the computerized trading system of the stock exchange. Under the arrangement, the lead underwriter acted as the sole seller, and during the stipulated period, investors sent their buying orders and fully paid upfront deposits (orders below the offering price were dismissed as ineffective). The minimum unit for the order was 1,000 shares or one lot, and the ceiling of subscription was typically 1/1,000 of the total offering size. The placement ratio was determined when the subscription was completed:

$$\text{Placement Ratio} = \frac{\text{Total Shares Issued}}{\text{Total Shares Effective Subscribed}} \qquad (3)$$

Online fixed-price offering was efficient in both temporal and economic terms. Usually the offering was a 4-day process, during which subscribers bore the cost of the interest earned on subscription funds. Instead, the interest income was earned by the issuer and allocated into its income statements for the following five fiscal years. Typically, an online fixed-price offering worked according to the following procedure:

[1] Before the subscription day: The lead underwriter opened a share-offering special account and a subscription-fund special account, while the

investors deposited subscription funds into designated margin accounts with the brokerage companies as stipulated by the sock exchange.

[2] On T+0 [subscription day]: investors ordered by submitting instruction forms in which the quantity to be purchased was set forth at the offering price.

[3] On T+1: the subscription funds were frozen and transferred into the subscription-funds special account by the registry and clearing company of the exchange.

[4] On T+2: The received subscription funds were verified by the accounting firm and verified funds were equally divided into units, to each of which a lottery number was assigned. The number assigned was based on the time the subscription was ordered. For example, when a subscriber submitted an order of 5,000 or 5-unit shares, he was assigned five continuous lottery numbers, e.g. from 10003500-10003504.

[5] On T+3: The placement ratio was announced to the public. The lead underwriter completed the lottery and announced the winners, and the stock exchange completed the transaction/delivery and registered the new shareholders.

[6] On T+4: the stock exchange transferred the IPO proceeds to the underwriter and returned the remaining subscription funds to the losers of the lottery.

E. Online Offering by Auction

Online offering through auction was attempted during 1994-1995, and has been rarely used since. In this method, after the lead underwriter first set a minimum offering price, investors were invited to bid their prices above the minimum price together with the quantity desired. After the bids were submitted, the central computer of the trading system would rank the bids based on the principles of price precedence and time precedence. The final offering price was set at the level where supply and demand were equal: any bids above this price were allowed to purchase the new shares at the clearing price. Susceptible to the price rigging of institutional bidders, the auction method has been abandoned for the time being. However, it may still be a viable method in the future because of its high efficiency and price-revelation function. Actually, many current offerings use non-binding online auctioning to seek demand information from potential IPO investors for more accurate pricing of shares.

F. Online Offering with Offline Private Tranche

This offering method combines the online open sale with the offline tranche to legal-person investors, and is employed usually when the offering size is relatively large (over 80 million shares). The offered shares are divided into two portions: the online public tranche that targets general public investors and the offline private tranche for legal-person or institutional investors. The offline tranche should not be above 50% of the total offering. The online tranche and the offline tranche must be sold at the same price. In pricing new shares, the issuer and lead underwriter usually first set the size and ceiling price of the offering, and then adjust the quantity and price by seeking demand information

from institutional investors. The final price is then applied to the public tranche shares.

Legal-person investors are further classified into two types: strategic legal-person investors and general legal-person investors. Strategic legal-person investors are those that have a close, long-term business relationship with the issuer, such as major suppliers, clients, or other important business alliances. These investors are favorably treated as they may receive full allocation of their orders. The number of strategic investors is limited, usually not more than two institutions, and are subject to a lock-up period of at least six months after a stock is listed on the exchange. The remainder of the offline tranche is partially allocated to general legal-person investors, either by pro-rata allocation or by lottery. General legal-person investors are also subject to a lock-up period of at least three months. According to CSRC regulations, the legal persons that have subscribed the offline private tranche are not allowed to subscribe the online public tranche.

G. Placement with Secondary-Market Investors

In recent years, many A-share IPOs have been placed solely or partially to secondary-market investors. This offering method qualifies only the investors holding equities traded on the SHSE or SZSE at the offering time to subscribe new shares. First attempted in 2000, this has been the principal method of offering new shares since mid-2002. This method is thought to help reduce speculation in the primary market, to favor small investors by limiting multiple subscriptions from institutional investors, and to boost investor sentiment in the secondary market.

The IPOs that are placed with secondary-market investors are also fixed-price offerings, yet placement with secondary-market investors does not require upfront payment equal to the value of subscribed shares as necessitated in a traditional open-sale IPO. Therefore, for the subscribers in those IPOs there will be no opportunity cost in interest income. Particularly, on the date specified by the IPO prospectus (usually several days before the offering day), the market value of each brokerage account is computed by the stock exchanges and clearing corporation based on the closing stock prices on that day. Prospective investors are soon informed of the calculated market value of their accounts.

On the offering day (Day T+0), the subscriber submits an application form that indicates his or her desired quantity of new shares. A market value of RMB10,000 (US$1,233) is allowed for a subscription of 1,000 new shares (one lot). The subscribed shares should be in integral multiples of 1,000 shares, and the total order size shall not be over the limit stipulated in the IPO prospectus. A lottery number is then assigned to every lot subscribed. The rest of the process is very similar to that of an open-sale balloting IPO.

On Day T+1 the lottery is conducted, and on Day T+2 results of the balloting as well as placement ratio are announced to the public. From Day T+3 onwards, subscription funds are transferred from winning subscribers to the underwriter's bank account. The shares that are given up by the public investors are underwritten by the lead underwriter.

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