

Ownership Concentration, Adverse Selection and Equity Offering Choice

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Abstract

Previous studies document inconsistent results on adverse selection problem in equity offering choice. We argue that the inconsistent results are driven by measurement problems and the lack of a clean sample for testing. This paper examines a sample of equity offerings in China, which are characterized by two special institutional features. First, the largest shareholder, the state owner commits not to subscribe shares in rights offerings. Second, the subscription ratio in rights offering is capped by the regulator. As opposed to previous studies, we argue that high ownership concentration is associated with high adverse selection problem for rights offerings, in this particular setting. This paper presents a simple framework for the equity offering choice (rights versus public) and firm valuation with respect to firm ownership concentration, with these two features incorporated. We empirically test the model implications and three patterns emerge. First, investors revise values of rights offering firms downward for those with high ownership concentration. Second, public offerings are associated with more negative abnormal returns than rights offerings but the dispersion in abnormal returns between the two converges with increasing ownership concentration. Third, firms tend to choose public offerings when they want to raise a larger amount of fund. Additional tests show that corporate managers do consider costs and benefits when they make their choices on offering methods.

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1. Introduction

Securities offering choices reveal new information to investors. Previous studies (Smith, 1986) show that equity offering announcements are associated with negative market reactions while other securities offering announcements that are less information sensitive are associated with less negative market reactions. The findings suggest equity offerings are costly to the issuing companies both in absolute term and compared to other securities offerings. Previous studies attribute the negative market reactions to the information asymmetry between corporate managers and outside investors (Myers and Majluf, 1984), and the agency problem (Jensen, 1986) as a result of equity offerings.

However, not all forms of equity offerings are as costly as others. Compared to public offering which issues common shares to the public, rights offering which issues shares to existing shareholders on a pro rata basis is considered as a less information-sensitive form of equity offering. In addition, the direct cost of a right offering is much lower than that of a public offering (Smith, 1977; Eckbo and Masulis, 1992). Presumably, right offering should be a predominant form of equity offering, as it is less costly than public offering. However, rights offerings are infrequent in the U.S. market nowadays. This renders a puzzle to academic researchers (Smith, 1977). This paper attempts to shed the light about this puzzle by solving the tripartite relations between offering method choices, firm value and ownership concentration.

Our paper is motivated by the lack of unified analytic framework with empirical consistency. On the one hand, Eckbo and Masulis (1992) argue that adverse selection problem exists in rights offering when inside take-up is uncertain. To the extreme, a rights offering is informationally equivalent to a public offering when expected inside take-up is zero. Therefore, rights offerings are expected to be used by firms in which high inside take-up is expected, usually in the existence of high insider ownership. However, empirical studies by Ursel (2006) fail to detect any significant relation between ownership concentration and the offering method choice. Instead, she finds that the choice of rights offering is associated with financial distress resulting in difficulty accessing underwriting services for public offering. She concludes that firms conducting rights offerings in the US are “relatively unconcern with wealth transfer due to adverse selection.

The inconsistent results from previous studies on the relation between ownership concentration and offering method choice, we argue, are probably due to potential

measurement problems and the lack of a clean sample for testing. In most stock markets, expected investor take-up is unobservable as most investors will not indicate their intention. To resolve the problem, previous studies estimate the expected take-up by certain firm characteristics, including ownership concentration. Two problems arise. First, not all existing shareholders are insiders. Therefore, not all investor take-up is related to adverse selection problem. Second, in many cases, the actual take-up is difficult to be measured because of trading activities among investors and it can only be inferred from trading activities of rights. As a result, the estimations of expected take-up in those studies are noisy. With respect to this, China stock market offers a natural environment for studying the adverse selection problem in equity offerings than other stock markets, for three reasons.

First, most listed companies in China are formerly state-owned enterprises (SOEs). They are tightly controlled by the government (the state owner) and its related institutions (the legal persons) and their ownership is legally non-tradable and non-transferable. In our sample, the non-tradable ownership of firms conducting rights offerings and public offerings are 65% and 73% respectively. Therefore, listed companies in China are more homogenous and stable in insider ownership than those in other countries.

Second, unlike in other countries, the insiders (the state owner) in China usually pre-commit *not to* subscribe shares in rights offering (Lee and Xiao, 2002). In our rights offering sample, 43% of cases have non-tradable share take-up equal to zero and the median take-up is 2.8%. The low insider take-up results in significant adverse selection problem, as suggested by Eckbo and Masulis (1992). However, as opposed to Eckbo and Masulis (1992), we argue that the adverse selection problem is increasing with ownership concentration when the insider pre-commit not to subscribe the new shares.

Third, also unlike in other countries, the subscription ratios of rights offerings in China are standardized, which is capped to 0.3 after 1996 (Wang, Wei and Pruitt, 2006). The constant subscription ratio further limits the scope of alternative explanations, other than the effect of insider (non-tradable) ownership, for our results in this paper. This also predicts the choice of a public offering when a company needs to raise a large amount of fund, even it is associated with higher adverse selection cost than a rights offering.

Our analysis starts with a theoretical model that captures the special institutional

features of China stock market, particularly on the aspect of rights offering (insiders' commitment not to exercise the rights and the constant subscription ratio). We assume there is a constant per-share benefit of reducing insider ownership for a given level of ownership reduction, and the per-share benefit is increasing with the ownership to be sold. Our model derives the investor's revision on firm values ex-post to their equity offering. Investors' revisions on offering firm values are more negative for firms with high ownership concentration. Public offerings are associated with more negative abnormal returns than rights offerings but the dispersion in abnormal returns between the two converges with increasing ownership concentration.

We empirically test our model implications using a data sample from China stock market and find the results consistent with our theoretical framework. In addition, this study examines if corporate managers choose an offering method that is less costly than the alternative. This study makes the econometric inference from the stock market reaction to an offering announcement, compared to a benchmark which is the hypothetical market reaction to the alternative method of offering. A benchmark is obtained by evaluating the attributes of an issuer (right/public) in the regression of the alternative method of offering (public/right). However, the major challenge to the above method is that econometric inference may be biased due the self-selection problem. To account for the bias, this study adopts the error correction method proposed by Lee (1978), followed by Dunbar (1995), Goyal (2005) and Fang (2005) in several papers in corporate finance. The analysis shows that corporate managers do choose an offering method that is less costly. The 7-day abnormal return of a public offering announcement is 1.04% higher than the hypothetical return of a rights offering announcement. Whilst the 7-day abnormal return of a rights offering announcement is 13.02% higher than the hypothetical return of a public offering announcement. Finally, firms tend to choose public offerings when they want to raise a larger amount of fund.

In sum, we provide a model to examine adverse selection problem in equity offerings in China, incorporating certain unique institutional features. Since the state owner and its related parties usually commit not to exercise the rights to subscribe new shares in rights offerings, adverse selection problem arises. In particular, our model predicts that the cost of adverse selection is larger when ownership concentration is higher. Our empirical results mostly support our model implications. In addition, our econometric analysis also shows that corporate managers do care about the costs of different offering methods when they make the choice. Collectively, the findings suggest that investors and companies in China care about the costs of

adverse selection, as opposed to Ursel (2006).

The remaining of this paper is organized as follows. Section 2 describes institutional background of China stock market, develops the model and the hypotheses. Section 3 describes the sample and defines key variables. Section 4 presents the results on the choice of equity offering method and the analysis of stock market reaction to offering announcement. Section 5 relates our results to other previous studies. Section 6 concludes.

2. Institutional Background, Model Setup and Hypotheses Development

2.1 Institutional background

To improve the efficiency of state-owned enterprises (SOEs), the China government launched a series of reform in 1980s and 1990s. One of which was to partially privatize the SOEs through the creation of joint-stock companies, where the process was known as Modern Enterprise System (MES). This is achieved through initial public offerings, followed by seasoned equity offerings.

After the IPOs of the state-owned enterprises (SOEs), the China government usually retains a significant percentage of ownership to the SOEs in order to make sure certain social objectives, such as maintaining employment level, can be achieved. In addition, the government restricts the trading of certain classes of shares to make sure the SOEs will be under the government's control. Usually, each listed SOE has five types of shares. The first three types, namely state shares, legal-person shares and employee shares, are non-tradable. The last two types, domestic shares and foreign shares are tradable. While to date, the shares of listed SOEs are still mainly held by the state or other SOEs and non-bank financial institutions, the China government has the intention to divest its ownership to the public.

The SOE reform in China presents researchers an opportunity to examine the costs and benefits of alternative offering methods for two reasons. First, it is clear that the China government intend to reduce its ownership in the SOEs. This provides a natural environment for the test of benefits of public offerings. Second, the China stock market is characterized by its uniqueness in state ownership, corporate governance and market structure. It is important to confirm evidence in previous studies on offering choice is applicable to China.

In China, the procedure difference between rights offering and public offering is little. For both types of offering, the issuing firm has to get the approval from the board of director first, then forward the approved proposal to the shareholders' meeting for voting, and finally submit a formal application to the China Securities Regulation Commission (CSRC), the regulatory body of the China stock market, for final approval. Once the CSRC approve the application, the applicant can make a public announcement about the terms of the offering and begin the formal offering process. The whole process can take several months to complete. To get the approval from the CSRC, the companies have to meet the restrictive guidelines set by the CSRC, which cover most aspects of the offering process, particularly a minimum requirement for past profitability (Chen and Yuan, 2004; Wang, Wei and Pruitt, 2006). However, the requirement for past profitability was changing over time.

There are several institutional differences in rights offering between China and other countries that make China a suitable testing ground for the adverse selection problem in equity offering.

First, in China, shares of different classes cannot be transformed from one to another. Therefore, there is no way that public shareholders can take up the rights to subscribe state shares or legal-person shares, unless the issuance of rights transfer shares is approved in a few cases.² As a result, the take-up of state owner and its related parties can be accurately estimated and confirmed with the data.

Second, in China, state owner and legal persons mostly give up their rights to subscribe new shares. This provides a perfect ground to test the spirit of the model of Eckbo and Masulis (1992) that higher expected investor take-up is related to lower adverse selection problem in rights offering, which in turn increase the likelihood of choosing rights offering versus public offering. However, it is difficult to estimate expected investor take-up empirically in the US and other markets for two reasons. Firstly, the commitments of shareholders to subscribe are not observable and noisy proxy variables such as ownership concentration are used for analyses. Second, the actual investor take-up cannot be verified because of trading of rights among investors. On the other hand, in China, the expected insider take-up can be easily estimated as the state owner and legal persons mostly give up their rights and the actual insider take-up can be verified as public shareholders cannot invest in non-tradable state and

² Rights transfer shares are shares where the right for subscription is transferred by state-owned shareholder or legal entity shareholders to the public investors.

legal-person shares.³

Third, in China, the subscription ratio was capped by the CRSC to 30% in 1996. Therefore, it is unlikely to a company can change the subscription ratio conditional on the observed signal for firm value. This further controls the relation between ownership concentration and adverse selection problem from potential manipulation of the subscription ratio by managers. This also provides a justification for the use of public offering in China even it is associated with higher adverse selection cost – the need to raise fund above the “limit” set by rights offering.

2.2 Model set-up and hypotheses development

Our model incorporates two major features of rights offerings in China: the commitment of insiders not to exercise the rights to subscribe and the constant subscription ratio. We then relax the second constraint, allowing the offering of any amount.

The model

A firm can take a value either V_H with probability π or V_L with probability $(1-\pi)$, where π follows a uniform distribution $U[0,1]$. Currently, the number of shares outstanding is N . The large shareholder owns a fraction α of the firm, where $\alpha \in [0,1]$ and the firm is deciding whether to issue $(1-\alpha)\beta$ of ownership through a rights offering or not, where $\beta \in [0,1]$. If he chooses to issue, he will commit not to exercise the right to purchase $\alpha\beta$ of ownership.

As the firm is closely held, there is a cost of high ownership concentration. Morck, Shleifer and Vishny (1988) suggest that insider ownership has both entrenchment and incentive effects on firm value. They document a non-linear relation between firm value and insider ownership. However, in China, high state ownership probably has negative effect on firm value only because the corporate managers, who manage the companies on behalf of the government, have little incentives to work for the shareholders' interests. Here, we assume the net benefit of reducing ownership is equal to $\beta(1-\alpha)C_D E(V)$, where $E(V)$ is the unconditional firm value, that is, $0.5(V_H+V_L)$.

³ While the tradable share take-up is still hard to be estimated because of trading of rights and underwriter take-up, we argue that the size of tradable share take-up is exogenous for (and not the cause of) adverse selection problem.

We assume there is no specific use of the new fund, or equivalent a zero NPV for new projects. This suggests that the whole purpose of launching a rights offering is to capture the benefits of ownership concentration reduction. This is also consistent with the spirit of Lee and Xiao (2002) that “giving up preemptive rights provides large shareholders an opportunity to take advantages on other shareholders” by paying cash dividend after offering of shares.

We assume the large shareholder will maximize his own value, conditional on the observed true value of π . The only signal for the firm quality is the choice between a rights offering decision and the status quo (not to issue). A consistent belief for the model can be summarized as follows:

1. If $\pi > \pi_2$, the firm will maintain the status quo.
2. If $\pi_2 \geq \pi > 0$, the firm will issue shares through a rights offering for $\$P_R$ per share.

Given a value $\pi \in [0,1]$, the value of status quo for the large shareholder

$$= [\pi V_H + (1 - \pi)V_L - \beta(1 - \alpha)C_D E(V)]\alpha \quad (1)$$

Given a value $\pi \in [0,1]$, the value of rights offering for the large shareholder

$$= [\pi V_H + (1 - \pi)V_L + P_R(1 - \alpha)\beta N] \frac{\alpha}{1 + \beta(1 - \alpha)} \quad (2)$$

The value of rights offering for small shareholders if they subscribe

$$\begin{aligned} &= \left[\frac{\pi_2}{2} V_H + \left(1 - \frac{\pi_2}{2}\right) V_L + P_R(1 - \alpha)\beta N \right] \frac{(1 + \beta)(1 - \alpha)}{1 + \beta(1 - \alpha)} - P_R(1 - \alpha)\beta N \\ &= \left[\frac{\pi_2}{2} V_H + \left(1 - \frac{\pi_2}{2}\right) V_L \right] \frac{(1 + \beta)(1 - \alpha)}{1 + \beta(1 - \alpha)} - \frac{\alpha P_R(1 - \alpha)\beta N}{1 + \beta(1 - \alpha)} \quad (3) \end{aligned}$$

The value of rights offering for small shareholders if they do not subscribe

$$= \left[\frac{\pi_2}{2} V_H + \left(1 - \frac{\pi_2}{2}\right) V_L - \beta(1 - \alpha)C_D E(V) \right] (1 - \alpha) \quad (4)$$

The large shareholder will make a rights offering if (2) \geq (1).

In particular, (2) = (1) when $\pi = \pi_2$.

$$\begin{aligned} &\Rightarrow \alpha[\pi_2 V_H + (1 - \pi_2)V_L] \left[\frac{1}{1 + \beta(1 - \alpha)} - 1 \right] + \frac{\alpha\beta(1 - \alpha)[1 + \beta(1 - \alpha)]}{1 + \beta(1 - \alpha)} C_D E(V) \\ &+ \frac{\alpha P_R (1 - \alpha)\beta N}{1 + \beta(1 - \alpha)} = 0 \\ &\Rightarrow -[\pi_2 V_H + (1 - \pi_2)V_L] \beta(1 - \alpha) + \beta(1 - \alpha)[1 + \beta(1 - \alpha)] C_D E(V) + P_R (1 - \alpha)\beta N = 0 \\ &\Rightarrow \beta(1 - \alpha) \{ [\pi_2 V_H + (1 - \pi_2)V_L] - [1 + \beta(1 - \alpha)] C_D E(V) - P_R N \} = 0 \quad (5) \end{aligned}$$

Small shareholders will subscribe for the new shares if (3) \geq (4).

Assume a zero NPV for the small shareholders

$$\begin{aligned} &\Rightarrow \left[\frac{\pi_2}{2} V_H + \left(1 - \frac{\pi_2}{2} \right) V_L \right] \left[\frac{(1 + \beta)}{1 + \beta(1 - \alpha)} - 1 \right] + \frac{\beta(1 - \alpha)[1 + \beta(1 - \alpha)]}{1 + \beta(1 - \alpha)} C_D E(V) \\ &- \frac{\alpha P_R \beta N}{1 + \beta(1 - \alpha)} = 0 \\ &\Rightarrow \alpha\beta \left[\frac{\pi_2}{2} V_H + \left(1 - \frac{\pi_2}{2} \right) V_L \right] - \alpha\beta[1 + \beta(1 - \alpha)] C_D E(V) - \alpha P_R \beta N \\ &+ \beta[1 + \beta(1 - \alpha)] C_D E(V) = 0 \\ &\Rightarrow \alpha\beta \{ [\pi_2 V_H + (1 - \pi_2)V_L] - [1 + \beta(1 - \alpha)] C_D E(V) - P_R N \} \\ &+ \alpha\beta \left[-\frac{\pi_2}{2} V_H + \frac{\pi_2}{2} V_L \right] + \beta[1 + \beta(1 - \alpha)] C_D E(V) = 0 \\ &\Rightarrow \frac{\alpha\pi_2}{2} [V_H - V_L] - [1 + \beta(1 - \alpha)] C_D E(V) = 0 \quad \text{from (5)} \\ &\Rightarrow \pi_2 = \frac{2[1 + \beta(1 - \alpha)] C_D E(V)}{\alpha(V_H - V_L)} = \frac{[1 + \beta(1 - \alpha)] C_D (V_H + V_L)}{\alpha(V_H - V_L)} \quad (6) \end{aligned}$$

$$\begin{aligned} \frac{\partial \pi_2}{\partial \alpha} &= \frac{-\alpha\beta(V_H - V_L)C_D(V_H + V_L) - [1 + \beta(1 - \alpha)]C_D(V_H + V_L)(V_H - V_L)}{\alpha^2(V_H - V_L)^2} \\ &= \frac{-(1 + \beta)C_D(V_H + V_L)}{\alpha^2(V_H - V_L)} < 0 \end{aligned}$$

The model suggests that expected firm quality, proxied by $\pi_2/2$, is decreasing with ownership concentration α . The intuition behind the result is that an investor will bear the cost when he overpays the shares. On the other hand, if he is also an existing shareholder, he can share part of the benefit from selling the overvalued shares. However, when ownership concentration is higher, fewer investors will subscribe the shares but the benefit from selling the overvalued shares is shared by the same group

of investors. This results in a higher cost of adverse selection. Therefore, rational existing shareholders will demand a larger discount on the shares to be issued, making a rights offering more costly and less likely. Therefore, only lower-quality firms will offer shares.

Given the result, we have our first hypothesis about the relation between ownership concentration and investors' revision on firm value:

Hypothesis 1: For rights offerings, ownership concentration is negatively related to stock price reaction.

For the same set-up, suppose now the firm is deciding whether to issue shares through a public offering. Assume all the shares will be sold to outside investors. A consistent belief for the model can be summarized as follows:

1. If $\pi > \pi_2'$, the firm will maintain the status quo.
2. If $\pi_2' \geq \pi > 0$, the firm will issue shares through a public offering for $\$P_R'$ per share.

The problem for the large shareholder will be the same as the one in rights offering. The value of public offering for outside shareholders if they subscribe

$$\begin{aligned} &= \left[\frac{\pi_2'}{2} V_H + \left(1 - \frac{\pi_2'}{2} \right) V_L + P_R' (1 - \alpha) \beta N \right] \frac{\beta(1 - \alpha)}{1 + \beta(1 - \alpha)} - P_R' (1 - \alpha) \beta N \\ &= \left[\frac{\pi_2'}{2} V_H + \left(1 - \frac{\pi_2'}{2} \right) V_L \right] \frac{\beta(1 - \alpha)}{1 + \beta(1 - \alpha)} - \frac{P_R' (1 - \alpha) \beta N}{1 + \beta(1 - \alpha)} \quad (3') \end{aligned}$$

Small shareholders will subscribe for the new shares if (3') ≥ 0 .

It can be shown that given (1), (2) and (3')

$$\begin{aligned} \pi_2' &= \frac{[1 + \beta(1 - \alpha)] C_D (V_H + V_L)}{(V_H - V_L)} < \frac{[1 + \beta(1 - \alpha)] C_D (V_H + V_L)}{\alpha (V_H - V_L)} = \pi_2 \\ \text{and } \frac{\partial \pi_2'}{\partial \alpha} &= \frac{-\beta C_D (V_H + V_L)}{(V_H - V_L)} < 0 \end{aligned}$$

In addition, the divergence in firm quality

$$\begin{aligned} \pi_2 - \pi_2' &= \left[\frac{1}{\alpha} - 1 \right] \frac{[1 + \beta(1 - \alpha)] C_D (V_H + V_L)}{(V_H - V_L)} \\ \text{and } \frac{\partial}{\partial \alpha} (\pi_2 - \pi_2') &= - \frac{[1 + \beta(1 - \alpha)] C_D (V_H + V_L)}{\alpha^2 (V_H - V_L)} < 0 \end{aligned}$$

From the model, it can be observed that for a given level of ownership concentration and an offering size, public offering always reveal a worse signal than rights offering. This is because in a public offering, the purchasers of new shares cannot capture part of the benefit of selling overvalued shares, as for the case of existing shareholders in a rights offering. Therefore, outside investors will demand a larger discount for the shares, making a public offering less likely.

It can also be observed the divergence in firm quality is decreasing with ownership concentration and it will be zero when $\alpha = 1$, i.e. when the state wholly own the company. This is also consistent with Eckbo and Masulis (1992) that rights offering and public offering are informationally equivalent when the expected take-up is zero in rights offering.

Following the results, we have the following two hypotheses on the comparison of announcement effects between rights offerings and public offerings:

Hypothesis 2a: Stock price will react more negatively to a public offering than to a rights offering.

Hypothesis 2b: The divergence in stock price reaction between a public offering and a rights offering will be narrowed when ownership concentration is higher.

While it has been shown that rights offering always dominate public offering, in some situation, companies in China have to go for public offerings because of the limitation on the subscription ratio that limits the fund raised in right offerings. The demand for a public offering will be larger when ownership concentration is high because the firm will find it harder to raise enough fund. Therefore, we have the following hypothesis:

Hypothesis 3: A company will be more likely to issue shares through a public offering when the ownership concentration is high or when it wants to raise a larger amount of fund.

Indeed, if we relax the assumption of the model to allow the selling of any ownership γ , π_2 will be given by:

$$\pi_2 = \frac{(1 + \gamma)C_D(V_H + V_L)}{(V_H - V_L)} \text{ which is increasing in } \gamma \text{ but independent of } \alpha.$$

From our model, the adverse selection problem is a decreasing function of issuing size. The intuition is that if the newly issued ownership is larger, the adverse selection cost will be shared among a larger group of outside investors. Therefore, outside investors will be willing to pay a higher price for the shares and more high-quality companies will offer shares.

Following the analysis, we have the following hypotheses:

Hypothesis 4: For public offering, stock price will react more positively when the relative offer size is larger.

If investors care about adverse selection in offering choice and corporate managers in China choose a method of offering which is less costly than the alternative one, the market reaction to an offering announcement should be more positive compared to a benchmark which is the hypothetical market reaction to the alternative method of offering. We follow the method similar to Dunbar (1995), Goyal (2005) and Fang (2005), proposed by Lee (1978) to correct for the self-selection bias in the regression model and estimate the hypothetical market reaction to the alternative decision.

Hypothesis 5: The market reaction of an equity offering should be more positive (less negative) than the hypothetical market reaction of the alternative offering method.

3. Data and methodology

The sample consists of 253 observations of rights offerings and 71 observations of seasoned public offerings completed between 2000 and 2004. In considering sample inclusion, we require the offerings to have identifiable board of directors (BoD) meeting dates and available data for the calculation of abnormal returns around the BoD meeting dates. In China, the offering process is initiated by the board of directors. Once this is approved, the board must call a shareholders' meeting to vote on the issue. In addition, the company concerned is required by the China Securities Regulation Commission (CSRC), the regulatory body of the China stock market, to announce their offering proposals in the three major newspapers for corporate announcements: *China Securities Journal*, *Securities Time* and *Shanghai Securities*

News within two working days after the BoD approvals (Chen and Yuan, 2004).⁴

We primarily identify the BoD dates from the three newspapers, through WiseNews. If we cannot find out the BoD meeting dates from the above three newspapers, we go for the final offering prospectuses (also from WiseNews) that usually mention the BoD meeting dates and other important dates. Finally, financial data and stock return data come from China Stock Market and Accounting Research (CSMAR) Database.

3.1. Calculation of cumulative abnormal returns around the BoD meeting dates

While the announcement dates of the BoD meeting resolutions are generally considered as better event dates than BoD meeting dates for event studies, we choose the BoD meeting dates as the event dates because the offering prospectuses usually do not mention the announcement dates. Therefore, we choose a longer event window (7 days) around the BoD meeting date to capture the announcement effect of an offering proposal.

To measure the announcement of an offering proposal, we identify the BoD meeting date as day 0 of the event window. A market model is then estimated over a period between day -150 and day -51, where market return is defined as the daily return of a value-weighted portfolio constructed by all A shares in the two stock exchanges, Shenzhen and Shanghai. Both tradable and non-tradable shares are considered in the calculation of the market index. Daily abnormal returns are then calculated from day -10 to day +10. Cumulative abnormal return (*ABRET*) over day -3 to day +3 are calculated by summing daily abnormal returns in the event window.

3.2. Construction of key explanatory variables

1. Non-tradable ownership (*CONC*) is defined as the number of non-tradable shares divided by the total number of shares outstanding as of the month-end prior to BoD meeting. Following our model, the adverse selection problem in right offering will be greater when ownership concentration is higher. Therefore, we expect abnormal return around offering proposal announcement to be negatively related to ownership concentration. While public offering is characterized by higher adverse

⁴ In US, firms can choose to apply for shelf registration of equity offering two years in advance from the SEC. While in China, there are no shelf registration and equity issuances have to be done within twelve months after the decision made in a firm's shareholders meeting. Another institutional difference is that in China, the announcement date is within two days of the BoD meeting date.

selection problem, resulting in a more negative announcement effect, the divergence in announcement abnormal returns between the two methods will be narrowed when ownership concentration is higher.

2. Relative offer size (*OFFER*) is defined as the gross proceeds from the offering as a percentage of market value prior to BoD meeting. In China, the subscription ratio in right offering is regulated at 30%, limiting the amount of fund raised. Therefore, we expect firms that offer a larger value of shares relative to the pre-offering value are more likely to go for public offerings so as to access a larger investor base. In addition, from our model, the adverse selection cost in a public offering is decreasing with the relative offer size. Therefore, for public offering, we expect relative offer size is positively related to announcement abnormal return.

3. Total asset (*SIZE*) is self-explained and is measured as of year-end prior to BoD meeting. Presumably, larger firms are more established and they are better understood by investors. As a result, the adverse selection problem will be less for larger firms than for smaller firms. Therefore, we predict that larger firms are more likely to sell shares through public offerings than smaller firms.

4. Stock volatility (*VOLAT*) is the standard deviation of daily abnormal returns over a period between day -50 and day 50 (excluding day -10 to day 10 to avoid the influence of the announcement effect), where daily abnormal returns come from the estimation of a market model as described above. Stocks that are more volatile generally have greater adverse selection problems because their market prices are more likely to deviate from their true values, resulting in more opportunities of market timing. Therefore, we expect more volatile firms are more likely to go for rights offering to reduce the possible information asymmetry between insiders and external investors.

5. P/E ratio (*PE*) is defined as market capitalization at the month-end prior to BoD meeting divided by net income at the fiscal year end prior to BoD meeting. Previous studies show that corporate managers generally make a public offering when the cost of equity is low (or equivalently when the share price is high). Therefore, a public offering is more likely if a firm has a higher market valuation, the P/E ratio. However, a higher P/E ratio could also suggest over-valuation. Therefore, we expect the market reaction to a public offering proposal is more negative when the P/E ratio is higher.

6. Profitability (OPINC) is defined as operating income divided by total asset and is measured as of the year-end prior to BoD meeting. However, Ursel (2006) finds that the choice of rights offering is mainly associated with financial distress resulting in difficulty accessing underwriting services for public offering, but little to do with ownership concentration. Therefore, we expect more profitability companies are more likely to choose public offerings than rights offerings. We use operating income rather than net income because previous studies show that companies in China manipulate their non-operating income prior to equity offerings (Chen and Yuan, 2004; Wang et al, 2006).

7. Investor take-up ($TAKEUP$, $TAKEUP_T$ or $TAKEUP_NT$) is measured for the rights offering sample only. $TAKEUP$ is defined as total number of shares outstanding after rights offering divided by total number of shares outstanding before rights offering, minus one, and then divided by subscription ratio. Tradable (Non-tradable) share take-ups, $TAKEUP_T$ ($TAKEUP_NT$) is defined similarly, but only tradable (non-tradable) shares are included in calculation. In our model, we assume non-tradable share take-up ($TAKEUP_NT$) is zero. However, it is possible that in some cases when the state owner exercises part of the rights, the decision may convey a good signal about the issuing company's prospect.

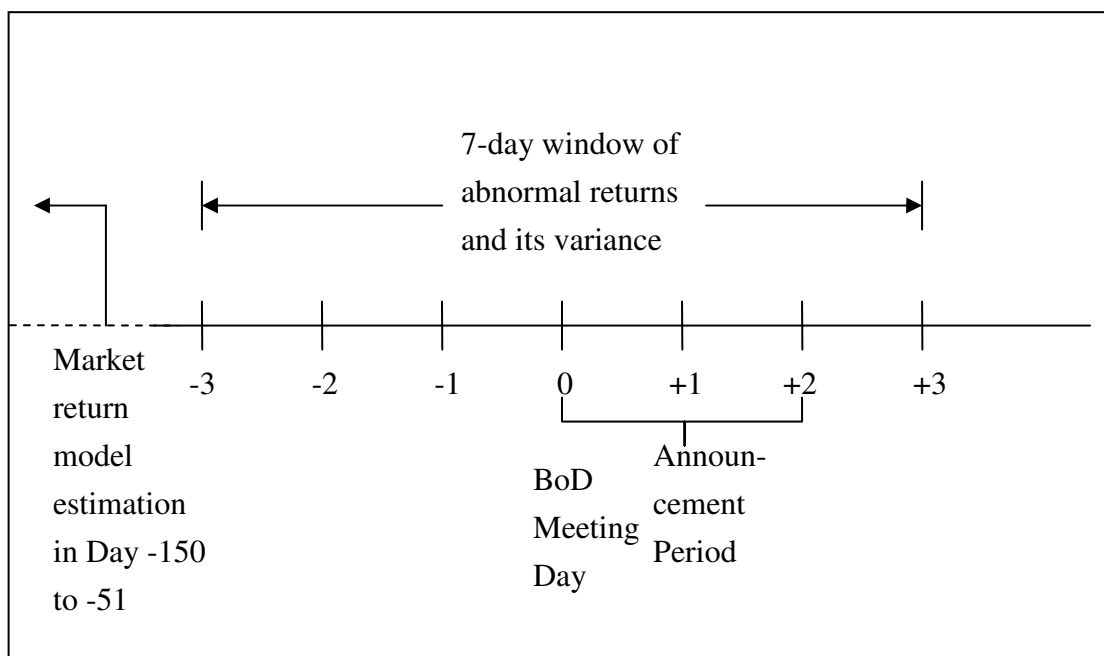


Figure 1. construction of the daily abnormal return around the Board of Director (BoD) meeting date and Announcement of the public or rights offering date.

4. Results

This section we report the empirical evidences on the three hypotheses developed in last section. To shed light on the costs and benefits of public and rights offering in China region, we employ standard event study techniques and probit regression model.

4.1. Summary statistics on announcement effect

In Table 1, we summarize the mean daily abnormal returns and the mean cumulative abnormal returns over a 21-day event window for firms who choose public offerings (Panel A) and firms who choose rights offering (Panel B). In our sample period from January 2000 to December 2004, there are 71 public offerings and 253 rights offerings.

For firms who use public offering, the average abnormal return is -1.44% ($t=-5.90$, with 57 firms negative out of 71) on day +1 and -1.01% ($t=-3.26$, with 51 firms negative) on day +2, both are significant at 1%. The cumulative two-day excess return is -2.45%. This is consistent with empirical evidences from U.S. firm commitment offerings of -2.7% to -3.6%.⁵ The mean values of daily abnormal returns on other days are insignificantly different from zero, except on day -9. The results show that there is not much information leakage prior to the announcements of offering proposals.

In Panel B shows that for firms who use rights offering, the abnormal returns is statistically insignificant in day +1 and +2 in the 21-day event window. For firms who use rights offering, the average abnormal return is -0.25% on day +1 and 0.04% on day +2, both are insignificant, with average two-day excess return of -0.21%, which is also insignificantly differ from zero.

Panel C reports cumulative raw returns, market-adjusted returns and abnormal (market model-adjusted) returns over different event windows. The 7-day (from day -3 to day +3) cumulative raw returns are negative and significant for public offerings but positive and significant for rights offerings. However, adjusted for overall market movement, the returns before more negative for public offerings but become insignificant for rights offerings, suggesting the positive returns around rights offering proposal announcements are mainly driven by the positive market returns in that

⁵ Asquith and Mullins (1986), Masulis and Korwar (1986) and Mikkelson and Partch (1986).

period. Our finding is robust if we change the event window to 4 days (day 0 to day +3) or 11 days (day -5 to day +5).

Together with the results in Panels A and B, our findings are consistent with previous studies and our Hypothesis 2a that public offerings reveal a negative signal for firm value, while rights offerings are more informationally neutral events.

4.2. Summary statistics on other key variables

Table 2 reports the summary statistics of all key variables in our analysis. All public offering firms issue equity only once and only 14 rights offering firms make multiple rights offerings. Among public offering firms, 30 firms come from Shenzhen Stock Exchange and 41 come from Shanghai Stock Exchange. Among rights offering firms, 109 firms come from Shenzhen Stock Exchange and 144 come from Shanghai Stock Exchange.

Consistent with Table 1, the 7-day abnormal returns around rights offering proposal announcements are negative but insignificantly different from zero while the returns around public offering proposal announcements are negative and significant at the 1% level. The mean (median) non-tradable ownership for public offering firms is 72.6% (72.2%), significantly larger than rights offering firms with 64.5% (66.7%). The mean (median) relative offer size (gross proceed per market value) across public offering firms equal 21.9% (19.9%), much larger than that of the rights offering firms with an average 13.9% (11.2%). Both results are consistent with Hypothesis 3 that a public offering is more likely when a company want to issue a larger amount of fund.

As we argued above, rights offerings are considered as less information sensitive events than public offerings. Therefore, we expect firms that are characterized by more severe problem of information asymmetry (smaller firm size and more volatile stock return) are more likely to issue shares through rights offerings. In general, there is significant difference in median firm size between rights offering firms and public offering firms. In addition, stocks of rights offering firms are more volatile than stocks of public offering firms. Both findings are consistent with our prediction that firms avoid issuing costs associated with information asymmetry by choosing rights offerings over public offerings.

Public offering firms have higher P/E ratios than rights offering firms, although the difference in median values is insignificant at the conventional levels. The

difference in profitability is also insignificant. Both suggest valuation is probably not an important for the choice between rights offering and public offering in China.

The average investor take-up (*TAKEUP*) of rights offerings in China is 44.5%, significantly lower than the take-ups in rights offerings of other countries.⁶ When we break down investor take-up into tradable and non-tradable ones, the median tradable share take-up is 100% and the median non-tradable share take-up is only 3%. This suggests the state owner always commits not to exercise the rights. The tradable share take-up is likely to overstate the actual take-up of existing public shareholders because the figure also includes the take-up by the underwriter and the take-up by other investors who purchase the rights in secondary market.

Overall, the summary statistics in Table 2 are consistent with our prediction that the choice between rights offering and public offerings in China is affected by the amount of fund raised. As the subscription ratio in rights offering is regulated, companies have to go for public offerings when they need to raise a large amount of financing. However, there are insignificant differences in firm valuation and profitability between the two groups of companies, suggesting financial difficulties cannot explain the choice in China.

4.3 Ownership concentration, investor take-up and abnormal return

Hypothesis 1 predicts that high state ownership is associated with high adverse selection cost in rights offering, resulting in a worse signal on firm value. Therefore, the abnormal returns around rights offering announcements should be negatively related to ownership concentration. In addition, Hypothesis 2b argues that while public offerings are characterized by higher adverse selection problem than rights offerings, the divergence in signals is decreasing when the ownership concentration is increasing. To test the two hypotheses, we break down the sample into four groups according to the pre-offering non-tradable ownership and calculate the respective mean abnormal returns. We expect that rights offerings are associated with less negative abnormal returns than public offerings but the divergence is decreasing with pre-offering non-tradable ownership.

Panel A of Table 3 reports the results. The first two columns report the abnormal returns for public offering announcements and rights offering announcements

⁶ For example, Slovin et al (2002) document that the median investor take-up is 92% in the UK. Cronqvist and Nilsson (2005) document a corresponding value of 84% in Sweden.

respectively and the last column reports the difference between the two groups. Consistent with our prediction, for rights offering, higher ownership concentration is associated with a more negative abnormal return. In addition, the rights offering groups always have higher abnormal return than public offering groups across different ownership concentration. However, the divergence is decreasing with ownership concentration and the differences are only significant at lower ownership concentration ($CONC < 70\%$). Also consistent with our prediction, companies with higher ownership concentration are more likely to issue shares through public offerings. While public offerings are much less frequent than rights offerings in general, public offerings outnumber rights offerings when ownership concentration is very high ($CONC > 80$).

Not predicted from our model, ownership concentration is positively related to abnormal returns for public offerings. A possible explanation for this is that the public offering decision by a company with low ownership concentration is a big negative surprise to investors than the decision by a company with high concentration. From our model, public offerings are more costly relative to rights offerings when ownership concentration is low. In this case, public offerings should be less likely unless there are adverse reasons that make a rights offering less preferable to a public offering.

Panel B of Table 3 reports investor take-ups across different ownership concentration for the rights offering sample. Consistent with the state owner commitment not to subscribe and a fixed subscription ratio a rights offering, investor take-up is decreasing with ownership concentration. Both tradable and non-tradable take-ups are fairly constant (100% vs. less than 5%) across different ownership concentration.

Table 4 reports the regression analysis on investor take-up in rights offerings. Since investor take-up are bounded between zero and one, Tobit regressions is used for estimation. Eckbo and Masulis (1992) suggest that investor take-up reflects the signal of firm value received by existing shareholders. However, our results show that there is no significant relationship between investor take-ups (overall, tradable and non-tradable) and abnormal return around offering announcements. Nor investors take up more shares for more profitability companies.

Consistent with Panel B of Table 3, overall investor take-up is negatively related to ownership concentration, but not for tradable and non-tradable take-ups. While it is

the fact that the state owner usually commits not to subscribe, it breaks the norm when the company has to raise a large amount of fund.

4.3. Offering method choice and ownership concentration

To explain the choice between rights offerings and public offerings, a Probit model is estimated. Following Slovin et al (2000), we include the non-tradable ownership, relative offer size, firm size, stock return volatility, P/E ratio (defined in Section 3) and year dummy variables in our model. The choice of a rights offering versus a public offering can be written in the following form:

$$(1) : I_i = \alpha + Z_i' \gamma - \varepsilon_i$$

where I_i equals ZERO if firm i files choose to issue shares through a public offering and ONE otherwise. The vector Z_i contains variables aforementioned of a public versus a rights offering.

In China, due to the state owner's commitments not to subscribe shares and a fixed subscription ratio in rights offerings, the amount of fund raised in a rights offering will be decreasing with ownership concentration. In addition, the divergence in the cost of adverse selection between the two methods of offering is decreasing with ownership concentration. Therefore, if the target of China government is to reduce the non-tradable ownership in the SOEs, we expect firms with higher non-tradable ownership rely more on public offerings to reduce ownership concentration. We expect rights offerings are less likely when ownership concentration is higher and relative offer size is higher, and expect negative coefficients for both variables.

The results are reported in Table 5. In general, the results from the Probit regression are consistent with the findings in Table 2. In line with Table 2 and our hypotheses, firms with higher non-tradable ownership and firms issuing a larger percentage of ownership are less likely to issue shares via rights offerings than via public offerings. Larger firms are less likely to choose rights offerings but the result is insignificant at conventional levels. More volatile firms are more likely to issue shares via rights offerings. As rights offerings are subject to a lower adverse selection cost than public offerings, both finding suggests that companies reduce adverse selection costs by choosing rights offerings (versus public offerings) when such costs are tend to be high.

Table 5 also shows that valuation is important in determining the offering choice. High P/E firms are less likely to choose rights offerings than low P/E firms. This is consistent with our model and previous studies that managers time the market before public equity offerings and market timing is less prevalent for rights offerings. However, inconsistent with Ursel (2006), we do not find financial difficulties relate to rights offerings, as given by the insignificant coefficient for the profitability variable.

4.4. Offering method choice, ownership and shareholders wealth effect

In Table 6, examine the effect of ownership concentration on shareholders wealth effect, using OLS regression models. However, our analysis is complicated by the fact that the choice between rights offering and public offering is a self-selection process. When we observe a firm decides to issue shares through a rights offering and its stock price changes as a result of the decision, we do not observe what would happen if the firm had chosen a public offering. When the decision to issue shares is inevitable, the benchmark for analysis should not be the stock returns on other firms but the “unobservable market reaction” of the alternative action.

Several studies show that corporate managers choose a form of contract which can give them a lower cost (or higher benefit) of financing than the alternative. Account for self-selection of using warrants as underwriter compensation, Dunbar (1995) finds that IPO firms are more likely to use warrants if this can reduce the expected level of underpricing. Goyal (2005) shows that banks are more likely to include restrictive covenants in their debt contracts if this can reduce their expected yield spread of borrowing. Fang (2005) also finds that after controlling for endogeneity in debt issuer–underwriter matching, reputable banks obtain lower yields and charge higher fees, but issuers’ net proceeds are higher.

Given the above studies, it is possible that the decision of SEO, like the IPO bundling, is a self-selection process to minimize the cost of offering. To account for the self-selection problem of these type, we adopt the method similar to Dunbar (1995) Goyal (2005) and Fang (2005), proposed by Lee (1978) to correct for the bias in our regression model.

The prediction model of value gain from a public offering and the value gain from a rights offering are specified as follows, y_{0i} is the abnormal returns from the public offering decision and y_{1i} is the abnormal returns from the rights offering

decision, three days before and after the board of director meeting date:

$$(2): y_{0i} = X_i' \beta_0 + u_{0i},$$

$$(3): y_{1i} = X_i' \beta_1 + u_{1i}.$$

where vector X_i is a set of exogenous variables to explain the abnormal return. We follow Lee's (1978) two-stage procedure to produce regression estimates net of the self-selection bias. In the first stage, a probit model (1) is estimated for the choice between rights offering and public offering, as we did in Section 4.3. In the second stage, models (2) and (3) are estimated with an OLS specification, with inverse Mill's ratio included to correct for self-selection bias. Inverse Mill's Ratio is defined as $-\phi(Z'\gamma)/\Phi(Z'\gamma)$ when it is a rights offering and $\phi(Z'\gamma)/[1-\Phi(Z'\gamma)]$ when it is a public offering, where ϕ and Φ are standard normal density function and cumulative standard normal density function respectively and $Z'\gamma$ is the linear prediction of the probit model (1).

The dependent variable is cumulative abnormal returns from day -3 to day +3 relative to the board of directors (BoD) meeting date. Following previous studies, we choose a subset of the dependent variables in our Probit model as the explanatory variables for the OLS regressions explaining abnormal returns. They include the variables non-tradable ownership, relative offer size, stock return volatility, the P/E ratio and year dummy variables.

Columns 1 and 2 report the results from OLS regressions without the inverse Mill's ratio for the two sub-samples, public offerings and rights offerings. For the sample of public offerings, no variable shows up significantly from the regression for cumulative abnormal returns. The finding is inconsistent with Table 3 that shows a positive relation between cumulative abnormal returns and non-tradable ownership. For the sample of rights offerings, non-tradable ownership has negative effect (t-value = -3.85) on firm value around the offering proposal announcement. The finding is consistent with Hypothesis 1 that adverse selection problem is greater for rights offerings by companies with higher ownership concentration. Other variables have weak effect on shareholders' wealth around rights offering announcements.

However, the OLS specification for Columns 1 and 2 is correct only when the choice between public offerings and rights offerings is random. However, the result for the Probit regression suggest that both ownership concentration and relative offer size affect the offering method choice. The selection bias leads to truncations of

residual terms and therefore the OLS estimation will generate in estimates. To address the endogenous nature of the choice, we include the inverse Mill's ratio in the OLS estimation for the cumulative abnormal returns.

Column 3 reports the model estimate for the public offering sub-sample, with inverse Mill's ratio included. For public offering firms, after controlling for selection bias between choices of offering (by the Mill's ratio), the pre-offering non-tradable ownership is positively (0.250) and significantly (t-statistics=2.55) related to abnormal returns. That is a percentage point larger non-tradable ownership associates with 0.25% higher abnormal returns for public offering issuers.⁷ Our regression results confirm the finding in Table 3.

The relative offer size in public offering is also positive (0.150) and significantly (t-statistics=2.32) related to cumulative abnormal returns. This is consistent with our Hypothesis 4 that the adverse selection problem is lower in public offering when the ownership offered is higher. If more shares are offered, more benefit from reducing ownership concentration will be captured by the incumbent shareholders. Therefore, given a constant per-share cost of adverse selection, more high-quality companies (firm with higher π) will be willing to offer shares, resulting in a less negative signal of a public offering decision.

Column 4 reports the model estimate for the rights offering sub-sample, with inverse Mill's ratio included. In general, the results are qualitative the same, compared to those of Column 2.

4.5. Do corporate managers in China make rational decisions?

Our previous analysis shows that the market reactions to right offering proposal announcements are on average less negative than to public offering proposal announcements. Therefore, even firms with higher ownership concentration (non-tradable ownership) are experienced less negative abnormal returns, it is still possible that a rights offering decision leads to a less negative market response. To test this possibility, we compare the stock market reaction to an offering

⁷ Slovin et al. (2000) document an inverted U-shaped relation between abnormal returns and ownership concentration, with 40% of ownership concentration the turning point. In an unreported analysis, we add the squared term of non-tradable ownership to the regression model. Both non-tradable ownership and its squared term are insignificant but the coefficient of non-tradable ownership is larger than the one reported in Column 3. We further investigate the correlation between the two terms and find that the correlation is 0.96. Therefore, it is possible that the multi-collinear problem causes both terms insignificant in the regression.

announcement, to a benchmark which is the hypothetical market reaction to the alternative method of offering.

We first estimate models (2) and (3) and obtain the coefficients, with the inverse Mills ratio included. We then evaluate the issuers' attributes in the regression of the alternative method of offering and get the hypothetical market reaction, with inverse Mill's ratio excluded. If corporate managers choose a less costly form of equity offering, the actual market reaction should be more positive than the hypothetical market reaction.

The result from the analysis is reported in Table 7. Panel A reports the analysis without controlling for self-selection in the choice between public offerings and rights offerings (i.e. cumulative abnormal returns are modeled with regressions in Columns 1 and 2 of Table 4). The first column reports the mean cumulative abnormal returns for the actual choice and the second column reports the hypothetical cumulative abnormal returns for the alternative. The result shows that regardless the actual decision, rights offering is always the better choice for equity offering.

Panel B reports the analysis with control for self-selection in the choice between public offerings and rights offerings (i.e. cumulative abnormal returns are modeled with regressions in Columns 3 and 4 of Table 4). This time, the result shows that for a firm that chooses a public offering, the alternative will result in a 1.04% more negative abnormal return. In addition, for a firm that chooses a rights offering, the alternative will result in a 13.02% more negative abnormal return. The finding suggests that the choice of offering method is an equilibrium result of cost and benefit analysis, where issuing firms trade off the cost and benefit of mimicking the signal. Any methods different from the equilibrium one are deemed to be more costly.

In Table 8, we re-estimate the choice model for the two offering methods, with a variable, which measures the expected value increase by choosing rights offering, included as an explanatory variable. The expected value increase is estimated from the predicted values of the models (3) and (4) in Table 6. (Predicted value from model (4) minus the predicted value from model (3)) If corporate managers do care about the costs and benefits of the two offering methods, they will be more likely to choose rights offerings when the expected benefits from doing so are higher. Since the expected value increase is a linear combination of explanatory variables in Table 6, we exclude those variables from the Probit model.

The coefficient for the expected value increase is positive and significant (t-value = 6.88). This indicates that corporate managers choose an offering method that provides a higher benefit, compared to the alternative.

Overall, Tables 7 and 8 show that corporate managers in China do consider the relative costs of benefits in choosing the method of equity offering. It also illustrates the importance to take into account the self-selection issue when we compare the costs and benefits of alternatives. This is important because if the choice is non-random, which is always the case, failing to control for endogeneity could lead to wrong conclusions.

5. Comparisons to Related Literature

Previous studies argue that compared to public offering which issues common shares to the public, rights offering which issues shares to existing shareholders on a pro rata basis is considered as a less information-sensitive form of equity offering. In addition, the direct cost of a right offering is much lower than that of a public offering (Smith, 1977; Eckbo and Masulis, 1992). Presumably, right offering is a predominant form of equity offering, as it is less costly than public offering. However, rights offerings are infrequent in the U.S. market nowadays. This renders a puzzle to academic researchers (Smith, 1977).

In attempt to resolve the above rights offering puzzle, several studies have examined possible hidden costs of rights offerings. In particular, examining seasoned offerings between 1973 and 1986, Kothare (1997) finds that rights offerings increase the ownership concentration and impose a significant indirect cost on the right issuers by reducing the issuance firm's market liquidity, where as public offerings increase a firm's market liquidity by reducing the ownership concentration. Similarly, Slovin et al (2000) document a reduction in ownership concentration after a public offering for a sample of U.K. equity offerings. Both findings are consistent with Amihud and Menderson (1986) and Amihud (2004) that illiquidity is priced by investors. However, Ursel (2006) examines rights offering firms in US and suggests that firms use rights offerings because of financial distress with "difficulty accessing underwriting services", not ownership concentration.⁸

⁸ There have been other studies on hidden costs of rights offerings. Heinkel and Schwartz (1986) model the choice between rights offerings and public offerings and show that only a high-quality firm can signal the market by bearing the cost of failure in an uninsured rights offering or a cost of investigation by the underwriter in an insured rights offering. Eckbo and Masulis (1992) conjecture that

Liquidity argument can probably explain the results that a positive relation exists between abnormal returns and ownership concentration for public offerings but a negative corresponding relation exists for rights offerings. If companies issue a higher ownership via public offerings when the ownership concentration is higher, then we will observe a positive relation between abnormal returns and ownership concentration. At the same time, a corresponding negative relation is expected for rights offering because the offering size is decreasing with ownership concentration, given the two characteristics of rights offerings in China.

To examine this hypothesis, we look into the relative offer size for the two samples across different ownership concentration, as we did in Table 3. In an unreported result, we find that the relative offer size for the public offering sample is actually decreasing, not increasing, with ownership concentration. In addition, the difference between the two groups is not increasing with ownership concentration. This suggests the difference in relative offer size, i.e. the difference in ownership concentration reduction, cannot explain the convergence of abnormal returns when ownership concentration is increasing.

6. Conclusion

This study examines the adverse selection problem in equity offering choice. The issue is of academic interests because previous studies document inconsistent results. Eckbo and Masulis (1992) argue that uncertainty in investor take-up in a rights offering results in adverse selection problem, albeit to a lesser extent than in a public offering. They use ownership concentration to proxy for investor take-up and suggest that higher ownership concentration is related to lower adverse selection problem. As a result, companies with higher ownership concentration should be more likely to choose rights offerings versus public offerings. However, Ursel (2006) document that in the US, rights offerings are used mainly by companies facing financial difficulties. Ownership concentration cannot explain the offering method choice, suggesting companies issuing rights are unconcerned about the adverse selection problem.

the general popularity of underwritten public offerings is probably due to indirect costs associated with rights offerings, including capital gains taxes and transaction costs of reselling rights, stock illiquidity and risk of rights offering failure. Singh (1997) argue that standby rights offerings are costly due to the massive selling pressure from shareholders who need to rebalance their portfolios and underwriters who want to hedge the risk of underwriting.

We add our footsteps to the adverse selection issue by examining the market reactions to the announcements of equity offerings in China, for two reasons. First, in China, the largest shareholder, the state owner, always commit not to subscribe new shares in rights offerings. This provides a natural environment for us to examine the adverse selection problem in rights offering. We hypothesize and model that ownership concentration is related to adverse selection problem, but in a spirit different from that of Eckbo and Masulis (1992). Eckbo and Masulis argue that higher ownership concentration guarantee higher take-up. However, since the state owner in China commits not to subscribe shares in rights offerings, higher ownership will lead to more severe adverse selection problem. Second, in China, the subscription ratio in a rights offering is regulated to 0.3. This limits the amount of fund raised in a rights offering, especially when ownership concentration is high. But this also helps to justify why companies issue shares through public offerings even public offerings are associated with higher adverse selection costs.

We use the standard event study method to examine the wealth effects of rights offering and public offering proposal announcements. We measure the wealth effects by the cumulative abnormal returns around the offering announcements. The analysis shows that for right offerings, cumulative abnormal return is negatively related to ownership concentration, consistent with our prediction that higher ownership concentration is associated with higher adverse selection cost. While public offerings are associated with more severe adverse selection problem than rights offerings, as shown by the more negative abnormal returns associated with them, the divergence between them are narrowed when ownership concentration is increasing. This is also consistent with Eckbo and Masulis (1992) that a rights offering is informationally equivalent to a public offering when expected investor take-up is zero. In addition, companies are more likely to choose public offerings when they need to issue a larger amount.

A peripheral issue is that whether corporate managers in China care about the costs and benefits of different equity offering methods when they are making the choices. We find that managers in China do consider these when they make their offering choices and use the one that is less costly. This finding sounds contradictory to our general perception that corporate managers in China are inefficient in decision making. However, a recent study by Wang, Wei and Pruitt (2006) find that rights offering firms outperform control portfolios of firms matched by size and B/M ratio. Their results suggest that corporate managers care about economic consequences of their decisions and our results confirm this is the case.

This paper also shows the importance of incorporating country-specific institutional features when we apply a theoretical model for one country to another country with different institutional settings. In our study, because of the special features of rights offerings in China, we come up with an opposite prediction about the effect of ownership concentration on adverse selection problem. Our empirical tests confirm our prediction.

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Table 1 Daily abnormal returns and cumulative abnormal returns between day -10 and day +10 of board of directors meeting

The sample consists of 324 observations of firms that publish prospectuses for rights offerings (253) or seasoned public offerings (71) between January 2000 and December 2004. Only observations with available information for calculation of abnormal returns around board of directors (BoD) meeting are included.

A market model is estimated over a period between day -150 and day -51, and daily abnormal returns are calculated accordingly. Cumulative abnormal returns are calculated from day -10. Panel A reports the results for seasoned public offerings. Panel B reports the results for rights offerings. Panel C reports the cumulative abnormal returns around rights offering announcements and seasoned public offering announcements. *ABRET*[-3,3] is measured from day -3 to day +3 (7 days) relative to BoD meeting. A market model is estimated over a period between day -150 and day -51, and daily abnormal returns are calculated accordingly. *ABRET*[0,3], *ABRET*[-5,5] are defined similarly. *RAWRET*[-3,3] is cumulative raw return from day -3 to day 3. *MADJRET*[-3,3] is cumulative market-adjusted return from day -3 to day +3. *, **, *** represent 10%, 5% and 1% significant levels respectively.

Panel A

Day	Abnormal return (%)	Cumulative abnormal return (%)
-10	0.09	0.09
-9	-0.33*	-0.24
-8	-0.20	-0.40
-7	0.18	-0.26
-6	-0.06	-0.32
-5	0.25	-0.24
-4	0.07	0.00
-3	0.09	0.09
-2	0.06	0.15
-1	-0.24	-0.09
0	-0.24	-0.32
+1	-1.44***	-1.77**
+2	-1.01***	-2.83***
+3	-0.20	-2.83***
+4	0.17	-2.77***
+5	0.15	-2.53**
+6	0.16	-2.41**
+7	0.24	-2.23**
+8	0.19	-2.04*
+9	-0.25	-2.56**
+10	-0.19	-2.63**

Panel B

Day	Abnormal return (%)	Cumulative abnormal return (%)
-10	0.13	0.13
-9	0.02	0.14
-8	0.02	0.14
-7	0.24	0.40
-6	-0.20	0.21
-5	-0.05	0.03
-4	0.27*	0.42
-3	-0.06	0.36
-2	0.22	0.57
-1	0.09	0.66
0	0.28	0.89*
+1	-0.25	0.70
+2	0.04	0.73
+3	-0.13	0.60
+4	-0.17	0.43
+5	0.05	0.49
+6	0.03	0.51
+7	-0.22*	0.29
+8	-0.26*	0.08
+9	0.01	0.04
+10	-0.20	-0.15

Panel C

Variable	Public offerings	Rights offerings
Raw return (%) (<i>RAWRET</i> [-3,3])	-2.01*** (-1.98)***	2.28*** (1.92)***
Market-adjusted return (%) (<i>MADJRET</i> [-3,3])	-2.93*** (-2.93)***	0.51 (0.36)
Abnormal return (%) (<i>ABRET</i> [-3,3])	-2.95*** (-2.48)***	0.17 (-0.02)
Abnormal return (%) (<i>ABRET</i> [0,3])	-2.86*** (-2.98)***	-0.07 (-0.21)
Abnormal return (%) (<i>ABRET</i> [-5,5])	-2.31*** (-2.11)***	0.28 (0.41)
N	71	253

Table 2 Summary statistics of key variables

Non-tradable ownership (*CONC*) is defined as the number of non-tradable shares divided by the total number of shares outstanding as of the month-end prior to BoD meeting. Relative offer size (*OFFER*) is defined as the gross proceeds from the offering as a percentage of market value prior to BoD meeting. Total asset (*SIZE*) is self-explained and is measured as of the year-end prior to BoD meeting. Cumulative abnormal return (*ABRET*[-3,3]) is measured from day -3 to day +3 (7 days) relative to BoD meeting. A market model is estimated over a period between day -150 and day -51, and daily abnormal returns are calculated accordingly. Stock volatility (*VOLAT*) is the standard deviation of daily abnormal returns over a period between day -150 and day 50. P/E ratio (*PE*) is defined as market capitalization at the month-end prior to BoD meeting divided by net income at the fiscal year end prior to BoD meeting. Profitability (*OPINC*) is defined as operating income divided by total asset and is measured as of the year-end prior to BoD meeting. Investor take-up (*TAKEUP*) is defined as total number of shares outstanding after rights offering divided by total number of shares outstanding before rights offering, minus one, and then divided by subscription ratio. Tradable (Non-tradable) share take-ups, *TAKEUP_T* (*TAKEUP_NT*) is defined similarly, but only tradable (non-tradable) shares are included in calculation.

Mean and (median values) are reported for each variable. *,**,*** represent 10%, 5% and 1% significant levels respectively for the differences in mean and median between firms conducting rights offering and firms conducting seasoned offerings.

Variable	Public offerings	Rights offerings
Abnormal returns (%) (<i>ABRET</i> [-3,3])	-2.94 (-2.48)	0.17*** (-0.02)***
Non-tradable ownership before offerings (%) (<i>CONC</i>)	72.6 (72.2)	64.5*** (66.7)***
Non-tradable ownership after offerings (%) (<i>CONC_1</i>)	63.7 (60.2)	58.5*** (60.4)
Relative offer size (%) (<i>OFFER</i>)	22.4 (20.0)	13.8*** (11.3)***
Total asset (RMB million) (<i>SIZE</i>)	2,612 (1,293)	2,095 (1,146)***
Stock volatility (%) (<i>VOLAT</i>)	1.59 (1.50)	1.95*** (1.85)***
P/E ratio (<i>PE</i>)	68.3 (46.0)	49.8*** (41.1)
Profitability %) (<i>OPINC</i>)	6.76 (6.66)	7.10 (6.57)
Investor take-up (%) (<i>TAKEUP</i>)	n.a.	44.5 (38.7)
Tradable share take-up (%) (<i>TAKEUP_T</i>)	n.a.	105.7 (100.0)
Non-tradable share take-up (%) (<i>TAKEUP_NT</i>)	n.a.	11.4 (2.8)
No. of offerings	71	253
No. of firms	71	239
No. of firms from SZSE	30	109
No. of firms from SHSE	41	144

Table 3 Analyze of the effect of non-tradable ownership on investor take-up and abnormal return around the board of directors (BoD) meeting date.

Sample offerings are partitioned based on the levels non-tradable ownership prior to offering proposal announcements. Summary statistics of variables in consideration are reported. Panel A reports the mean value of abnormal return around BoD meeting date. Panel B reports the median value of invest take-ups (*TAKEUP*, *TAKEUP_T* and *TAKEUP_NT*) for the rights offering sample. All variables are defined in Table 2. *,**,*** represent 10%, 5% and 1% significant levels respectively.

Panel A	Public offerings (1)	Rights offerings (2)	Difference (1) – (2)
CONC < 60%	-4.91% (N = 10)	0.93% (N = 67)	-5.84%***
60% ≤ CONC < 70%	-2.89% (N = 21)	1.21% (N = 92)	-4.10%***
70% ≤ CONC < 80%	-3.12% (N = 22)	-1.42% (N = 83)	-1.69%
CONC ≥ 80%	-1.71% (N = 18)	-1.09% (N = 11)	-0.62%

Panel B (Rights offerings only)	Investor take-up	Tradable share take-up	Non-tradable share take-up
CONC < 60%	56.5% (N = 67)	100.0% (N = 67)	1.19% (N = 64)
60% ≤ CONC < 70%	36.8% (N = 89)	100.0% (N = 89)	1.39% (N = 90)
70% ≤ CONC < 80%	40.7% (N = 79)	100.0% (N = 79)	5.00% (N = 78)
CONC ≥ 80%	18.8% (N = 11)	100.0% (N = 11)	3.08% (N = 11)

Table 4 Tobit model to explain investor take-ups in rights offerings

The dependent variable is one of the variables for investor take-up. Explanatory variables include abnormal returns (*ABRET*[-3,+3]), measured from day -3 to day +3 (7 days) relative to BoD meeting, non-tradable ownership (*CONC*), relative offer size (*OFFER*) and profitability (*OPINC*). A Tobit model is used to estimate investor take-up, with the dependent variable censored left at 0.0. Year dummy variables and intercept are included but not reported. White-adjusted t-statistics are reported in parentheses. *,**,*** represent 10%, 5% and 1% significant levels respectively.

	TAKEUP	TAKEUP_T	TAKEUP_NT
Abnormal returns (<i>ABRET</i> [-3,+3])	-0.029 (-0.13)	-0.203 (-0.49)	0.069 (0.24)
Non-tradable ownership (<i>CONC</i>)	-0.722 (-5.85)***	0.181 (0.80)	0.186 (1.03)
Relative offer size (<i>OFFER</i>)	0.454 (3.34)***	0.042 (0.17)	0.739 (4.38)***
Profitability (<i>OPINC</i>)	0.305 (0.81)	-0.221 (-0.32)	0.739 (1.56)
Year dummies and intercept	Yes	Yes	Yes
No. of observations	245	245	242

Table 5 Probit model to explain the choice between rights offerings and seasoned public offerings

The dependent variable is a dummy variable that is equal to ONE when a firm offers shares by rights offerings and ZERO when it offers shares by seasoned public offerings. Explanatory variables include non-tradable ownership (*CONC*), relative offer size (*OFFER*), log (total asset) (*SIZE*), stock volatility (*VOLAT*), P/E ratio (*PE*) and profitability (*OPINC*). All variables are defined in Table 2. Year dummy variables and intercept are included but not reported. A Probit model is used to estimate the choice of offering method. White-adjusted t-statistics are reported in parentheses. *,**,*** represent 10%, 5% and 1% significant levels respectively.

	Dependent variable Dummy = 1 for rights offering
Non-tradable ownership	-4.705 (-4.79)***
Relative offer size	-4.191 (-2.94)***
Log (total asset)	-0.257 (-1.45)
Stock volatility	72.164 (3.14)***
P/E ratio	-0.013 (-3.01)***
Profitability	2.389 (0.83)
Year dummies and intercept	Yes
Pseudo R-squared	0.352
No. of observations	320

Table 6 OLS model to explain abnormal return around board of directors (BoD) meeting date

The dependent variable is abnormal returns (*ABRET*), measured from day -3 to day +3 (7 days) relative to BoD meeting. Explanatory variables include non-tradable ownership (*CONC*), relative offer size (*OFFER*), stock volatility (*VOLAT*) and P/E ratio (*PE*). All variables are defined in Table 1. Inverse Mill's Ratio is defined as $-\phi(\gamma'z)/\Phi(\gamma'z)$ when it is a rights offering and $\phi(\gamma'z)/[1-\Phi(\gamma'z)]$ when it is a seasoned public offering, where ϕ and Φ are standard normal density function and cumulative standard normal density function respectively and $\gamma'z$ is the linear prediction of the Probit model for the choice of offering method in Table 4. White-adjusted t-statistics are reported in parentheses. *,**,*** represent 10%, 5% and 1% significant levels respectively.

	(1) Public	(2) Rights	(3) Public	(4) Rights
Non-tradable ownership	0.070 (1.24)	-0.117 (-3.85)***	0.250 (2.55)**	-0.158 (-3.65)***
Relative offer size	0.051 (0.96)	-0.007 (-0.30)	0.150 (2.32)**	-0.066 (-1.29)
Stock volatility	0.540 (0.33)	-0.726 (-1.00)	-1.625 (-0.89)	-0.174 (-0.21)
P/E ratio	0.000 (0.03)	-0.000 (-1.12)	0.000 (2.46)**	-0.000 (-1.55)
Inverse Mill's ratio			0.058 (2.14)**	-0.031 (-1.37)
Year dummies and intercept	Yes	Yes	Yes	Yes
R-squared	0.097	0.075	0.143	0.081
No. of observations	69	251	69	251

Table 7 Actual versus hypothetical abnormal returns around BoD meeting date

The table compares the mean values of the actual abnormal returns with their hypothetical counterparts for rights offerings and seasoned public offerings. The hypothetical measures reflect what the abnormal returns would be if the firms had chosen another form of offerings. The hypothetical abnormal returns of right (seasoned public) offerings for firms that actually choose seasoned public (rights) offerings are the predicted values from evaluating the issuers' attributes in the rights (seasoned public) offering regression. *, **, *** represent 10%, 5% and 1% significant levels respectively.

Actual offering decision	(1) Actual CAR	(2) Hypothetical CAR	t-statistics (1) – (2)
<u>Panel A Without control for self-selection</u>			
Seasoned public offering	-2.90%	-1.50%	-2.07**
Rights offering	0.14%	-3.76%	9.53***
<u>Panel B With control for self-selection</u>			
Seasoned public offering	-2.89%	-3.85%	1.25
Rights offering	0.14%	-12.88%	27.28***

Table 8 Probit model to explain the choice between rights offerings and seasoned public offerings

The dependent variable is a dummy variable that is equal to ONE when a firm offers shares by rights offerings and ZERO when it offers shares by seasoned public offerings. Expected value increase by choosing rights offering is estimated from the predicted values of the models (3) and (4) in Table 6. (Predicted value from model (4) minus the predicted value from model (3).) Other explanatory variables include profitability (*OPINC*) and log (total asset) (*SIZE*). A Probit model is used to estimate the choice of offering method. White-adjusted t-statistics are reported in parentheses. *,**,*** represent 10%, 5% and 1% significant levels respectively.

	Dependent variable Dummy = 1 for rights offering
Expected value increase by choosing rights offering	18.582 (6.88)***
Log (total asset)	-0.125 (-0.83)
Profitability	3.690 (1.49)
Year dummies	No
Intercept	Yes
Pseudo R-squared	0.305
No. of observations	320