# 舊股東在新股上市時售股之抉擇
# The Selling Choice of Existing Shareholders in New Equity Offerings

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## 摘　　要

　　股票發行市場是企業籌募資金重要的管道，然而由於資訊不對稱的問題，使新上市股票產生折價，這種折價的情形，讓舊股東不易在新股上市時、或上市後短時間內出脫持股，以避免增加資訊不對稱的負面影響。這種因資訊不對稱減低舊股東持股的流通性，一方面增加舊股東的機會成本。另一方面，當舊股東售股而使折價幅度加大，無異於提高發行公司的資金成本。因此，如何減低資訊不對稱，降低發行成本便成為一項重要的課題。本文認為信譽是克服資訊不對稱有效的方法。因為信譽所賺取的準租會因遭受質疑而毫無殘值，亦即愈有信譽的舊股東，其信譽有瑕疵的代價較高，較不會有投機的行為。投資者從而對他們的售股行為較不會有負面的反應。舊股東基於財富最大化的理由，在繼續持股的機會成本與折價售股中，選擇兩者損失較低者。因此，假如信譽能減低資訊不對稱的問題，那麼有信譽的舊股東因其售股時的折價損失較小，自然較有可能在新股上市時出脫其持股。本文亦推論有信譽的第三者對新上市股價值的認證，也可以幫助舊股東在新股上市時出售其持股。

關鍵詞：信譽、舊股東售股、資訊不對稱、新上市股

## Abstract

　　New equity offering is an important source for business to raise capital. However, information asymmetry in new equity offering can cause outside investors react negatively to existing shareholders selling in an offering. The negative reaction can raise the effective cost of insider selling and discourage them from selling. Such a negative market reaction caused by information asymmetry not only reduce the liquidity of existing shareholders, but also

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insider selling implies an increase of cost for an enterprise to raise capital. These concerns motivate existing shareholders to establish a reputation of dealing fairly with outsiders. The reputation serves as an effective bond to convince outsiders that existing shareholders will not behave opportunistically when the present value of their reputational quasi-rents exceeds the one-time wealth transfer from the sale of shares. Existing shareholders trade off the opportunity cost of holding the shares and the price discount in the offering if they sell. Since reputable insiders can reduce the negative market reaction, the costs arise from selling shares will be lower. Therefore, reputable insiders are expected to be more likely to sell shares than nonreputable ones. In addition, a reputable third-party may be a substitute and/or a complement to facilitate insiders unwind their positions.

**Key Words:** Reputation, Insider Selling, Information Asymmetry, New Equity Offering

## 1. INTRODUCTION

Leland and Pyle (1977) argue that insider ownership can signal firm value. Their model predicts a negative market reaction to news of insider selling in new equity offerings. In their study of initial public offerings, Downes and Heinkel (1982) report that firm value is positively related to insider holding. Mikkelson and Partch (1985) and Masulis and Korwar (1986) find that equity issues involving shares sold by existing shareholders appear to have larger negative announcement effects than those without existing shareholders selling (hereinafter insider and existing shareholder are interchangeable throughout the paper). The kind of negative reaction is also implied by Myers and Majluf (1984) asymmetry information argument that outsiders expect new equity offerings to be overpriced. Along with the insider ownership argument, but with opposite perspective, Admati and Pfleiderer(1994)contend that if insiders make a fixed fraction investment in a multistage financing for the issuing firm, such investment arrangement would eliminate insiders any incentive to misprice securities issued in the later financing round. Empirical evidence by Lerner (1994) who uses venture capital investments as an example supports their argument.

Informational asymmetry gives rise to both private and social costs including higher required rates of return, wider bid-ask spreads and illiquidity. Chiang and Venkatesh (1988) report that a higher degree of information asymmetry leads to a larger spread, which in turn causes investors to demand higher return. Demsetz (1968) notes that outside investors can protect themselves from loss by refraining from active trading. Such a strategy, however, is not costless. Reducing the number of trades by outsiders, other things being equal, increases the probability that any trade that does occur will involve an insider, and therefore increases the required rate of return. Conversely, when insider selling must be disclosed in advance the concern with adverse selection can unnecessarily reduce the negative reaction to insider selling. Accordingly, potential investors who cannot distinguish among the quality of new equity offerings place an average value on all issues. Insiders are worse off if they can not sell at a price consistent with the firm value. The private and social

costs of informational asymmetry provide incentives for institutional structure to establish reputation that can reduce the asymmetry.

This study develops a model to determine whether insider reputation can reduce negative market reaction to insider selling. The model predicts that reputable existing shareholders are more likely to sell their shares in new equity offerings than nonreputable ones. The implication is consistent with Lin and Smith(1995)who report that reputable venture capital firms are more likely to sell shares in initial public offerings than non-reputable venture capital firms. This analysis differs significantly from Leland and Pyle (1977) model that ignores reputation.

## 2. THE MODEL

To understand the effect of an insider reputation on stock price of new equity offerings, assume that an existing shareholder has information about the estimated offer price, $P_e$, conditional on there being no insider selling. The estimated price is a fair expectation of the firm value perceived by the market after reflecting the uncertainty of the offering. The final offer price cannot be determined until near the offering date. A final offer price is typically a negotiation result between an issuer and underwriter. Assuming the underwriting industry behaves competitively, the post-offer price of an issue can be expressed as $p_a = p_e + \varepsilon$, where $\varepsilon$ is unknown to outsiders and is randomly distributed as $N(\mu, \sigma_\varepsilon^2)$. $p_a$ is defined as the closing price after the stock is traded and fully reflected the intrinsic value of the issuing firm. The assumption of normal distribution of the error term is justified by the independent nature of information collection process in new equity offerings, such as indication of interest from prospective buyers, stock price of comparable companies, and the selling intention of insiders. Furthermore, as noted by Ruud(1994), if underpricing of new equity offerings is used as a means to signal firm value (e.g. Allen and Faulhaber(1989) and Welch(1989)) or as a form of preventing litigations(e.g. Hughes and Thakor(1992) and Tinic (1988)), the $\varepsilon$ will have positive value, but it is plausible to assume that the error term is normally distributed. The assumption of the normality of does not limit the generality of the analysis, however.

When an insider does not have a reputation of dealing fairly with outsiders a selling decision of the insider can induce an immediate negative effect on the offer price, according to the degree of overvaluation perceived by outsiders. As a result, the insider cannot sell shares at the estimated offer price, $p_e$. The insider can only sell his shares at a price, $p_s$, that reflects the negative reaction. The negative reaction with respect to new equity offerings, though it is not observable directly, can influence the decision of whether a firm raises capital public, and, if so, when and how. The price decline can make investment by insiders illiquid, and limit their ability to redeploy their capital and entrepreneurial talent.

To see this, let $p_e - p_s = c$ represent the magnitude of the negative reaction when outsiders believe that existing shareholders sell overpriced issues. Anticipating the adverse reaction, existing shareholders choose the greater value between the anticipated selling price, and the present value of the post-offer

price, $p_a$. That is, an existing shareholder sells shares when

$$p_s \geq p_a e^{-rt} \tag{1}$$

where r is the opportunity cost to an insider who holds shares after offering date, and t is defined as the interval between issues.[1] Equation(1)states that an insider sells shares only if the selling price exceeds the present value of the post-offer price. The discount factor, r, depends on the insider's value placed on cashing out now. If the insider has positive net present value investment opportunities and constraints on management talent or capital, then r is above risk-free rate. In other words, the greater the value the insider cash out now, the larger the r is. From equation (1), the equilibrium price for an insider to sell shares is when $p_s = p_a e^{-rt}$ . This implies that an insider is willing to sell shares at a lower price, $p_s$, when the net present value of investing other projects is greater than retaining shares in the issuing firm. However, should the adverse market reaction against insider selling persist and the type of market failure described by Akerlof(1970)occurs, at no price will the insider be able to sell his shares.

Since cashing out in new equity offerings allows existing shareholders the liquidity to invest in other ventures in which they might better use their knowledge and capital. Existing shareholders who are unable to cash out hold their shares for a certain length of time after the offering date and possibly miss the opportunity to invest in other ventures at optimal times.[2] Even if existing shareholders can sell their shares, the cost of not being able to sell shares at a fair price may outweigh the net present value of other investment opportunities. The concern that they will not be able to sell their shares in new equity offerings or not be able to sell them at a fair price motivates them to establish a reputation of not taking advantage of outsiders.

In particular, if an insider comes to the new equity offering market repeatedly, the ability to sell shares and to sell at a fair price appears to be a valuable asset. In their reputation model, Klein and Leffler (1980) show that a nonsalvageable capital expenditure can serve as an effective bond to guarantee product quality. Recent extensions of the reputational capital reasoning to financial markets include: DeAngelo(1981) on the role of auditor reputation in accounting statement certification, Booth and Smith(1986) on the underwriter reputation in certifying new equity offerings, and Megginson and Weiss(1991) on block-shareholders' reputation in signaling firm value. Similarly, we argue that insiders can use their reputation to avoid a negative effect on their selling decision

First, consider situations when outsiders do not expect any opportunistic behavior by insiders. Insiders are able to sell shares at $P_e$ without any negative market reaction. An insider can sell an overpriced issue and receive a one-time gain of $(p_e - p_a)$. The cost of selling an overpriced issue is the perpetuity of penalty, $c/(e^{-rt} - 1)$ , on shares sold in future offerings. Insiders would avoid selling overpriced issues when the perpetuity of penalty is greater than the one-time wealth transfer from selling overpriced shares, expressed as:

$$c/(e^{rt} - 1) > p_e - p_a \tag{2}$$

This scenario is analytically identical to the Booth and Smith (1986) case

of using underwriter reputation to certify new issues (but the transactors are different). In their study, reputable underwriters receive a premium stream for certifying firm value to outsiders. In this study, reputable insiders are rewarded with selling shares with no negative effect when outsiders are convinced of no opportunism.

If it were clear to outsiders that equation (2) holds in all states, existing shareholders could convince outsiders that they have no incentive to sell overvalued issues. However, since only existing shareholders know whether equation (2) holds, they may break their commitment to maintaining a good reputation to gain a temporary increase in profit. Existing shareholders may sell an overpriced issue, i, if the one-time wealth transfer exceeds the perpetuity of penalty, expressed as

$$P_e^i - P_a^i > c/(e^{rt} - 1) \tag{3}$$

The probability of selling an overpriced issue can therefore be expressed as

$$
\begin{aligned}
pr &= pr\left(p_e^i - p_a^i > c/(e^{rt} - 1)\right) \\
&= pr\left(\varepsilon < -c/(e^{rt} - 1)\right)
\end{aligned}
\tag{4}
$$

and is represented in the gray area in Figure 1.

From Figure 1, it is shown that insiders are less likely to sell overvalued issues when the information disclosure of the issuing firm is greater, which means a decrease in $\sigma_\varepsilon$ . When the penalty of cheating is higher, which means an increase in c, insiders are less likely to sell overpriced issues.[3] Turning the statement around, for a constant penalty, greater information disclosure should reduce the variance of firm value. That is, the credibility of the information can be used to reduce uncertainty and opportunism. This implies that selling insiders have an incentive to hire reputable underwriters to reduce uncertainty about firm value, which may convince outsiders that shares are fairly priced. Accordingly, insiders are more likely to be able to piggy-back their shares in new issues when reputable underwriters are employed. Empirical evidence of using underwriter reputation to reduce new issuers' uncertainty can be found in Carter and Manaster(1990), and among others, who show that underpricing in initial public offerings is negatively related with underwriter quality.

Potential investors view the underwriter reputation as an efficient way to ensure that an issue is not overpriced as long as the underwriter's reputational quasi-rents are greater than a one-time wealth transfer from falsely certification. Investors know that underwriters have an immediate incentive to avoid overpricing an issue, particularly if the issue is underwritten on a firm commitment basis. A firm commitment puts an underwriter's capital at risk by requiring it to purchase securities from the issuer. In addition, the Security Act imposes liability on every party that signs the registration statement, including members of the board of directors in the issuing firm, every accountant or other consultant, and all investment banks associated with an offering. Underwriters are particularly vulnerable to liability if they do not exercise due diligence or reasonable care in investigating the company. The costs of defending the litigation can be substantial, and the litigation itself can damage the underwriter's reputation.
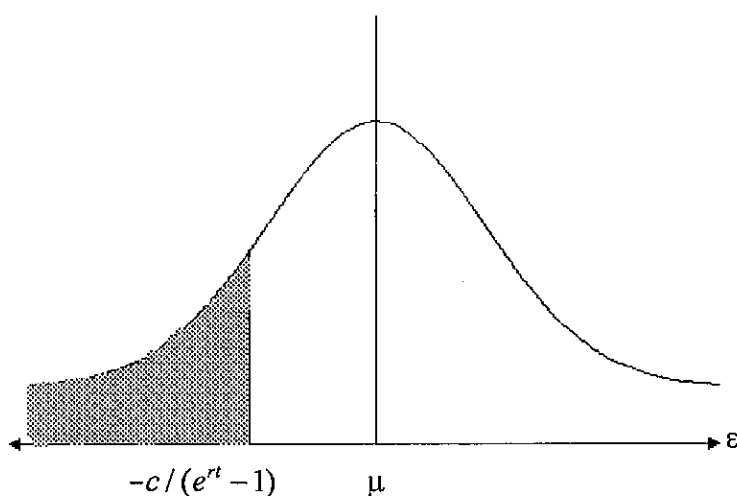
$$-c/(e^{rt}-1) \qquad \mu$$

Figure 1. The probability of insider's selling overpriced shares. The r represents cost of holding shares after the offering, c represents the magnitude of negative market reaction, and $\varepsilon$ is distributed as $N(\mu, \sigma^2\varepsilon)$. The probability is shown in the gray area.

Although underpricing can ensure against legal liability, underwriters lose prospective issuers if they underprice new issues too much. Beatty and Ritter(1986)show that underwriters who underprice or overprice issues too much in the first time period lose their market shares in the subsequent period. Investment banks that want to stay in the business need to avoid underpricing as well as overpricing. To protect their reputation, avoid potential lawsuits, and maintain their market share, underwriters must press their issuers to a high disclosure standard. By doing so, they can avoid pricing a new issue too low or too high. Hence, by hiring reputable investment banks, existing shareholders are able to reduce uncertainty of an issuer and obtain a fair price when they piggyback on new equity offerings.

*Testable Hypothesis 1:* If the reputation of an underwriter can mitigate adverse reactions to existing shareholder selling, the probability of their selling shares in IPOs is positively related to underwriter reputation.[4]

Although, as indicated in equation (4), there is a possibility that existing shareholders sell overpriced issues, doing so may not be consistent with wealth maximization. That is because underwriters usually allow them to piggy-back on a pro rata basis. Unless the magnitude of overpricing is very large, the gain from selling overpriced shares is not likely to exceed the perpetuity of penalty. Even if a cheating insider only loses part of his reputational quasi-rents, outsiders can be convinced of no cheating as long as they can recognize that the present value of losing quasi-rents exceeds the one-time wealth transfer from selling overpriced shares. In an extreme case, if the penalty of cheating is substantial, the probability of selling overpriced shares is essentially zero.

On the other hand, selling mildly underpriced issues can be consistent

with an existing shareholder's wealth maximization. An existing shareholder maximizes his wealth if he can redirect capital and talent to other investments. The gains from new investments can offset the underpricing and increase total returns. In addition, existing shareholders may sell underpriced issues to build their reputation. Booth and Smith (1986) and DeAngelo (1981) show that the requisite investment for reputation can be created by deliberately sacrificing short-run profit. With the short-run sacrifice, they can secure long-term quasi-rents. This analysis, however, does not suggest that existing shareholders sell shares when the offer price is set too low. Rather, they sell their shares only when the current loss can be recouped from future quasi-rents.

Since there is a possibility that insiders act opportunistically, outside investors always react negatively to insider selling. Nevertheless, rational investors, to protect themselves, react less adversely when reputable insiders sell their shares. Outsiders infer an insider's reputation by considering his past experience with similar issues. On the other hand, insiders maximize their wealth by choosing the greater value between the selling price and the present value of the post-IPO price, $P_a$. Their selling probability can therefore be expressed as :

$$
\begin{aligned}
pr_r &= pr(p_s > p_a e^{-rt}) \\
&= pr(p_e - c > (p_e + \varepsilon)e^{-rt}) \quad . \\
&= pr(\varepsilon < p_e(1 - e^{-rt}) - c)
\end{aligned}
\tag{5}
$$

and is represented by the gray area of Figure 2.

Equation(5)and Figure 2 show that insiders are more likely to sell their shares when the estimated offer price is higher and the potential negative reaction is smaller. Given a constant value of the estimated offer price, the loss from selling underpriced shares is less for reputable insiders than for nonreputable insiders. The resulting implication is based on the rational behavior of investors who react less adversely to the selling action of reputable insiders.

*Testable Hypothesis 2:* Since reputable insiders are less likely to take advantage on outsiders, they are more likely to sell shares in new equity offerings than nonreputable insiders.

Empirical support for Hypotheses 1 and 2 can be found in Lin and Smith (1995). They show that the venture capitalist's selling decision during initial public offerings depends on venture capitalist reputation and the reputation of underwriter. In particular, high quality venture capitalist making offerings via high quality underwriter is more likely to sell in underpriced issues, but unlikely to sell in cases in which a new equity offering is overpriced.

## 3. CONCLUSIONS

The illiquidity of insider selling due to information asymmetry can induce both private and social costs. The costs of information asymmetry provide incentives for designing institutional structures that reduce the asymmetry. This paper develops a model of insider selling that incorporates insider and underwriter reputations. Existing shareholders balance the costs of continued ownership against the adverse market reaction to insider selling. If existing shareholders are concerned about not being able to sell shares and sell them at
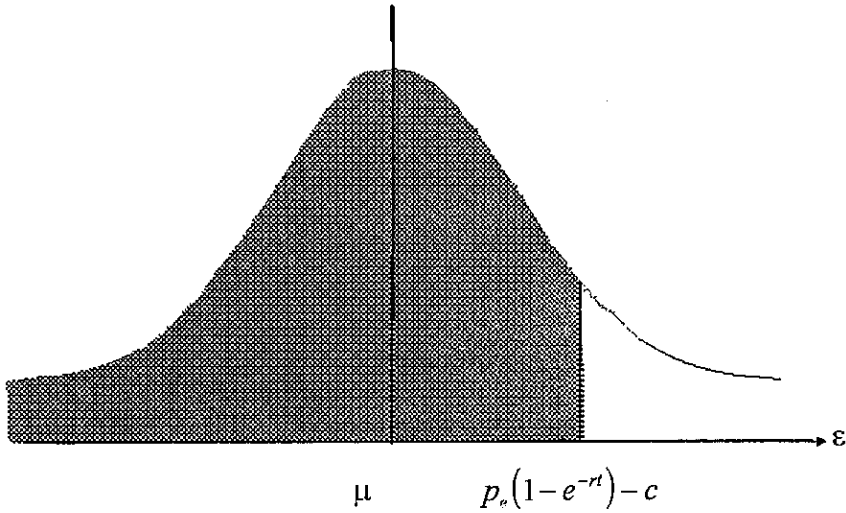
$$\mu \qquad p_{e}\left(1-e^{-rt}\right)-c$$

Figure 2. The probability of reputable insider selling shares. $P_e$ represents the estimated offer price without any negative market reaction, c represents the magnitude of negative market reaction, r represents cost of holding shares after the offering, and $\varepsilon$ is distributed as $N(\mu, \sigma^2\varepsilon)$. The probability is shown in the gray area.

a fair price, they will have incentives to establish a reputation of dealing fairly with outsiders. The reputation serves as an effective bond to convince outsiders that existing shareholders will not sell overpriced issues if the present value of reputational quasi-rents exceeds a one-time wealth transfer from selling overpriced shares. Since rational outsiders react less adversely to reputable insider selling, they are more likely to sell shares in new equity offerings. In addition, the model implies that insiders may hire a reputable third-party to facilitate them sell shares. The implication of the model is supported by current literatures that show issuers employing reputable investment banks and auditors to reduce information asymmetry in new equity offerings. The implication of the model also points to a new direction to explore the certification role of insider reputation.

**Endnote:**

1. We assume the first issue occurs at time t. The assumption only serves to facilitate the presentation, but do not limit the generality of the analysis.
2. In Taiwan, when a firm is listed on the over-the-counter, insiders cannot sell shares two years after the offering. In the United States, underwriter agreements usually contains a "green shoes" provisions, which prevents insiders from selling shares within six to nine months after the offering date.
3. A direct implication from equation(4)is that the probability of selling overpriced shares decreases as the frequency of an insider's portfolio companies going public increases. For example, assuming that an insider is involved

in twice as many IPOs as other insiders, the present value of perpetuity becomes $c(e^{rt/4} - 1)$. The probability of selling overvalued shares is

$$
\begin{aligned}
pr &= pr\left(p_e^i - p_a^i > c/(e^{rt/4} - 1)\right) \\
&= pr\left(-\varepsilon > c/(e^{rt/4} - 1)\right) \\
&= pr\left(\varepsilon < -c/(e^{rt/4} - 1)\right)
\end{aligned}
$$

4. Plaintiffs can sue underwriters regardless of whether they bought the stock in initial public offerings(IPOs)or in the aftermarket. Drake and Vetsuytens (1993)report that the average settlement cost for IPO-related lawsuits is $4.7 millions.

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