The choice of seasoned-equity selling mechanism: Theory and evidence

B. Espen Eckbo

Tuck School of Business at Dartmouth and CEPR

and

Øyvind Norli*

Tuck School of Business at Dartmouth

November 2004

Abstract

Extending the Myers and Majluf (1984) framework, we present a model for the choice of seasoned-equity selling mechanism. A sequential pooling equilibrium exists which implies a positive market reaction to certain flotation strategies. We examine the model implications using the market reaction to issues on the Oslo Stock Exchange using the full range of flotation methods. The average market reaction is non-negative across all methods, and significantly positive for both rights offerings and private placements, as predicted. We also show that average long-run abnormal stock returns to OSE issuers are indistinguishable from zero, supporting the market rationality assumption underpinning the flotation game.

*Author email addresses: b.espen.eckbo@dartmouth.edu, and oyvind.norli@dartmouth.edu

1 Introduction

Myers and Majluf (1984) provide the first analytical approach to the equity issue decision. A key prediction of their adverse selection, separating equilibrium is that the market reaction to a decision to issue securities will be negative and increasing in the risk that the issue is overpriced. To date, this argument is the leading theoretical explanation for the *joint* finding of US empirical studies that the market reaction to security offerings is negative for seasoned equity (SEOs), zero for investment-grade straight debt issues, with convertible debt in between.[1] Moreover, Eckbo and Masulis (1992) argue that the possibility of current shareholder takeup of the equity issue implies different market reaction to rights and underwritten offerings in a Myers-Majluf setting, and present supporting evidence. Myers (1984) also suggests that costs of adverse selection drives a pecking order of financial instruments, with a preference for internal over external financing and for debt over external equity.[2]

However, the basic adverse selection model fails to explain the growing evidence of a *positive* market reaction to equity issuances around the world (Eckbo, Masulis, and Norli (2005)). We present both a theoretical and an empirical analysis of this puzzle. At the outset, an important limitation of the original Myers-Majluf framework is their assumption that firms sell equity directly to the market with no intermediary or system for communication. This in of itself exacerbates costs of adverse selection. Preserving key aspects of the Myers-Majluf setup, we generalize the equity issue decision by studying the economic tradeoffs between several commonly observed selling mechanisms. These mechanisms, which include rights offer, underwriting and private placement, differ in terms of direct costs as well as in their potential for creating wealth transfers. In effect, we present a theoretical pecking order—not of financing instruments but of selling mechanisms. We use the model implications to interpret the average market reaction to the *complete* set of flotation method choices observed by issuers on the Oslo Stock Exchange (OSE), which makes our empirical analysis unique as well.

Our model preserves the assumption of Myers and Majluf (1984) that managers' objective is to maximize the value of current shareholders' stake in the firm. This drives the potential for sep-

[1] See Asquith and Mullins (1986) and Masulis and Korwar (1986) for equity offerings, Dann and Mikkelson (1984) and Eckbo (1986)) for debt offerings. The evidence of insignificant market reaction to low-risk straight debt issues fails to support asymmetric-information signaling models, e.g., such as Ross (1977).

[2] Frank and Goyal (2005) review the evidence on the pecking order theory of capital structure.

arating equilibria where some high-value firms prefer to forego the investment project rather than issuing undervalued stock. Dybvig and Zender (1991) argue that an appropriately structured managerial compensation contract would eliminate this underinvestment problem. The result would be a pooling equilibrium with a neutral market reaction to equity issues. The overwhelming empirical evidence of a non-neutral market reaction to SEOs (also in our sample below) suggests to us that managerial contracts do *not* resolve the underinvestment problem in this context. One could also, as Cooney and Kalay (1993) and Wu and Wang (2004), allow for the possibility of managerial *over*investment in order to generate equilibria with a positive market reaction to equity issues. However, this begs the issue of why managers would issue equity to finance value-decreasing projects on a regular basis. Hence our maintained assumption of equity-value maximization.

In our model, issuers have access to a menu of flotation methods. As in Eckbo and Masulis (1992), we allow current shareholder participation in the issue through a rights offer, with or without standby underwriting.[3] Moreover, we include a flotation method where the issue proceeds are fully guaranteed. Throughout the paper, we refer to this method as 'private placement', but it could equally well have been labelled 'firm commitment underwriting' or 'bought deal' by trivially changing the direct cost structure. We prefer the private placement label because this is the only fully guaranteed method observed on the OSE, our empirical laboratory.

A interesting feature of the model is that standby underwriters and private placement investors have access to an informative inspection technology, and decide to accept or reject the issue request following a round of 'bargaining'. The quality inspection is noisy and may lead to rejection of the high-quality issuer. If rejected, the firm either abandons the issue (foregoing the investment project) or tries the next available flotation method subgame. In the model, these choices are derived endogenously. We identify a sequential equilibrium which implies a positive average market reaction to certain equity issue strategies, also in the presence of adverse selection.

We focus primarily on pooling equilibria in the multistage issue game. In the extant literature, various papers have examined separating equilibria in different settings. For example, Giammarino and Lewis (1988) analyze sequential strategies in an extended Myers-Majluf setup, in a setting with a single equity-selling mechanism. In their model, an uninformed 'financier' may reject the

[3]In a standby rights offer, the underwriter performs due diligence, markets the issue, and guarantees the portion of the issue not taken up by rights-holders. Thus, the difference between standbys and uninsured rights highlights the marginal impact of the underwriter function.

issue conditional on the offer price proposed by the informed issuer, and they identify possible semi-separating equilibria implying a positive market reaction to the issue. Heinkel and Schwartz (1986) derive a separating equilibrium involving the choice between rights and underwriting, but does not use a sequential framework. Chemmanur and Fulghieri (1999) present a model of the choice between a private placement and the going-public (IPO) decision, where outside investors have access to a costly information technology, but also do not consider sequential issue strategies. Below, we comment on the possibility of separating equilibria in our multistage issue game as well.

We use the equilibrium analysis to interpret the relative market reaction to the observed flotation strategies on the OSE, 1980–1996. The market reaction is non-negative for all categories, and significantly positive for both uninsured rights offers and private placements. We also consider alternative hypotheses for this evidence. For example, Wruck (1989), Hertzel and Smith (1993) and Cronquist and Nilsson (2003) hypothesize that a private placement may lead to a change in shareholder monitoring of management. If managers enjoy private benefits of control, they may have an incentive to place the issue with the public at large, as opposed to selling it as a single block to a private investor that may actively monitor management performance. Or, management may attempt to place the issue with a "friendly" private investor that will not threaten its consumption of control benefits. Either way, this control argument provides a separate motivation for the flotation method choice and involves different predictions for the market reaction to the issue announcement. Our empirical analysis, however, fails to support this alternative interpretation of the market reaction to our seasoned equity-offering announcements.

Since our empirical inferences are based largely on the announcement-effect of equity offerings, the presumption is that this market reaction is unbiased. An alternative hypothesis is that investors misread the information in the public announcement or, as in the "overconfidence" model of Daniel, Hirshleifer, and Subrahmanyam (1998), place too much weight on their own private information. The preponderance of the US-based evidence fails to reject the null of zero post-issue abnormal performance (Eckbo, Masulis, and Norli (2000), Eckbo and Norli (2004)). However, some studies report negative long-run stock price performance following certain offer categories, e.g. Hertzel, Lemmon, Linck, and Rees (2002) for private placements. Due to the paucity of information about the OSE, we include a long-run performance study for this market as well. This analysis requires development of an empirical asset pricing model for the OSE. Using this empirical pricing model, we show that average three-year abnormal returns to a "hedge" portfolio that is short in our issuers and long in non-issuing matched firms fail to produce significant abnormal performance.

The paper is organized as follows. Section 2 develops our theoretical framework predicting the flotation method choice. Section 3 presents descriptive characteristics of the sample of equity offerings and provides estimates of the announcement-period abnormal returns for private and public equity offerings. Section 4 provides long-run abnormal return estimates, while Section 5 concludes the paper.

2 Equilibrium flotation methods

This section examines equilibrium strategies in our multistage flotation method game. The setup in terms of managerial objectives and the nature of the information asymmetry is as in Myers and Majluf (1984). However, we generalize their analysis by allowing for sequential choices between a set of costly flotation methods: uninsured rights (ur), rights with standby underwriting (sr), and private placement (pp). The latter two involve informative but imperfect issue quality inspection. As expected for a multistage game, the number of potential equilibria is large, and we focus primarily on pure-strategy pooling equilibria. Towards the end, we outline how separating equilibria may arise in our flotation game as well.

2.1 The issue decision criterion

The firm faces a short-lived investment project that must be financed externally. The investment project has a net present value of $b > 0$ and an investment amount I, both of which are common knowledge. The investment must be financed entirely by selling equity—using financial slack or debt financing is not an option. Let a denote the value of assets in place. The firm knows its true value $a \in A$, while outside investors only know the probability distribution with density $p(a)$. Current shareholders subscribe to a fraction $k \in [0, 1]$ of the issue. We assume throughout that the issue announcement reveals k to the market.[4] Managers' objective is to maximize the value of old

[4] In practice, investors learn k from three sources: (i) the offering prospectus announcing shareholder subscription pre-commitments, (ii) the trading activity in the second-hand market for rights, and (iii) the general characteristics of the firm's share ownership structure (small shareholders are less likely than large shareholders to participate in the offering). Regulatory requirements limit k in private placements (placing an upper bound on the number of shareholders for the issue to qualify), which we account for in the analysis below.

(pre-issue) shareholders equity stake in the firm.

Let d denote direct issue costs (underwriter fees, legal fees, mailing costs etc.), and $\delta \equiv n/S$ the ratio of new shares issued (n) to the post-issue number of shares (S). Then, $\delta(1-k)$ is the fraction of the post-issue company held by new shareholders, and the condition for issuing equity can be written as:

$$[1-\delta(1-k))]\,(a+b+I-d) \geq a+kI. \tag{1}$$

The left-hand side of equation (1) is the value of old shareholders claim on the post-issue firm, given that they take up a portion k of the new issue. The right-hand side is the value of old shareholders claim on the firm if it does not issue plus the funds old shareholders would have contributed to the equity issue. Note that equation (1) reduces to the issue criterion in Myers and Majluf (1984) when $k=0$ (current shareholders remain passive) and $d=0$ (zero flotation costs).

The issue condition (1) depends on the market price P of the issue.[5] To see how, let $S=1$ (without loss of generality). Since the issue proceeds I have to satisfy $I=Pn$, we can write $\delta = I/P$. By substitution, the payoff π to old shareholders from issuing is:

$$\pi(a,d,k,P) = b-d-\frac{I(1-k)\,[(a+b+I-d)-P]}{P}, \tag{2}$$

and the issue decision criterion is $\pi(a,d,k,P) \geq 0$. This issue condition says that the project NPV must exceed direct issue costs and a (potential) wealth transfer between old and new shareholders. The wealth transfer depends on the market price P, which in turn is determined by investors' equilibrium beliefs about a. The equilibrium beliefs determines whether P differs from the full-information value of the post-issue company, $a+b+I-d$. The difference is zero in a fully separating equilibrium (as in Myers and Majluf (1984)) while it is positive in our pooling equilibrium (see below). As first pointed out by Eckbo and Masulis (1992), regardless of the putative equilibrium, the wealth transfer is attenuated by current shareholder participation in the issue ($k>0$).

In the analysis below, we focus primarily on pooling equilibria. In any pooling equilibrium, the low-value type mimics the high-value issuer's flotation strategy, so it suffices to look at the participation constraint for the high-value firm. To simplify, partition the issuer-type space in two

[5] For rights offerings (standbys or uninsured), P is the sum of the subscription price set by the issuer and the total market value of the number of rights necessary to acquire one new share.

parts, "high" and "low", or $A = \{a_1,\ a_2\}$, where $a_1 < a_2$. Let μ be the probability that investors put on the high-value type in equilibrium. The post-issue value of all shares is then

$$P = (1-\mu)(a_1 + b + I - d) + \mu(a_2 + b + I - d), \tag{3}$$

which, when substituted into equation (2) yields the value of the issue condition given investors' beliefs.

To simplify the notation, we scale all exogenous variables in terms of the assets in place for the high-value type a_2, as follows:

Required project investment amount	$I \equiv \alpha a_2$
Assets in place for low-value type	$a_1 \equiv \beta a_2$
Direct issue costs, $i \in \{pp, sr, ur\}$	$d_i \equiv \rho_i I = \rho_i \alpha a_2$
Project net present value	$b \equiv \eta I = \eta \alpha a_2$

Shareholder takeup in private placement is scaled down to γk, $\gamma \in [0,1]$ ($\gamma = 1$ for standbys and uninsured rights). Using the redefined variables, the issue condition for the high-value type can now be written as:

$$\pi(a_2, d_i, \gamma, k, P) = b - d_i - \frac{\alpha a_2 (1-\gamma k)(1-\beta)(1-\mu)}{\beta + (1-\beta)\mu + (1+\eta-\rho_i)\alpha} \geq 0. \tag{4}$$

In sum, the high-value issuer type will choose a particular issue method $i \in \{pp,\ sr,\ ur\}$ if the payoff π in equation (4) is positive (a participation constraint) and if the expected cost of method i is less than the expected cost for any other issue method (an incentive constraint), given investors' beliefs μ in equilibrium.

2.2 The multistage equity-flotation game

Figure 1 describes the stages in the issue game. In the first subgame, issuers selects from a menu that includes all three flotation methods. as well as "no issue" Before undertaking a private placement or a standby offering, the issuer undergoes a quality inspection. If the offer is rejected following inspection, the issuer either does not issue (and abandons the investment project) or moves on to the second flotation method subgame in Figure 1. This subgame is identical to the first subgame, however, the subsequent options are fewer. We are assuming that there only exists a single private placement investor (or group of investors). Therefore, rejection by the private investor in the first subgame eliminates this flotation method in the second subgame. The third and last subgame is reached only if the issuer is inspected and rejected twice. Thus, in the third subgame there are only two remaining options; use uninsured rights or do not issue.

Let q denote the probability that quality inspection truly identifies the high-value type (a_2). The quality inspection is assumed to be informative ($q > 0.5$), symmetric, and identical for standby underwriters and private placement investors.[6] Following inspection, the issuer and the investor bargain over the offer price (illustrated by the ovals in Figure 1). Negotiation means that the issuer suggests a price and the investor/underwriter accepts or rejects. Negotiations succeed if and only if the issuer's lowest acceptable issue price (the reservation price) is below the reservation price of the the private investor or the underwriter (their highest acceptable prices). The reservation price of the issuer is determined by the expected price that she will get in the continuation game that starts after a bargaining fails. A rejection is private information.

2.3 Pooling equilibria

The sequential equilibrium of Kreps and Wilson (1982) is used to characterize pure strategy equilibria in our flotation game, where investors' beliefs are formed using Bayes' rule. As shown below, the equilibrium flotation method path will depend on certain critical values of the shareholder takeup k. These threshold values are derived from the issuer's participation constraints and thus reflect both the project's net present value and total flotation costs.

For the pooling equilibrium analysis, we assume the following direct-cost structure: $d_{sr} > d_{ur}$ and $d_{sr} > d_{pp}$. The direct costs of standby rights is assumed to exceed the direct cost of uninsured rights because the former include standby fees.[7] We also assume that the direct cost of private placements are lower than the direct costs of standby rights. This reflects the fact that

[6] With only two issuer types, a random (uninformative) inspection implies that $q(a_2 \mid a_2) = 0.5$. With multiple issuer types, informativeness means that $q(a \mid a) > q(a \mid a') > q(a \mid a'')$ for a adjacent to a, and a not adjacent to a''. That is, the probability of concluding any particular type a decreases with the difference in value between a and the type being inspected. The inspection is symmetric when $q(a_1 \mid a_2) = q(a_2 \mid a_1)$. Given access to the same inspection technology, the main difference between the private placement investor and the standby underwriter is the comparative direct cost-advantage of the private placement investor ($d_{pp} < d_{sr}$), and the lower shareholder takeup implied by a private placement.

[7] Bøhren, Eckbo, and Michalsen (1997) document that the direct cost of standby rights on the OSE are about twice as large as the direct costs of uninsured rights issues.

the registration process for private placements is simpler (less costly) and does not require the issuer to administer the rights subscriptions. Note that we do not make any assumptions regarding the relative cost of uninsured rights vs. private placement. Finally, we assume that a rejected issuer does not pay for the inspection. This assumption is relaxed below when we discuss possible separating equilibria.

We start in Proposition 1 by showing that high-k firms go straight to uninsured rights in equilibrium. As k increases, the wealth transfer between old and new shareholders decreases (it is zero when $k = 1$, see Eq. 4). When the wealth transfer is low, the flotation method decision is driven primarily by direct issue costs, which are lowest for uninsured rights.[8] We then discuss the equilibrium choices of low-k issuers (Proposition 2), medium-k issuers (Proposition 3) and, finally, all issuers regardless of k (Proposition 4).

Proposition 1 (high-k issuers): *It is part of a pooling sequential equilibrium for issuers with high current shareholder takeup k, such that $k \geq \max\{k_{1b},\ k_{1pp},\ k_{1sr}\}$, to follow the flotation method path $\{ur\}$.*

Proof We first derive the equilibrium beliefs of investors (the market, private placement investor, underwriter) and then substitute these into the issuer participation constraints. This yields the critical k-values $\{k_{1b},\ k_{1pp},\ k_{1sr}\}$ that determine the equilibrium strategy in the proposition.

(1) Beliefs: When approached by a firm that wants to issue equity using uninsured rights, the market forms beliefs (posterior probability) μ that the issuer is of the high-value type. The approach may be the issuer's first move in the flotation game, denoted $\mu(ur)$, or it may happen after two rounds of inspection and rejection, denoted $\mu(pp, sr, ur)$. Either way, the market assumes that the equilibrium strategy is $\{ur\}$, so we have that

$$\mu(ur) = \mu(pp, sr, ur) = 1 - p. \tag{5}$$

[8] If private placement were the method with the lowest direct costs, some high-k issuers will still prefer uninsured rights. The reason is that shareholder takeup in a private placement is small so the wealth transfer to new shareholders may still be significant.

All off-equilibrium flotation method paths involve issuer inspection. The beliefs of the private placement investor or the underwriter that the issuer is of the high-value type, given that the inspection concludes high type, is denoted ψ. The argument of ψ indicates whether the inspection is the first (e.g. $\psi(pp)$) or the second attempt by the issuer (e.g. $\psi(pp, sr)$). We also need to specify the beliefs about which issuer types will deviate from the equilibrium path. The simplest is to assume that high- and low-value issuers are equally likely to deviate. Finally, let the private placement investor and the underwriter know whether they are the first to be approached by the issuer. It then follows that

$$\psi(pp) = \psi(sr) = \frac{q(1-p)}{(1-q)p + q(1-p)} \tag{6}$$

for the first inspection, and

$$\psi(pp, sr) = \psi(sr, pp) = 1 - p \tag{7}$$

for the second inspection (the two inspection results cancel out).

(2) Participation constraints: Total issue costs are derived using Eq. (4) and the beliefs shown above. To simplify the exposition, we use a superscript to indicate that beliefs are formed following at most one inspection: $\mu' \equiv \mu(ur)$, $\psi' \equiv \psi(pp)$. Thus, absence of a superscript indicates that more than one inspection has been undertaken, e.g. $\psi \equiv \psi(pp, sr)$. Furthermore, let C_i denote the total flotation cost when the flotation method path i involves two inspections ($\{pp,\ sr\}$, $\{sr,\ pp\}$, $\{pp,\ sr,\ ur\}$), and let C'_i denote the flotation cost when the path involves a single or no inspection ($\{ur\}$, $\{pp\}$ and $\{sr\}$). Note that since the cost of rejection is zero for the issuer, $C_{ur} = C'_{ur}$. The different issue costs are as follows:

$$
\begin{aligned}
C'_{ur} &\equiv d_{ur} + \frac{\alpha a_2(1-k)(1-\beta)(1-\mu')}{\beta + (1-\beta)\mu' + (1+\eta-\rho_{ur})\alpha} \\
C_{pp} &\equiv d_{pp} + \frac{\alpha a_2(1-\beta)(1-\gamma k)(1-\psi)}{\beta + (1-\beta)\psi + (1+\eta-\rho_{pp})\alpha} \\
C'_{pp} &\equiv d_{pp} + \frac{\alpha a_2(1-\beta)(1-\gamma k)(1-\psi')}{\beta + (1-\beta)\psi' + (1+\eta-\rho_{pp})\alpha} \\
C_{sr} &\equiv d_{sr} + \frac{\alpha a_2(1-k)(1-\beta)(1-\psi)}{\beta + (1-\beta)\psi + (1+\eta-\rho_{sr})\alpha} \\
C'_{sr} &\equiv d_{sr} + \frac{\alpha a_2(1-k)(1-\beta)(1-\psi')}{\beta + (1-\beta)\psi' + (1+\eta-\rho_{sr})\alpha}
\end{aligned} \tag{8}
$$

This gives the following set of incentive constraints for the first stage of the game:

$$
\begin{aligned}
C'_{ur} &\leq qC'_{pp} + (1-q)\left[qC_{sr} + (1-q)C'_{ur}\right] \\
C'_{ur} &\leq qC'_{sr} + (1-q)\left[qC_{pp} + (1-q)C'_{ur}\right] \\
C'_{ur} &\leq qC'_{pp} + (1-q)C'_{ur} \\
C'_{ur} &\leq qC'_{sr} + (1-q)C'_{ur} \\
C'_{ur} &\leq b
\end{aligned} \tag{9}
$$

Since $\psi' < \psi$, it follows that $C_{pp} > C'_{pp}$ and, similarly, $C_{sr} > C'_{sr}$. This means that the first and second condition in Eq. (9) never binds, and the binding incentive constraints are:

$$
\begin{aligned}
C'_{ur} &\leq C'_{pp} \\
C'_{ur} &\leq C'_{sr} \\
C'_{ur} &\leq b
\end{aligned} \tag{10}
$$

Solving the inequalities for k gives the restrictions on shareholder takeup in the proposition:

$$\begin{aligned} k_{1pp} &= \frac{\dfrac{d_{ur} - d_{pp}}{\alpha a_2(1-\beta)} + \dfrac{p}{v'_{ur}} - \dfrac{1-\psi'}{v'_{pp}}}{\dfrac{p}{v'_{ur}} - \dfrac{1-\psi'}{v'_{pp}\gamma}} \\ k_{1sr} &= 1 - \frac{d_{sr} - d_{ur}}{\alpha a_2(1-\beta)\left[\dfrac{p}{v'_{ur}} - \dfrac{1-\psi'}{v'_{sr}}\right]} \qquad (11) \\ k_{1b} &= 1 - \frac{(b - d_{ur})v'_{ur}}{\alpha a_2(1-\beta)p} \end{aligned}$$

where

$$\begin{aligned} v'_{pp} &= \beta + (1-\beta)\psi' + (1+\eta-\rho_{pp})\alpha \\ v'_{sr} &= \beta + (1-\beta)\psi' + (1+\eta-\rho_{sr})\alpha \qquad (12) \\ v'_{ur} &= \beta + (1-\beta)\mu' + (1+\eta-\rho_{pp})\alpha \end{aligned}$$

The interpretation of the condition $k \geq \max\{k_{1b},\ k_{pp},\ k_{sr}\}$ as stated in the proposition is as follows: $k \geq k_{1b}$ is required for the firm to issue equity, $k \geq k_{1pp}$ is required for uninsured rights to be more profitable than private placement, and $k \geq k_{1sr}$ is necessary for uninsured rights to be preferable to standby rights. ■

Figure 2 illustrates this equilibrium. The key parameters are the informativeness of the inspection technology, direct issue cost, and degree of shareholder takeup in private placement. Panel A illustrates an equilibrium with $q = 0.8$,[9] direct costs as a percentage of issue proceeds of $\rho_{ur} = 0.02$, $\rho_{pp} = 0.02$, and $\rho_{sr} = 0.044$, respectively, and a shareholder takeup in a private placement of 30% of the takeup that would have materialized in a rights offering ($\gamma = 0.3$).[10] In this example, the binding condition is $k \geq k_{sr}(d_{ur}, d_{sr}, q) = 0.81$. Thus, issuers with current shareholder takeup greater than 0.81 optimally issue equity using uninsured rights.

Panel B of Figure 2 shows that the $\{ur\}$ equilibrium exists even if the direct cost of uninsured rights is assumed to be higher than the direct cost of private placement. The reason is that a private placement is associated with larger wealth transfer cost than uninsured rights because

[9] Recall that $q(a_i \mid a_i) = 0.5$ if the inspection is completely uninformative.

[10] The remaining parameters are $p = 0.5$, $a_2 = 109$, $\alpha = 0.275229$, $\beta = 0.541284$, and $\eta = 0.367$.

$\gamma k < k$. Without this additional wealth transfer cost for private placement, the $\{ur\}$ equilibrium would not exist if $\rho_{pp} < \rho_{ur}$. Panel C illustrates this by setting $\gamma = 1.0$, $\rho_{ur} = 0.03$, $\rho_{pp} = 0.02$. In the last Panel of Figure 2 we illustrate the effect of making the inspection function uninformative. If private investors and underwriters have no competitive advantage relative to the market, the issue decision would be determined completely by direct cost and shareholder takeup (as in Eckbo and Masulis, 1992).

Figure 2 makes it clear that the {ur} equilibrium does not exist for firms with relatively low k. We next turn to equilibria for issuers with shareholder takeup below the level that makes uninsured rights optimal.

Proposition 2 *(***low-k issuers):** *It is part of a pooling sequential equilibrium that issuers with current shareholder takeup k such that $k \leq \min\{k_{2pp}, \ k_{2sr}\}$ and $k \geq k_{2b}$, follow the flotation method path $\{pp, \ sr, \ ur\}$.*

Proof The structure of the proof is analogous to the one for Proposition 2 and is therefore relegated to the appendix. ■

Table 1 presents an example of an equilibrium that satisfies Proposition 2. Any issuer with low current shareholder takeup first tries to float the new equity using a private placement. The tradeoff is between the lower direct issue costs for private placements and the greater wealth transfer cost given the lower effective takeup. However, when k is small, the first effect dominates the second.

In the example, if the private placement investor concludes type a_2, both issuer types propose an offer price of 139.40, which makes the private placement investor indifferent between accepting and rejecting the equity issue. If the inspection by the private investor concludes type a_1, the highest offer price acceptable to the private investor is 99.10. However, the expected cost for the high-value issuer of proceeding to standby rights (6.57) is lower than the costs incurred if placing equity privately at this price (14.21). Therefore, the high-value issuer optimally proposes an offer price that will be rejected by the private investor. In the subsequent standby rights sub-game, if the underwriter concludes the inspection with type a_2, both issuer types propose offer price 123.68, which is accepted by the underwriter. This gives the high-value type issue costs of 4.96. If the inspection conclusion is type a_1, the high-value type would again optimally propose an offer price that will be rejected by the underwriter. If the issuers are rejected twice, both types issue using uninsured rights at an offer price 102.34.

There also exists an equilibrium where the issuer approaches the underwriter before the private investor:

Proposition 3 (intermediate-k issuers): *It is part of a pooling sequential equilibrium that issuers with current shareholder takeup k such that $k \leq \min\{k_{3pp},\ k_{3sr}\}$ and $k \geq k_{3b}$, follow the flotation method path $\{sr,\ pp,\ ur\}$.*

Proof See appendix ■

Issuers that find it optimal to approach the underwriter first will typically have levels of shareholder takeup that is greater than the level of takeup when private placements is the first choice. Moreover, the level of takeup is lower than for issuers that find it optimal to go straight to uninsured rights. However, there are levels of takeup that are part of two equilibria. That is, the conditions on k from proposition 3 may overlap with the conditions from propositions 1 and 2. We propose the following definition to choose between overlapping equilibria: A sequential equilibrium $\{x\}$ *Pareto dominates* a sequential equilibrium $\{y\}$ if the expected costs in equilibrium $\{x\}$ is lower than in equilibrium $\{y\}$. We refer to $\{x\}$ as a Pareto dominant equilibrium. Applying this criterion to the equilibria in the previous propositions yields the following equilibrium strategies for the full range of $k \in [0,\ 1]$:

Proposition 4 (all issuers) *There exists levels of shareholder takeup k_{4pp} and k_{4sr}, $k_{4pp} < k_{4sr}$, such that $\{pp,\ sr,\ ur,\}$ is a Pareto dominant equilibrium for issuer with $k < k_{4pp}$, $\{sr,\ pp,\ ur\}$ is a Pareto dominant equilibrium for issuer with $k \in [k_{4pp}, k_{4sr}]$, and $\{ur\}$ is a Pareto dominant equilibrium for issuer with $k > k_{4sr}$.*

Proof See appendix.[11] ■

Figure 3 illustrates the existence of takeup levels k_{4pp} and k_{4sr}. Using the same parameter values as in Table 1, issuers with current shareholder takeup less than $k_{4pp} = 0.51$ attempt a private placement as the first choice. Issuers with k between $k_{4pp} = 0.51$ and $k_{4sr} = 0.62$ attempt

[11] Note that for reasonable assumptions about direct costs, $\{pp,\ ur\}$ and $\{sr,\ ur\}$ are not equilibria. The reason is that they are not subgame perfect. For example, if rejected by the private investor, and issuer will always prefer to test the underwriter before going to the market to do ur.

a standby rights offering as the first choice, and issuers with k greater than $k_{4sr} = 0.62$ go directly to uninsured rights offer.

2.4 Separating equilibria: Adverse selection and signaling

Up to this point we have focused strictly on pooling equilibria in the game between the issuer and investors. There may also exist separating equilibria. For example, as in Myers and Majluf (1984), the high-value issuer may find the wealth transfer too costly in equilibrium. If the issuer participation constraint equation (4) is binding, the high-value firm prefers to forgo the project over selling under-priced equity.[12] In a separating equilibrium where the high-value type does not issue, the market infers the true value of the issuer (low), and there is no wealth transfer. As a result, issuers select the flotation method with the lowest direct cost: uninsured rights *regardless* of the value of k.

A separating equilibrium may also arise where the high-value type signals its type. Giammarino and Lewis (1988) and Heinkel and Schwartz (1986) develop models with this type of separating equilibria. Giammarino and Lewis (1988) study the bargaining game between an issuer and a financier-underwriter (a single available flotation method). As in the bargaining stage of our model, the issuer suggests an offer price and the financier accepts or rejects. However, while we limit our attention to pure strategy equilibria, their players randomize between pure strategies. That is, in equilibrium, an issuer can suggest a "high" price with some probability θ and a "low" price with probability $1 - \theta$ and the financier randomizes between accepting or rejecting the offer.

Giammarino and Lewis (1988) show the existence of a semi-pooling equilibrium:[13] The high-value type always makes a "high" price offer, while the financier randomizes between accepting and rejecting the "high" offer price but always accepts a "low" offer price. When the low-value type is relatively more eager to finance the project (the ratio of assets in place to post-issue value is higher for the low-value type), the low-value type will find a way to avoid being rejected too often by the financier. This is accomplished by randomizing between the "low" price (which is always accepted

[12] By inspection of equation (4), for a given investment amount (I), the participation constraint is more likely to bind the lower the net present value of the project, and the greater the difference between the values of assets in place of the high- and the low-value types. Increasing this difference (i.e., decreasing the parameter β) increases the wealth transfer cost to the high-value type.

[13] In a semi-pooling equilibrium, one type makes the pooled offer with probability one while the other type randomizes between the pooled offer and the separating offer.

by the financier) and the "high" price. In this signaling equilibrium, it is the low-value type that ends up being revealed in the separating part of the equilibrium. Giammarino and Lewis (1988) also provide another semi-pooling equilibrium where the high-value type is relatively more eager to obtain financing. This equilibrium does not exist in our setting since, when b is the same for both types, the low-value type will always be the most eager to obtain financing.

Heinkel and Schwartz (1986) obtain a separating equilibrium by focusing on the cost of a failed (uninsured) rights offer. If the offer price is set high (so that the rights are expected to trade close to zero), the probability that the offer fails is large for a low-value type that tries to mimic a high value type. Thus, the expected failure cost of setting a high offer price is larger for the low-value type than for the high-value type, and the offer-price becomes a signaling mechanism for the high-value type. High-value types signals their value by choosing rights offers (with high offer prices) while low-value types conceal their value to investors by using a fully underwritten issue.[14]

Since our model ignores the failure probability in rights offers and since we limit our attention to pure strategy equilibria, the signaling equilibria discussed above do not exist in our multistage flotation game. However, what if there is a cost to the issuer of being rejected by the inspection? In practice, underwriters and private placement investors do not charge the firm for inspections that lead to rejection. However, rejection may slow the investment process as the firm must find another way of issuing equity. Since inspection is informative, this outcome is more likely for the low-value type than for the high-value type. However, in our model this is not sufficient for a separating equilibrium: Suppose there existed an equilibrium where the high-value type could signal its value by choosing to expose itself to inspection. In this equilibrium, the inspector would have post-inspection beliefs that put a probability of one on the high value type—regardless of the outcome of the inspection. But, then the low-value type could mimic the high-value type—breaking the putative separating equilibrium.

2.5 Empirical predictions

In the empirical analysis below, we estimate the market reaction to seasoned equity offering announcements. The market reaction is $AR \equiv (p^+ - p^-)/p^-$, where p^+ and p^- are the post- and

[14] Heinkel and Schwartz (1986) also show that in the pool of rights offers, the issuers with the highest value in the pool separate from the rest by paying a fixed investigation cost. In contrast to our inspection technology, they assume that the true type is fully revealed by paying the fixed cost.

pre-announcement stock prices of the issuer, respectively. Our theory explains the equilibrium beliefs that are reflected in p^+ as a function of k and the flotation method. In order to structure our predictions for AR, we also need to make an auxiliary assumption concerning the information content of p^-. Consistent with the pooling equilibrium of Proposition 4, we assume that investors prior to the issue announcement believe the participation constraint (eq. (4)) is always satisfied for at least one flotation method. We subsequently relax this assumption, allowing for prior expectations of adverse selection.

Hypothesis 1 (Pooling equilibrium): *Suppose issuers follow the flotation game of Figure 1, and that the equity issue announcement reveals the value of k. Using the critical k-values defined in Proposition 4, let "high k" mean $k \in [k_{sr},\ 1]$, "medium k" mean $k \in [k_{pp},\ k_{sr}]$ and "low k" mean $k \in [0,\ k_{pp}]$. The market reaction to the issue announcement, $AR \equiv (p^+ - p^-)/p^-$, is as follows:*

	k high	*k medium*	*k low*
Uninsured rights:	$AR_{ur} = 0$	$AR_{ur} < 0$	$AR_{ur} < 0$
Standby rights:	*no equilibrium*	$AR_{sr} > 0$	$AR_{sr} = 0$
Private placement:	*no equilibrium*	$AR_{pp} = 0$	$AR_{pp} > 0$

Hypothesis 1 follows directly from Proposition 4. All firms with high k prefer to issue using the low-cost uninsured rights method. Since there is no inspection, there is no information conveyed by the issue decision, thus $AR_{ur} = 0$. Issuers of uninsured rights with medium or low k have been rejected twice by the quality inspection, thus $AR_{ur} < 0$. Medium-k issuers prefer standbys, creating a positive market reaction ($AR_{sr} > 0$) due to the positive inspection result. For low-k issuers, $AR_{sr} = 0$ since the issuer have been rejected by the private placement inspection before succeeding with the standby inspection, with a neutral net information effect to the market. Medium-k issuers that use private placement have first been rejected by the standby underwriter, thus $AR_{pp} = 0$. Finally, for low-k issuers, private placement is the first choice, so the successful inspection result implies $AR_{pp} > 0$.

However, suppose the market believes prior to the issue announcement that the participation constraint in eq. (4) is binding for some high-value firms. This creates expectations of adverse selection, and results in the pre-issue price p^- reflecting an underinvestment discount. Moreover, high-k issuers will now be met with a positive market reaction ($AR_{ur} > 0$) because the issue announcement prompts the market to increase p^- by the expected value of the investment project in the high-value state. This effect is easily illustrated by a numerical example. Suppose investors know that the firm is in one of two equally likely states, as follows:

	High state (p=0.5)	Low state
Assets in place	a_1=150	a_2=50
Project NPV	b=20	b=20

If $k = 0$, the firm issues only in the low state, and we have that $p^- = (150 \times 0.5 + (50 + 20) \times 0.5) =$ \$110 and $p^+ = (50 + 20) =$ \$70. If $k = 1$, the firm issues in both states and the issue announcement does not reveal the true state. However, the announcement causes the market to capitalize the value of the project in *both* states, so $p^+ =$ \$120. Thus, in the adverse selection separating equilibrium AR_{ur}=-36%, while in the pooling equilibrium, AR_{ur}=9%.

In the next section, we estimate the market reaction to seasoned equity offerings on the OSE. By including the full range of flotation methods in the analysis, we are in a position to make full use of Hypothesis 1 in interpreting the empirical estimates.

3 Market reaction to seasoned equity offerings

3.1 Sample characteristics

Our total sample of 381 public and private equity offerings by OSE-listed firms is collected from annual reports published by the OSE, the OSE Daily Bulletin, and major business newspapers such as *Dagens Næringsliv* and *Aftenposten* over the period 1/1980–12/1996. The 381 offerings represents nearly the population of equity issues over the period, excluding only private placement made as part of employee stock ownership plans (ESOPs).

If the equity issue is a payment to target shareholders in a takeover, using the rights offer method is not an option. Moreover, these private placements directly signal the existence of the investment project (the takeover) which by itself may cause unusual stock price movements. We therefore single out private placements related to takeovers. Because data on the exact use of the proceeds from private placements is limited, we treat a private placement as takeover-related if the issuer is involved in a merger or acquisition within one year of the SEO date. Data on mergers and acquisitions is available from various OSE publications.

Table 2 lists the annual distribution of the 381 issues, of which 228 are public offerings using rights, and 153 are private placements. Of the rights offerings, 80 cases use uninsured rights and 148 use the standby rights method. Of the private placements, 126 are unrelated to merger activity while in 27 cases the equity issue is a means of paying target shareholders in a takeover. The second column of Table 2 shows the number of issues as a percent of the number of firms listed on the OSE. This percentage is typically between 10% and 20%—which is high compared to the U.S. (Mikkelson and Partch (1986), Eckbo, Masulis, and Norli (2000)). For example, on the NYSE and Amex, the percentage of issuers relative to the total number of listed firms reaches 10% only during the "hot" issue markets in the early 1980s.

Table 3 provides information on issue- and issuer-specific characteristics for the total sample. The 228 public offerings involving rights are made by 116 different OSE-listed firms, while the 153 private placements are undertaken by 91 different firms, respectively. Thus, OSE-listed firms that float new equity using rights offers do so on average twice over the 17-year sample period. For private placements, the average sample firm issues 1.7 times over the sample period (60 firms issue once only). The largest number of issues by a single company is 7 for the public offering sample and 6 for the private placement sample. The equity issue size averages NOK 146 mill. for rights and standbys, and NOK 120 mill. for private placements. Both the amount offered and market value of the issuer are on average larger for standby offerings than for uninsured rights offerings. Comparing standbys to private placements, the average equity market capitalization is similar. Private placement issuers tend to have lower book-to-market ratio.

Panel (b) in Table 3 provide information on the ownership structure of the issuing firm. The holdings of the ten largest shareholders confirm that Norwegian companies have a relatively concentrated ownership structure (ranging from 57% to 65% across issuer types). Note that, for standbys and private placements, the issue itself does not materially change the ownership proportion of the ten largest shareholders over the year of the issue. This implies that the group of the ten largest shareholders typically either participates in the private placement directly, or purchases shares in the market following the issue so as to maintain its ownership proportion. With the ownership proportion of the group of largest shareholders unchanged, it is difficult to argue that the private placements change monitoring of management by this group. The table also shows that insiders (the CEO and members of the board of directors) reduce their proportional shareownership from 18% to 15% over the year of the private placement. Whether this is sufficient to materially alter agency costs remains an open question. We return to this issue below.

3.2 Current shareholder takeup

Table 4 describe current shareholder takeup (k) in the rights offering sample. Rights are traded in an organized market and we use data on the rights trading activity to estimate k. Assuming that each right is traded only once during the rights offer period, k can be estimated as one minus the fraction of rights traded. Note that since this fraction is publicly observable at the end of the rights offer period, it is unlikely that a low-k company would try to fool the market into believing that its k-value is high.[15]

Hypothesis 1 predicts that high-k issuers will use neither standby rights nor private placement. Consistent with this prediction, Panel (a) of Table 4 shows that current shareholder takeup is on average higher for uninsured rights offerings than for standby offerings. The mean takeup for uninsured rights is 94.4% while the mean takeup for standby rights is 84.8%. The corresponding numbers using median to measure differences are 96.4% and 91.5%. In terms of our flotation model, this suggests that the threshold value for k that separates standbys and uninsured rights (k_{4sr}) is somewhere in the range of 0.85 to 0.91.

Panel (b) and (c) show takeup in two subsamples created by splitting the public offering sample according to whether or not the issue had a takeup above or below the median takeup. As predicted by our model, a disproportionately large number of uninsured rights offerings are in the subsample with above median takeup, and a disproportionately large number of standby rights offerings are in the subsample with below median takeup.[16] Importantly, as the model predicts, there are no cases where a rights offer is attempted when the value of k is *low*.

[15]This observation drives our earlier assumption that k becomes known to the market at the time of the issue announcement.

[16]The subsamples also reveal a non-linearity in the takeup data. Panel (b) of Table 4 show that issues with below median takeup exhibit the same tendency as the overall sample—uninsured rights have a higher takeup than standby rights. However, panel (c) show that the takeup in the above-median subsample are similar for both offer types.

3.3 Market reaction to equity offerings

We estimate abnormal stock returns using the conditional event parameter δ in the following market model:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \sum_{j=1}^{2} \delta_{ij} d_{jt} + \epsilon_{it}, \tag{13}$$

where r_{it} is the continuously compounded daily equity return to firm i over period t; r_{mt} the daily return on a value weighted market portfolio of all OSE-listed stocks; d_{1t} is a "runup" dummy variable taking on a value of one during the event window from day -130 through day -4, and zero otherwise; d_{2t} is an "announcement" dummy variable taking on a value of one during (1) the two-day event window from day -1 through day 0, or (2) the four-day event window from day -3 through day 0, respectively, and zero otherwise;[17] and δ is the daily abnormal return to firm i averaged over the corresponding event window. Thus, the total abnormal return to firm i over the event window of ω days is $\omega \times \delta_{ij}$. The estimation period starts on trading day -310 relative to the announcement date and ends on trading day +160. Issues with less than four months (82 trading dates) of data prior to the announcement are excluded from the analysis.[18]

The sample average values for δ, representing the average abnormal stock price run-up and announcement-induced abnormal returns, are reported in Table 5 along with the p-values for the hypothesis of zero abnormal returns.[19] The two-day announcement period abnormal return for standby rights offerings is not significantly different from zero, while uninsured rights offerings show a positive abnormal return of about 1.0% (statistically significant at the 10% level). When using the four-day event window, the average market reaction to standby rights offerings remains insignificant, while the market reaction to uninsured rights offerings doubles to a statistically significant 2.1%.

Turning to private placements, the average announcement-period abnormal return for the total

[17]Event studies of U.S. public equity offerings typically use a two-day event window to measure the announcement effect. Event studies of U.S. private placements (e.g., Wruck (1989) and Hertzel and Smith (1993)) use a four-day announcement window. For comparison purposes, we report both.

[18]This reduces the standby- and rights offering samples with 5 and 4 observations, respectively. The private placement sample is reduced by 17 observations (14 observations if mergers are excluded). The resulting estimation periods is 471 trading dates (the maximum) for about 88% of the issues, and the shortest estimation period is 244 trading dates.

[19]Under the null hypothesis of zero abnormal return, the following test statistic converge in distribution to the standard normal distribution

$$z_j = \frac{1}{\sqrt{N}} \sum_{i=1}^{N} \frac{\hat{\delta}_{ij}}{\hat{\sigma}_{ij}},$$

where $\hat{\delta}_{ij}$ is the OLS estimate of δ_{ij}, and $\hat{\sigma}_{ij}$ is the estimated standard error of this estimate.

sample is similar in magnitude to uninsured rights. However, excluding the private placements associated with mergers reduces the magnitude and renders the two-day abnormal return statistically indistinguishable from zero. With the four-day window, the effect of excluding merger-related private placement is minimal, other than reducing power (p-vale falls from 0.22 to 0.50). With the four-day window, the market reaction to private placements is a significantly positive 2.66%. This finding is comparable to the four-day average abnormal return of 4.4.% reported by Wruck (1989) for 128 private placements in the US, and with the slightly lower market reaction reported by Hertzel and Smith (1993) also on US data. Moreover, Kang and Stulz (1996) find a cumulated abnormal return of 2.13% in a sample of 69 private equity offerings in Japan, while Wu and Wang (2003) document an average market reaction of 3.5% to 99 private placements over the three-day window (-1, 1).

The announcement-induced abnormal return for private placements incorporates the effect of any discount or premium in the offer. For example, Hertzel and Smith (1993) reports an average discount in the private placement issue price (relative to the pre-issue market price). In uninsured rights, there are no costly discount. Thus, to better gauge the relative magnitudes of rights and private placements, we next adjust the announcement returns reported in Table 5 for any issue discount.

We follow Bradley and Wakeman (1983) and measure the net return to old shareholders (the information effect) using the following adjusted abnormal return:

$$\mathrm{AAR} = \left(\frac{1}{1-\delta}\right)\mathrm{AR} - \left(\frac{\delta}{1-\delta}\right)\left(\frac{P_{\mathrm{Offer}} - P_{a-4}}{P_{a-4}}\right), \tag{14}$$

where δ is the fraction of the company owned by the new private investors after the private placements, P_{Offer} is the offer price, P_{a-4} is the market price four days prior to the announcement day, and AR is the four-day abnormal stock return. To illustrate, suppose the private investor will own 20% of the shares after the issue ($\delta = .2$), and the average four-day announcement period abnormal return is 2.6% (AR= 0.026). In order for "issue costs" to explain the positive announcement day effect, the issue must be placed at a premium of 13%.

Table 6 report AAR using the 133 sample observations with available data on the placement price. Note that the adjustment alters the distributional properties of the the original abnormal return estimate AR in a way that we cannot determine. Thus, we ignore issues of statistical significance, so this exercise is primarily to illustrate relative magnitudes. As shown in the first row of Table 6, the private equity placement implies an ownership stake for the new investor that averages 24%. The average holding is acquired at a premium of 3.5% when mergers and acquisitions are included, and of 0.9% when mergers and acquisitions are excluded. Both numbers are statistically insignificant at conventional levels using a standard t-test. Thus, the first row does not change the basic conclusion from Table 5 that the market reaction to private placements and uninsured rights offers are statistically indistinguishable.

As a robustness check, Table 6 reports results of trimming the sample by excluding extreme observations. The "weak" trimming excludes observations with a discount less than 60% or a premium higher than 60%, the medium and strong trimming use 40% and 20% as cutoff percentages respectively. The trimmed samples also exhibit a positive premium, although smaller and still not statistically different from zero. Even though the average premium is positive, the average adjusted abnormal returns (AAR) are positive and larger than the average unadjusted abnormal returns (AR). This can only happen if the private placements with a positive premium typically give new investors a smaller fraction of the post issue company (i.e., δ is low) than placements that are done at a discount. Computing an average premium by weighting each observation with δ confirms this. Under the weak sample trimming, the weighted average premium is -2.7% (i.e., a discount). The full sample show large AARs, but looking at the trimmed samples, these seem to be driven by outliers in the data. Nevertheless, the trimmed samples show AARs that are more than twice the size of the unadjusted abnormal returns. Thus, we conclude that the information effect from the announcement of private placements is reliably positive.

Overall, the announcement-period abnormal returns for rights, standbys and private placements reported in tables 5 and 6 are largely consistent with the predictions stated in Hypothesis 1. First, the highest-k issuers use uninsured rights. The average market reaction to uninsured rights is significantly positive, as predicted if the pre-issue price (p^-) contains an underinvestment discount. Second, firms using standbys have intermediate or low values of k. The average market reaction to standbys is statistically insignificant, possibly because the values of k are in the lower range of $[k_{4pp},\ k_{4sr}]$. Third, the average market reaction to private placements is positive and statistically significant. With no adjustment for the offering premium, this market reaction is indistinguishable from the market reaction to uninsured rights, otherwise it appears to be larger than for uninsured rights.

Interestingly, It appears that the strong market reaction to private placements is in part driven by a offer *premium*. That is, in contrast to much of the extant literature, we find that the offer price in private placements at the OSE are on average greater than the market price four days prior to the offer announcement. Note that this finding reinforces our assumption that a private placement involves lower direct costs than a standby rights offer (which are offered with a discount).

It is also possible that the positive announcement-period return for private placements reflects expectations of increased monitoring. Panel (a) in Table 7 splits the sample in two groups based on whether shareholder concentration increased or decreased over the year of the private placement. A standard t-test fails to reveal a statistically different announcement-effect across the two groups. Panel (b) reports the coefficients from a regression of abnormal returns on shareholder concentration and percent insider holding. The two-day announcement period returns is unrelated to shareholder concentration (δ_1) and positively related to the insider holdings at the beginning of the offering year (coefficient δ_2). These results provide little support for the monitoring hypothesis.

4 Long-run issuer performance

The evidence above allow joint tests of the equilibrium flotation method strategy and the rationality of the market. In their study of US private placements, Hertzel, Lemmon, Linck, and Rees (2002) challenge the rationality assumption and argue instead that the market tends to overreact. They support their claim by providing long-run post-issue performance estimates that are significantly negative. Given the paucity of empirical research of the efficiency of the Oslo Stock Exchange, it is useful to perform a long-run performance analysis also for our equity issuers. We use two alternative procedures for estimating long-run abnormal performance. The first is the matched control firm approach used by Hertzel, Lemmon, Linck, and Rees (2002). Here, expected returns to issuers are measured as the realized stock return to non-issuing firms matched on size and book-to-market ratio. In the second procedure, we estimate a multi-factor asset pricing model used to generate expected returns.

4.1 Performance using matched control firms as benchmark

The performance measure used in this section is similar to the one used by Loughran and Ritter (1995). For firm that announces an issue in month t, the procedure is as follows:

(1) All firms on OSE are ranked based on market capitalization (size) in month t. Then all companies with an equity capitalization in the interval $[(v_i/1.3), 1.3v_i]$ are identified, where v_i is the market value of the issuer's common stock at the end of month t. The company within this size-interval with the closest book-to-market ratio to the issuer is then selected as the matched firm.[20]

(2) The holding period returns for the issuer and the matched firm are computed from the month following the offer announcement day and the earlier of the three-year anniversary date and the delisting date for the issuer. If the matched firm delists a new matched firm is selected as described above but using the delisting date instead of the announcement date. If the matched firm issues equity, it is treated as if it was delisted.

The first rows of panel (a) in Table 8 reports three-year holding-period return for our sample of Norwegian public and private equity offerings when the matched firm is selected based on size only. Both for public offerings and private placements, the issuing firms have lower three-year holding period returns than their corresponding matched firms. The average abnormal performance for public offerings is a statistically insignificant −7.1%, while private placements show a negative performance of about 25 percent (statistically significant at around the 8% level). However, results change when using size/book-to-market as matching criteria. The first two rows of panel (b) of Table 8 show that both offer types still have negative long-run abnormal returns, but with size/book-to-market matching the underperformance of public offerings are more severe than the underperformance of private placements.

The average three-year holding period return for public offerings is 42.6%, while matched firms have an average holding period return of 65.2%. The −22.6% abnormal return is significant at the 10% level using bootstrapped p-values and at the 5% level using a standard t-test. The private placement sample show negative three-year abnormal performance (−10.4%), but this is not statistically different from zero. Thus, Table 8 shows some evidence of long-run abnormal performance

[20]Below, we also report performance when selecting the matched firm based on size only.

for Norwegian public equity offerings, especially when using size/book-to-market matched firms as the benchmark. Given the difference in results using size and size/book-to-market matching, the rest of the discussion of Table 8 will mainly be based on the results using size/book-to-market matching. There are two reasons for this. First, since we know that both size and book-to-market ratio is related to the cross-section of asset returns, size/book-to-market matching should give a better match than size matching only. Second, the findings of Jegadeesh (2000) indicate as long as one control for differences in book-to-market ratio, adding other matching criteria only affect long-run abnormal performance marginally.

In the model of section 2, the incentive to time an issue is decreasing in the current shareholder takeup k. Thus, under the overconfidence hypothesis, the long-run performance should be negative and greater for rights offerings with below-median takeup than for offerings with above-median takeup. The results in last two rows of Table 8 do not support this prediction. The three-year holding period return for issuers with below median current shareholder takeup is 38.8%, while the corresponding return for matched firms is 56.1%. The −17.3% abnormal long-run return is not statistically significant at conventional levels. Issuers with above median takeup experience an even worse long-run performance (−27.9%), statistically significant at the 10% level using both bootstrapped and t-statistic based p-values. However, a standard t-test fails to reject the hypothesis of no difference in the abnormal long-run returns of the two median-splitted subsamples. The overconfidence hypothesis also predicts that announcement-induced abnormal return and long-run abnormal return should be correlated. While not shown, when we regress long-run abnormal returns on a constant and the announcement period abnormal returns, we find that this prediction is rejected for all of the offering categories.

4.2 Performance using a factor-model as benchmark

Factor model procedures assume that expected returns are generated by a set of K pre-specified risk factors. The average monthly abnormal return of portfolio p is estimated as the constant term ("Jensen's alpha") in a regressing of the portfolio return on the risk factors. The expected value of alpha equals zero for passively held portfolios provided the specified factor model adequately captures the pervasive risk factors underlying the economy. We follow Ferson and Schadt (1996) and Eckbo and Smith (1998) and condition our factor model estimation on a vector Z_{t-1} of observable characteristics that may be useful in forecasting time-variations in expected returns:

$$r_{pt} = \alpha_p + b'_{p0} r_{mt} + b'_{p1}(Z_{t-1} \otimes r_{mt}) + e_{pt}. \tag{15}$$

Here, r_{pt} and r_{mt} are portfolio return and returns on factor mimicking portfolios in excess of the return on the risk free asset, the K-vector b_{p0} measures average factor loadings, the KL-vector b_{p1} is designed to pick up predictable time-variation in factor loadings. The motivation for the conditional model framework is the growing evidence that expected returns are predictable using publicly available information.[21] In the presence of time-varying expected returns, an estimate of Jensen's alpha derived from an unconditional model is a biased measure of the true abnormal performance, and our conditional factor model estimation represents an attempt to correct for this bias.

The dependent variables in the factor model regressions are the monthly returns to equal- and value-weighted portfolios of security issuers. To illustrate, the value-weighted private placement portfolio is constructed as follows: Invest one dollar in the stocks of the first firm that announces a private placement. At the beginning of the first month after the second private placement announcement, the portfolio is rebalanced to include the new company using current value-weights. This process is continued as additional firms issue securities, until the first firm reaches its three-year anniversary or a firm in the portfolio is delisted, at which point it is removed and the portfolio is again rebalanced using value-weights.

We create ten such "issuer portfolios" by partitioning the sample according to offering type (standby rights/uninsured rights/private placements), by shareholder takeup (above and below median), and by using equal and value weights. Similarly, ten "match-portfolios" is constructed using the corresponding set of size/book-to-market matched firms identified in the preceding analysis. Finally, six "zero-investment portfolios" are constructed by selling issuer-portfolios short to finance a long position in the match-portfolio, and two "zero-investment portfolios" are constructed by going short in below median takeup issuers and long in above median takeup issuers.

The four risk factors used in the conditional expectation models are described in panel (a) of

[21] Ferson and Harvey (1991) and Evans (1994) argue that time-variation in conditional betas for passive portfolios is economically and statistically small in the U.S. However, Ferson and Schadt (1996) find that time-varying betas are important in their measurement of the performance of managed U.S. mutual funds. Moreover, it is commonly accepted that conditional expected risk premiums tend to vary with economy-wide factors such as the business cycle.

Table 9. The excess return on the market portfolio (RM) is computed as the difference between the return on the Oslo Stock Exchange (OSE) total index and the return on 1-month NIBOR. The term structure factor (ΔTerm) is computed as the change in long-maturity government bonds (from OECD) and 3-month NIBOR. The exchange-rate factor (ΔUSD/NOK) is computed as the change in the NOK/USD exchange rate. The oil-price factor (ΔBrent) is the change in the Brent Blend (crude oil) spot price. The three factors that are not return on portfolios (ΔTerm, ΔUSD/NOK, and ΔBrent) should ideally have been represented by factor mimicking portfolios. However, it turned out to be hard to accomplish this in a meaningful way. The factor mimicking procedures of Breeden, Gibbons, and Litzenberger (1989) and Lehmann and Modest (1988) using either decile portfolios or the 30 largest companies each year to mimic the factor time-series, generated factor returns that had very low correlation with the original macro economic variables. Thus, the factor model uses the macro economic variables ΔTerm, ΔUSD/NOK, and ΔBrent directly as factors.[22]

The information variables (Z_{t-1}) are the return on the Morgan Stanley World Index in excess of the return on the 1-month NIBOR (MSWI excess return), the dividend yield on the Morgan Stanley World Index (Dividend Yield), a dummy variable that takes on the value of one in January and zero otherwise (January Dummy), and real per capita growth rate of industrial production (Industrial Production Growth). Except for the January dummy, the numbers in panel (a) and (b) are percentages.

Table 10 reports the results for portfolios of standby rights offerings, uninsured rights offerings, and private placements. The rows labeled "EW issuer" or "VW issuer" contain results for equally- and value weighted issuer portfolios respectively. The rows labeled "EW M−I" contain the results for zero-investment portfolios that sell issuer portfolios short in order to finance a long position in the matched firm portfolios. The last column of Table 10 report the p-values for an F-test of the null hypothesis that none of the elements in b_{p1} are statistically different from zero. In other words, a test of the time-varying beta model. Except for the equally weighted standby rights portfolio, the null hypothesis cannot be rejected at the 5% level for any of the portfolios. That is, we cannot

[22]When factors are not returns on portfolios, they enter the asset return generating process as deviations from their conditional expected value (See Shanken (1992)). In order to test the sensitivity of our results to the model misspecification that arises because ΔTerm,ΔUSD/NOK, and ΔBrent are not measured as the deviation from their respective expectations, the regressions are also run with ΔTerm,ΔUSD/NOK, and ΔBrent measured as the deviation from the time-series mean. The results using this specification are virtually identical.

reject the hypothesis that betas are constant over time. The betas reported in the columns marked RM, ΔTerm, ΔUSD/NOK, and ΔBrent in Table 10 and 11 are computed as $\hat{b}_{p0} + \hat{b}_{p1}\overline{Z}$, where $\overline{Z}$ contain the time series means of the information variables, $\hat{b}_{p0}$ is the estimate of b_{p0}, and $\hat{b}_{p1}$ is the estimate of b_{p1}.[23] The p-values for the betas are from an F-test of the null that the scalar b_{j0p} and the L-vector b_{j1p} $(j = 1, \dots K)$ are both zero.

Column two of Table 10 reports Jensen's alpha for the portfolios. The alphas measures the average monthly abnormal return in percent. Thus, the 0.7% average monthly abnormal return for value weighted standby rights issuers represent a three-year abnormal return of about 29%. The portfolios of rights issuers have positive alphas, indicating that these are overperforming relative to the benchmark. However, except for the value-weighted standby rights issuer portfolio, the alphas are not different from zero at conventional levels of statistical significance. The evidence of no abnormal performance for rights issuers are reinforced by the results for the zero-investment portfolios. The zero-investment portfolios have positive but statistically insignificant alphas.[24]

Turning to the private placements portfolios, Table 10 shows some evidence of underperformance. The equally-weighted issuer portfolio and the equally-weighted zero-investment portfolios both show evidence of statistically significant underperformance for private placements. The equally-weighted private placement portfolio underperform the factor model benchmark by 0.91% on average over the sample period. This is comparable to a three-year abnormal holding period return of about −39%. The 1.0% average monthly abnormal return for the equally-weighted zero investment portfolio show that most of this abnormal performance is generated by the short position in the issuing firms. The performance of the private placements change dramatically when the portfolio returns are computed using value-weights. The issuer portfolio now show a positive alpha (an insignificant 0.33%) and the abnormal performance of the zero-investment portfolio is dramatically reduced.

Panel (a) and (b) of Table 11 report the performance of portfolios constructed based on the current shareholder takeup. Firms with below median takeup is placed in one portfolio while firms

[23] The mean of the January dummy have no economic meaning. Replacing the mean with zero or one have virtually no effect on the results.

[24] These results are consistent with evidence on long-run performance of SEOs by firms listed on the New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX) reported by Eckbo, Masulis, and Norli (2000). Using a multi-factor model with macroeconomic factors, Eckbo, Masulis, and Norli (2000) find no evidence of abnormal long-run performance for SEOs over the period 1963–1998.

with above median takeup is placed in another portfolio. Using either equal or value-weights, both below-median and above-median portfolios show positive abnormal performance (significant at the 5% level for the value weighted portfolios.) In order to test whether or not the below-median portfolio have performance significantly different from the performance of the above-median portfolio, a zero-investment portfolio is constructed by selling the above-median portfolio short and use the proceeds to finance a long position in the below-median portfolio. As shown in panel (c) of Table 11, one cannot reject the hypothesis that the equally and value-weighted zero-investment portfolios have normal returns.

In sum, we fail to reject the hypothesis of zero abnormal post-issue performance for any of the three offer-type portfolios or for the takeup-grouped portfolios. This result, which is robust with respect to the estimation technique, fails to support the overconfidence hypothesis, and places confidence in our announcement-induced abnormal returns as unbiased estimates of the economic effect of the equity issue announcements.

5 Conclusions

Myers and Majluf (1984) provide insights into the equity issue decision that receive substantial empirical support in studies of seasoned equity offerings in the US. However, their model does not anticipate the positive market reaction to seasoned equity issue announcements often reported in international studies, nor is it designed to explain firms' choices among alternative equity-selling mechanisms. Preserving key aspects of the original Myers-Majluf framework, we formalize the equity-flotation choice using a multistage flotation game. We show that there exists a pooling equilibrium in which the issue announcement conveys positive news to the market. We then estimate the market reaction to seasoned equity offerings on the Oslo Stock Exchange using the full set of flotation methods observed in that market. The market reaction is non-negative across flotation methods, and significantly positive for uninsured rights and private placements.

In our flotation game, the menu of flotation methods contains uninsured rights, rights with standby underwriting, and fully guaranteed offering which we refer to as a private placement. The order in which these flotation methods are tried out is determined endogenously. The pooling equilibrium implies a flotation method preference ordering (akin to a pecking order) that depends on expected shareholder takeup (k): High-k firms use uninsured rights (with minimal wealth transfer). Medium- and low-k firms start the issue process with quality inspection. Medium-k issuers prefer the standby method but move on to private placement if the underwriter rejects the issue, and vice versa for low-k issuers. As the issue game progresses, the menu of flotation methods narrows until the firm either accepts uninsured rights (having been rejected by both the underwriter and the private placement investor) or abandons the issue.

In the empirical part of the paper, we present an event study of the market reaction to seasoned equity offerings on the Oslo Stock Exchange. The sample is useful because it includes *all* flotation methods observed in this equity market, providing a meaningful comparison of the average market reaction across uninsured rights, standby rights and private placements. Several interesting results emerge. First, the observed shareholder takeup levels preserve the theoretical rank ordering, with only the highest-k issuers selecting uninsured rights. This is consistent with the levels of shareholder takeup for US rights issues reported by Eckbo and Masulis (1992) as well.

Second, the market reaction is non-negative across *all* offering categories, a finding that is unique to the empirical literature. Third, the market reaction is significantly positive for private placements. This is consistent with our pooling equilibrium where low-k issuers prefer private placement and survive inspection. Elsewhere in the literature, private placements are typically also associated with a positive market reaction, e.g., Wruck (1989) and Hertzel and Smith (1993) on US data, and Wu and Wang (2003) in Hong Kong. Interestingly, we also find that the offer price in private placements on the OSE typically are at a *premium* relative to the stock price shortly before the issue announcement, which contrasts with the evidence of a discount typically reported by studies of other markets, and in particular in the US (Barclay, Holderness, and Sheehan (2003)).

Fourth, we also document a significantly positive market reaction to uninsured rights offers. In the pooling equilibrium, this market reaction is predicted to be zero: high-k issuers all prefer this method and since there is no issue inspection, there is also no information conveyed to the market. A positive market reaction is, however, consistent with the joint hypothesis of our pooling equilibrium and prior market expectations of adverse selection in issue markets. Adverse selection reduces the market value of all firms relative to the first-best investment policy. Since the announcement of an uninsured rights issue by high-k firm causes the market to impound in the issuer's stock price the present value of the investment project also in the high-value state, the issuer's stock price will be revised upwards. Our finding of positive market reaction to uninsured rights is typical for studies of smaller equity markets, e.g. Loderer and Zimmermann (1987) (Switzerland), Kang (1990) (Korea), Tan, Chng, and Tong (2002) (Singapore), and Cronquist and Nilsson (2003) (Sweden).

Finally, we address two alternative hypotheses that propose a different interpretation to some of our empirical findings. First, if private placements result in greater shareholder concentration and monitoring, then the positive announcement-period abnormal return reflects a reduction in agency costs and not necessarily the information content depicted by our issue game. However, we find no evidence that the announcement effect is greater for the subsample of private placements with the greater increase in shareholder concentration over the year of the issue. Second, the positive market reaction may reflect overconfidence on the part of investors, and thus represent biased estimates of the true information content in the issue announcement. This hypothesis implies some degree of price reversal in the period following the equity issue. We construct an empirical factor-model for the OSE and examine average returns to a portfolio strategy involving shorting the stock of issuing firms and investing in non-issuers matched on firm size and book-to-market ratio. We fail to reject the hypothesis of zero post-issue abnormal performance to equity issuers on the OSE.

A Proofs of propositions

A.1 Proof of proposition 2

The equilibrium flotation method path is $\{pp,\ sr,\ ur\}$. In this equilibrium, when the issuer approaches the market to do an uninsured rights offering, the market knows that the issuer has been rejected twice by inspections. Moreover, the underwriter knows the issuer has been rejected once, and the private investor knows that the issuer will try a private placement first. Thus, the beliefs are:

$$\begin{aligned}
\mu(pp,sr,ur) &= \frac{(1-q)^2(1-p)}{q^2p+(1-q)^2(1-p)} \\
\psi(pp) &= \frac{q(1-p)}{(1-q)p+q(1-p)} \\
\psi(pp,sr) &= 1-p
\end{aligned} \tag{16}$$

Define $\psi' \equiv \psi(pp)$, $\psi \equiv \psi(pp,sr)$ and $\mu \equiv \mu(pp,sr,ur)$. Total issue costs for the flotation methods in $\{pp,\ sr,\ ur\}$ are:

$$\begin{aligned}
C'_{pp} &= d_{pp} + \frac{\alpha a_2(1-\delta k)(1-\beta)(1-\psi')}{\beta+(1-\beta)\psi'+(1+\eta-\rho_{pp})\alpha} \\
C_{sr} &= d_{sr} + \frac{\alpha a_2(1-k)(1-\beta)(1-\psi)}{\beta+(1-\beta)\psi+(1+\eta-\rho_{sr})\alpha} \\
C_{ur} &= d_{ur} + \frac{\alpha a_2(1-k)(1-\beta)(1-\mu)}{\beta+(1-\beta)\mu+(1+\eta-\rho_{ur})\alpha}
\end{aligned} \tag{17}$$

The corresponding incentive constraints for the first stage of the game are:

$$\begin{aligned}
qC'_{pp}+(1-q)\left[qC_{sr}+(1-q)C_{ur}\right] &\leq qC_{sr}+(1-q)\left[qC'_{pp}+(1-q)C_{ur}\right] \\
qC'_{pp}+(1-q)\left[qC_{sr}+(1-q)C_{ur}\right] &\leq qC'_{pp}+(1-q)C_{ur} \\
qC'_{pp}+(1-q)\left[qC_{sr}+(1-q)C_{ur}\right] &\leq qC_{sr}+(1-q)C_{ur} \\
qC'_{pp}+(1-q)\left[qC_{sr}+(1-q)C_{ur}\right] &\leq C_{ur}
\end{aligned} \tag{18}$$

Using the assumption that inspection is informative, these conditions reduce down to:

$$C_{pp} \leq C_{sr} \leq C_{ur} \tag{19}$$

If the private investor concludes the inspection with "low value", the issuer attempts a standby rights offer. The incentive constraint at this stage of the game simplifies to $C_{sr} \leq C_{ur}$. At the final stage of the game, only the participation constraint ($b \geq C_{ur}$) remains. Thus, the path $\{pp,\ sr,\ ur\}$ is an equilibrium if:

$$C'_{pp} \leq C_{sr} \leq C_{ur} \leq b. \tag{20}$$

The corresponding restrictions on shareholder takeup is derived by solving the inequalities $C_{pp} \leq C_{sr}$, $C_{sr} \leq C_{ur}$, and $b \geq C_{ur}$ for k:

$$\begin{aligned}
k_{2pp} &= \frac{\dfrac{d_{pp} - d_{sr}}{\alpha a_2(1-\beta)} + \dfrac{1-\psi}{v_{sr}} - \dfrac{1-\psi'}{v'_{pp}}}{\dfrac{1-\psi}{v_{sr}} - \dfrac{1-\psi'}{v'_{pp}}\delta} \\
k_{2sr} &= 1 - \frac{d_{sr} - d_{ur}}{\alpha a_2(1-\beta)\left[\dfrac{1-\mu}{v_{ur}} - \dfrac{1-\psi}{v_{sr}}\right]} \qquad (21) \\
k_{2b} &= 1 - \frac{(b - d_{ur})v_{ur}}{\alpha a_2(1-\beta)(1-\mu)}
\end{aligned}$$

where

$$\begin{aligned}
v'_{pp} &= \beta + (1-\beta)\psi' + (1+\eta-\rho_{pp})\alpha \\
v_{sr} &= \beta + (1-\beta)\psi + (1+\eta-\rho_{sr})\alpha \qquad (22) \\
v_{ur} &= \beta + (1-\beta)\mu + (1+\eta-\rho_{pp})\alpha
\end{aligned}$$

■

A.2 Proof of proposition 3

Beliefs In this proposition, the equilibrium flotation method path is $\{sr,\ pp,\ ur\}$. In equilibrium, the market knows that the issuer has been rejected twice when approached with an uninsured rights offering; the private investor knows that the issue failed at the standby rights stage; and the underwriter knows the issuer will try standby rights first. The following beliefs are consistent with the equilibrium strategy:

$$\begin{aligned}
\mu(pp, sr, ur) &= \frac{(1-q)^2(1-p)}{q^2 p + (1-q)^2(1-p)} \\
\psi(sr) &= \frac{q(1-p)}{(1-q)p + q(1-p)} \qquad (23) \\
\psi(sr, pp) &= 1 - p
\end{aligned}$$

Define $\psi' \equiv \psi(sr)$, $\psi \equiv \psi(sr, pp)$ and $\mu \equiv \mu(pp, sr, ur)$. Total issue costs for the flotation methods in $\{sr,\ pp,\ ur\}$ are:

$$\begin{aligned}
C_{pp} &= d_{pp} + \frac{\alpha a_2(1-\beta)(1-\psi)}{\beta + (1-\beta)\psi + (1+\eta-\rho_{pp})\alpha} \\
C'_{sr} &= d_{sr} + \frac{\alpha a_2(1-k)(1-\beta)(1-\psi')}{\beta + (1-\beta)\psi' + (1+\eta-\rho_{sr})\alpha} \qquad (24) \\
C_{ur} &= d_{ur} + \frac{\alpha a_2(1-k)(1-\beta)(1-\mu)}{\beta + (1-\beta)\mu + (1+\eta-\rho_{ur})\alpha}.
\end{aligned}$$

By an argument analogous to the proof of proposition 2, the binding participation constraint is $b \geq C_{ur}$, and the incentive constrains simplify to $C'_{sr} \leq C_{pp} \leq C_{ur}$. The restrictions on shareholder takeup is derived by solving the inequalities $C'_{sr} \leq C_{pp}$, $C_{pp} \leq C_{ur}$, and $b \geq C_{ur}$ for k:

$$\begin{aligned}
k_{3pp} &= \frac{\dfrac{d_{pp} - d_{sr}}{\alpha a_2(1-\beta)} + \dfrac{1-\psi}{v_{pp}} - \dfrac{1-\psi'}{v'_{sr}}}{\dfrac{1-\psi}{v_{pp}}\delta - \dfrac{1-\psi'}{v'_{sr}}} \\
k_{3sr} &= \frac{\dfrac{d_{ur} - d_{pp}}{\alpha a_2(1-\beta)} + \dfrac{1-\mu}{v_{ur}} - \dfrac{1-\psi}{v_{pp}}}{\dfrac{1-\mu}{v_{ur}} - \dfrac{1-\psi}{v_{pp}}\delta} \qquad (25) \\
k_{3b} &= 1 - \frac{(b - d_{ur})v_{ur}}{\alpha a_2(1-\beta)(1-\mu)}
\end{aligned}$$

where

$$\begin{aligned} v_{pp} &= \beta+(1-\beta)\psi+(1+\eta-\rho_{pp})\alpha \\ v'_{sr} &= \beta+(1-\beta)\psi'+(1+\eta-\rho_{sr})\alpha \\ v_{ur} &= \beta+(1-\beta)\mu+(1+\eta-\rho_{pp})\alpha \end{aligned} \tag{26}$$

■

A.3 Proof of proposition 4

The expected costs for the three equilibria $\{ur\}$, $\{pp,\ sr,\ ur\}$, and $\{sr,\ pp,\ ur\}$ are, respectively

$$\begin{aligned} \{ur\}: &\quad C'_{ur} \\ \{pp,sr,ur\}: &\quad qC'_{pp}+(1-q)\left[qC_{sr}+(1-q)C_{ur}\right] \\ \{sr,pp,ur\}: &\quad qC'_{sr}+(1-q)\left[qC_{pp}+(1-q)C_{ur}\right] \end{aligned} \tag{27}$$

Define:

$$\begin{aligned} U &= \frac{\alpha a_2(1-\beta)(1-\mu)}{\beta+(1-\beta)\mu+(1+\eta-\rho_{ur})\alpha} \\ U' &= \frac{\alpha a_2(1-\beta)p}{\beta+(1-\beta)(1-p)+(1+\eta-\rho_{ur})\alpha} \\ P &= \frac{\alpha a_2(1-\beta)(1-\psi)}{\beta+(1-\beta)\psi+(1+\eta-\rho_{pp})\alpha} \\ P' &= \frac{\alpha a_2(1-\beta)(1-\psi')}{\beta+(1-\beta)\psi'+(1+\eta-\rho_{pp})\alpha} \\ S &= \frac{\alpha a_2(1-\beta)(1-\psi)}{\beta+(1-\beta)\psi+(1+\eta-\rho_{sr})\alpha} \\ S' &= \frac{\alpha a_2(1-\beta)(1-\psi')}{\beta+(1-\beta)\psi'+(1+\eta-\rho_{sr})\alpha} \end{aligned} \tag{28}$$

The takeup threshold level k_{4pp} is derived by comparing expected costs in $\{pp,\ sr,\ ur\}$ and $\{sr,\ pp,\ ur\}$:

$$qC'_{pp}+(1-q)\left[qC_{sr}+(1-q)C_{ur}\right] \leq qC'_{sr}+(1-q)\left[qC_{pp}+(1-q)C_{ur}\right] \tag{29}$$

Using the above definitions and solving for k, we get:

$$k \leq \frac{q(d_{sr} - d_{pp}) + S' - P' - (1-q)(S-P)}{S' - \delta P' - (1-q)(S - \delta P)} \equiv k_{4pp} \tag{30}$$

The takeup threshold level k_{4sr} is derived by comparing expected costs in $\{ur\}$ and $\{sr,\ pp,\ ur\}$:

$$C'_{ur} \leq qC'_{sr} + (1-q)\left[qC_{pp} + (1-q)C_{ur}\right] \tag{31}$$

Using the above definitions and solving for k, we get:

$$k \geq \frac{[1-(1-q)^2]d_{ur} - qd_{sr} - (1-q)qd_{pp} - qS' - (1-q)qP - (1-q)^2U + U'}{U' - qS' - (1-q)q\delta P - (1-q)^2 Y} \equiv k_{4sr}. \tag{32}$$

■

References

Asquith, Paul, and David W. Mullins, Jr., 1986, Equity issues and offering dilution, *Journal of Financial Economics* 15, 61–89.

Barclay, Michael, Clifford Holderness, and Dennis Sheehan, 2003, Private placements and managerial entrenchment, Working paper, University of Rochester.

Bøhren, Øyvind, B. Espen Eckbo, and Dag Michalsen, 1997, Why underwrite rights offerings? Some new evidence, *Journal of Financial Economics* 46, 223–261.

Bradley, Michael, and L.M. Wakeman, 1983, The wealth effects of targeted share repurchases, *Journal of Financial Economics* 11, 301–328.

Breeden, Douglas T., Michael R. Gibbons, and Robert H. Litzenberger, 1989, Empirical tests of the consumption-oriented capm, *Journal of Finance* 44, 231–262.

Chemmanur, Thomas J., and Paolo Fulghieri, 1999, A theory of the going-public decision, *Review of Financial Studies* 12, 249–279.

Cooney, Jr., John W., and Avner Kalay, 1993, Positive information from equity issue announcement, *Journal of Financial Economics* 33, 149–172.

Cronquist, Henrik, and Mattias Nilsson, 2003, The choice between rights offerings and private equity placements, Unpublished working paper, The Ohio State University.

Daniel, Kent, David Hirshleifer, and Avanidhar Subrahmanyam, 1998, Investor psychology and security market under- and overreactions, *Journal of Finance* 53, 1839–1885.

Dann, L. Y, and W. H Mikkelson, 1984, Convertible debt issuance, capital structure change and financing-related information: Some new evidence., *Journal of Financial Economics* 13, 157–186.

Dybvig, Philip H., and Jamie F. Zender, 1991, Capital structure and dividend irrelevance with asymmetric information, *Review of Financial Studies* 4, 201–219.

Eckbo, B. Espen, 1986, Valuation effects of corporate debt offerings, *Journal of Financial Economics* 15, 119–151.

——— , and Ronald W. Masulis, 1992, Adverse selection and the rights offer paradox, *Journal of Financial Economics* 32, 293–322.

——— , and Øyvind Norli, 2000, Seasoned public offerings: Resolution of the 'new issues puzzle', *Journal of Financial Economics* 56, 251–291.

Eckbo, B. Espen, Ronald W. Masulis, and Øyvind Norli, 2005, Security offerings and corporate timing, in B. E. Eckbo, ed.: *Handbook of Corporate Finance: Empirical Corporate Finance* . chap. 13 (Elsevier/North-Holland).

Eckbo, B. Espen, and Øyvind Norli, 2004, Liquidity risk, leverage and long-run IPO returns, *Journal of Corporate Finance* forthcoming.

Eckbo, B. Espen, and David C. Smith, 1998, The conditional performance of insider trades, *Journal of Finance* 53, 467–498.

Evans, Martin D. D., 1994, Expected returns, time-varying risk, and risk premia, *Journal of Finance* 49, 655–679.

Ferson, Wayne E., and Campbell R. Harvey, 1991, The variation of economic risk premiums, *Journal of Political Economy* 99, 385–415.

Ferson, Wayne E., and Rudi W. Schadt, 1996, Measuring fund strategy and performance in changing economic conditions, *Journal of Finance* 51, 425–461.

Frank, Murray Z., and Vidhan K. Goyal, 2005, Trade-off and pecking order theories and debt, in B. E. Eckbo, ed.: *Handbook of Corporate Finance: Empirical Corporate Finance* . chap. 7 (Elsevier/North-Holland).

Giammarino, Ronald M., and Tracy Lewis, 1988, A theory of negotiated equity financing, *Review of Financial Studies* 1, 265–288.

Heinkel, Robert, and Eduardo S. Schwartz, 1986, Rights versus underwritten offerings: An asymmetric information approach, *Journal of Finance* 41, 1–18.

Hertzel, Michael, Mike Lemmon, Jim Linck, and Lynn Rees, 2002, "long-run performance following private placements of equity, *Journal of Finance* 57, 2595 – 2617.

Hertzel, Michael, and Richard L. Smith, 1993, Market discounts and shareholder gains for placing equity privately, *Journal of Finance* 48, 459–485.

Jegadeesh, Narasimhan, 2000, Long-run performance of seasoned equity offerings: Benchmark errors and biases in expectations, *Financial Management* 29, 5–30.

Kang, H., 1990, Effects of seasoned equity offerings in Korea on shareholder's wealth, in S. Rhee, and R. Chang, ed.: *Pacific-Basin Capital Markets Research* (North-Holland).

Kang, Jun-Koo, and René Stulz, 1996, How different is japanese corporate finance? an investigation of the information content of new security issues, *Review of Financial Studies* 9, 109–139.

Kreps, D., and R. Wilson, 1982, Reputation and imperfect information, *Journal of Economic Theory* 27, 280–312.

Lehmann, Bruce N., and David M. Modest, 1988, The empirical foundations of the arbitrage pricing theory, *Journal of Financial Economics* 21, 213–254.

Loderer, Claudio F., and Heinz Zimmermann, 1987, Stock offerings in a different institutional setting: The swiss case, *Journal of Banking and Finance* 12, 353–377.

Loughran, Tim, and Jay R. Ritter, 1995, The new issues puzzle, *Journal of Finance* 50, 23–51.

Masulis, R. W., and A. N. Korwar, 1986, Seasoned equity offerings: An empirical investigation, *Journal of Financial Economics* 15, 91–118.

Mikkelson, Wayne H., and M. Megan Partch, 1986, Valuation effects of security offerings and the issuance process, *Journal of Financial Economics* 15, 30–60.

Myers, Stewart C., 1984, The capital structure puzzle, *Journal of Finance* 39, 575–592.

——— , and Nicholas S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187–221.

Ross, Stephen, 1977, The determination of financial structure: The incentive signalling approach, *Bell Journal of Economics* 8, 23–40.

Shanken, Jay, 1992, On the estimation of beta-pricing models, *Review of Financial Studies* 5, 1–33.

Tan, Ruth S.K., P.L. Chng, and Y.H. Tong, 2002, Private placements and rights issues in Singapore, *Pacific-Basin Finance Journal* 10, 29–54.

White, Halbert, 1980, A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity, *Econometrica* 48, 817–838.

Wruck, Karen Hopper, 1989, Equity ownership concentration and firm value: Evidence from private equity financings, *Journal of Financial Economics* 23, 3–28.

Wu, Xueping, and Zheng Wang, 2003, Understandingthe positive announcement effects of private equity placements: New insights from hong kong data, Working paper, City University of Hong Kong.

——— , 2004, Equity financing in a Myers-Majluf framework with private benefits of control, *Journal of Corporate Finance* forthcoming.

Figure 1
The game between equity issuers and investors

The game proceed to a new subgame if the bargaining between issuer and investor fails. If the bargaining succeed or either the not issue or the uninsured rights offering is chosen, the game ends.

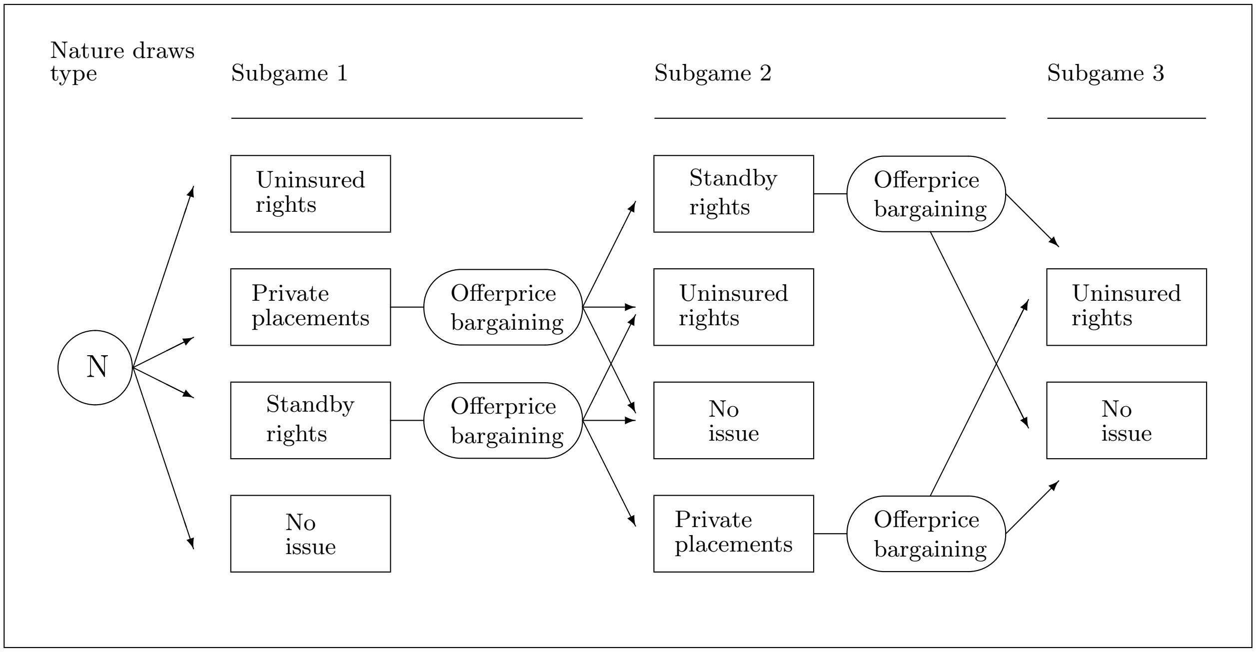
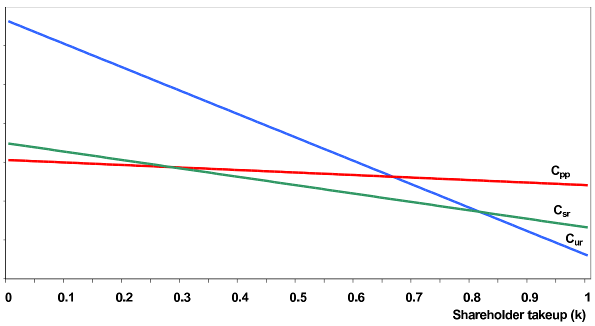
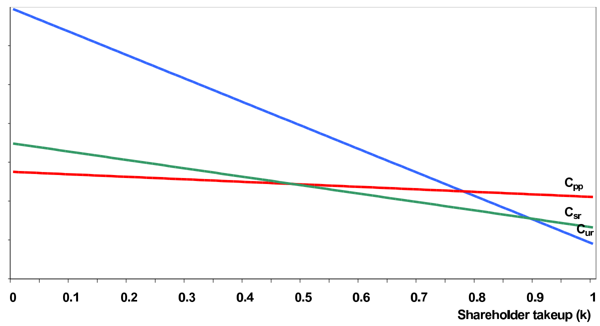


Figure 2
Sequential equilibria and shareholder takeup.

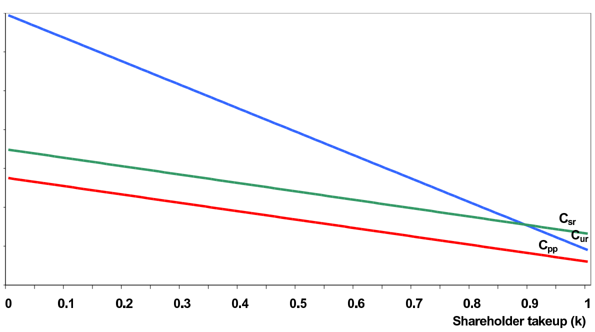
A. Inspection technology is such that $q = 0.8$, direct costs as a percentage of issue proceeds is assumed to be $\rho_{ur} = 0.02$, $\rho_{pp} = 0.03$, and $\rho_{sr} = 0.044$, and shareholder takeup in a private placement is assumed to be 30% of the takeup that would have materialized in a rights offering ($\gamma = 0.3$).



B. Inspection technology is such that $q = 0.8$, direct costs as a percentage of issue proceeds is assumed to be $\rho_{ur} = 0.03$, $\rho_{pp} = 0.02$, and $\rho_{sr} = 0.044$, and shareholder takeup in a private placement is assumed to be 30% of the takeup that would have materialized in a rights offering ($\gamma = 0.3$).



C. Inspection technology is such that $q = 0.8$, direct costs as a percentage of issue proceeds is assumed to be $\rho_{ur} = 0.03$, $\rho_{pp} = 0.02$, and $\rho_{sr} = 0.044$, and shareholder takeup in a private placement is assumed to be 100% of the takeup that would have materialized in a rights offering ($\gamma = 1.0$).



D. Inspection technology is such that $q = 0.5$, direct costs as a percentage of issue proceeds is assumed to be $\rho_{ur} = 0.02$, $\rho_{pp} = 0.03$, and $\rho_{sr} = 0.044$, and shareholder takeup in a private placement is assumed to be 30% of the takeup that would have materialized in a rights offering ($\gamma = 0.3$).

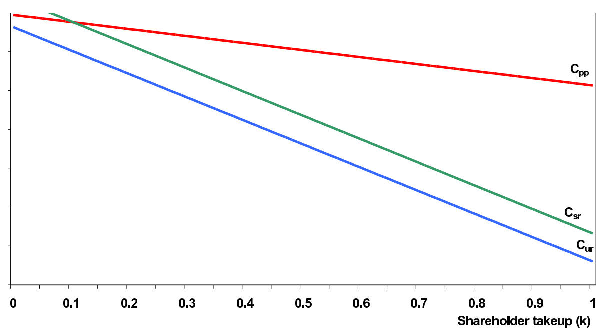


Figure 3
Pareto dominating equilibria.

Inspection technology is such that $q = 0.8$, direct costs as a percentage of issue proceeds is assumed to be $\rho_{ur} = 0.02$, $\rho_{pp} = 0.03$, and $\rho_{sr} = 0.044$, and shareholder takeup in a private placement is assumed to be 30% of the takeup that would have materialized in a rights offering ($\gamma = 0.3$). The other parameters are as in Table 1.

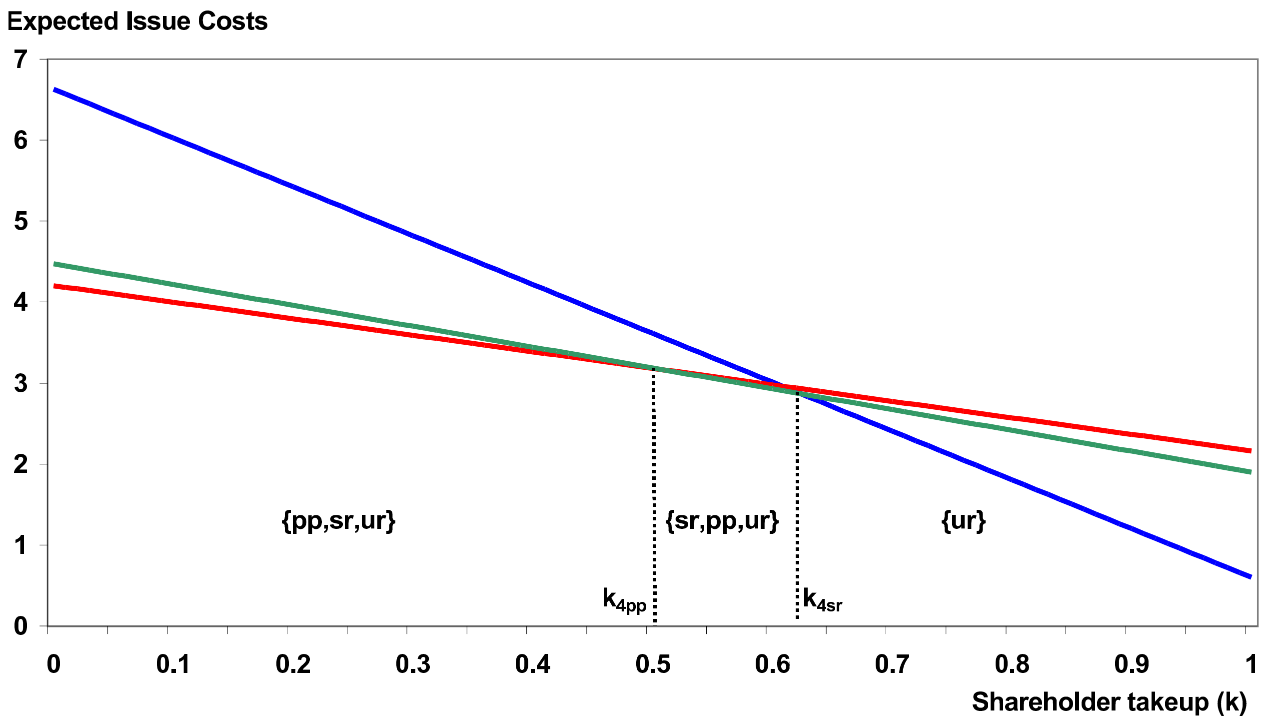


Table 1
Numerical illustration of the equilibrium in Proposition 2

The inspection performed by the private investor and the underwriter is informative and symmetric. The direct costs are highest for standby rights and lowest for private placements. The probability private investors and underwriters put on facing each type is consistent with Bayes' rule using the prior distribution, the inspection ability, and the equilibrium strategy.

A. Exogenous parameters

Types	Prior	Inspection	Direct costs	Investment	Project NPV
$a_1 = 59$	$p(a_1) = 0.5$	$q(a_1 \mid a_1) = 0.80$	$d_{pp} = 0.60$	30	11
$a_2 = 109$	$p(a_2) = 0.5$		$d_{ur} = 0.90$		
			$d_{sr} = 1.32$		
$k = 0.4$					
$\gamma = 0.3$					

B. Equilibrium beliefs

			Inspection concludes			
			Type a_1		Type a_2	
Subgame	Type	Before inspection	Before offer	After offer	Before offer	After offer
Private placement	a_1	0.5	0.8	1.0	0.2	0.2
Private placement	a_2	0.5	0.2	0.0	0.8	0.8
Standby rights	a_1	0.8	0.941	1.0	0.5	0.5
Standby rights	a_2	0.2	0.059	0.0	0.5	0.5
Uninsured rights	a_1	0.941				
Uninsured rights	a_2	0.059				

C. Costs and reservation prices

			Inspection concludes			
			Type a_1		Type a_2	
Subgame	Type	Expected costs if rejected	Investor's expected value	Issue costs	Investor's expected value	Issue costs
Private placement	a_1	−0.40	99.10	0.90	139.40	−6.69
Private placement	a_2	5.74	99.10	14.21	139.40	2.79
Standby rights	a_1	0.08	98.68	1.32	123.68	−2.31
Standby rights	a_2	8.88	98.68	10.44	123.68	4.96

Subgame	Type	Expected costs if rejected	Investor's expected value	Issue costs
Uninsured rights	a_1	11	102.34	0.08
Uninsured rights	a_2	11	102.34	8.88

Table 2
Number of seasoned equity offerings by OSE-listed firms in the sample, 1980–1996

				Public equity offerings[a]			Private placements[b]	
Year	Number of offerings in percent of number of firms	Number of firms	Total number of offerings	Total	Standby rights	Uninsured rights	Including mergers	Excluding mergers[c]
1980	3.2	124	4	4	0	4	–	–
1981	11.2	116	13	13	4	9	–	–
1982	16.9	118	20	20	2	18	–	–
1983	24.4	119	29	29	9	20	–	–
1984	18.9	148	28	24	14	10	4	2
1985	19.0	163	31	24	13	11	7	3
1986	14.2	155	22	14	10	4	8	7
1987	8.9	146	13	8	7	1	5	4
1988	16.4	134	22	10	10	0	12	12
1989	30.2	129	39	21	19	2	18	14
1990	24.0	121	29	9	9	0	20	12
1991	17.0	112	19	6	6	0	13	11
1992	11.4	123	14	9	9	0	5	4
1993	23.7	131	31	14	13	1	17	16
1994	16.4	134	22	11	11	0	11	9
1995	12.3	163	20	4	4	0	16	16
1996	14.5	173	25	8	8	0	17	16
Sum	16.5	2309	381	228	148	80	153	126

[a]The sample includes the 200 rights offerings compiled by Bøhren, Eckbo, and Michalsen (1997)

[b]The sample excludes placements that are part of an employee stock ownership plan.

[c]This subsample excludes private placements followed by a merger or takeover involving the issuer within one year of the placement.

Table 3
Descriptive statistics for seasoned equity offerings by OSE-listed firms in the sample, 1980–1996

	Total	Public equity offerings Total	Standby rights	Uninsured rights	Private placements
(a) Issue and issuer characteristics					
Number of issues[a] The	381	228	148	80	153
Amount offered (NOK millions)	136	146	190	65	120
Market value of equity (NOK millions)	749	667	856	316	870
Book-to-market ratio	1.01	1.15	1.22	1.04	0.79
(b) Ownership characteristics[b]					
Percent holding by the ten largest owners at the beginning of the issue year	–	–	57.42 (81)	56.77 (19)	64.96 (77)
Percent holding by the ten largest owners at the end of the issue year	–	–	57.95 (98)	47.89 (28)	65.81 (66)
Percent holding by insiders[c] at the beginning of the issue year	–	–	8.31 (115)	6.35 (66)	18.13 (88)
Percent holding by insiders at the end of the issue year	–	–	6.16 (117)	4.99 (74)	15.44 (74)

[a]The 228 public issues involving rights are made by a total of 116 different OSE-listed firms, for an average of 2.0 over the sample period. The 153 private placements are made by a total of 91 different firms, with an average of 1.7 placements per form over the period. Of the different firms, 60 issues only once over the sample period.

[b]Ownership information is from the companies annual reports. Numbers in parentheses are number of observations

[c]Insiders include the CEO and members of the board of directors

Table 4
Current shareholder takeup in seasoned equity offerings by OSE-listed firms in the sample, 1980–1996

Takeup is defined as the fraction of the issue acquired by the old shareholders. Assuming that each warrants issued in a rights offering only is traded once, takeup is proxied by one minus the fraction of warrants sold in the secondary market.

	N	Mean	STD	90%	75%	50%	25%	10%
(a) All issues								
Uninsured rights	80	94.38	7.03	98.89	97.99	96.43	93.44	89.63
Standby rights	148	84.81	17.14	99.27	96.34	91.47	79.68	61.17
Total	228	88.17	15.11	99.08	97.34	93.93	84.77	69.40
(b) Issues with below median takeup								
Uninsured rights	24	87.68	9.91	93.60	93.19	91.78	87.74	74.64
Standby rights	90	76.76	17.76	92.48	89.68	81.52	70.82	52.65
Total	114	79.06	16.98	93.43	91.51	84.77	73.11	55.27
(c) Issues with above median takeup								
Uninsured rights	56	97.24	1.41	99.08	98.24	97.32	96.28	95.19
Standby rights	58	97.31	2.05	1.00	99.27	97.40	95.33	94.51
Total	114	97.28	1.76	1.00	98.00	97.34	95.80	94.98

Table 5
Average pre-announcement date run-up and announcement-day abnormal returns to OSE-listed firms making public and private equity offerings, 1980–1996

Six month run-up and announcement day abnormal returns for issuer i are computed using the following market model:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \sum_{j=1}^{2} \delta_{ij} d_{jt} + \epsilon_{it},$$

where r_{it} is daily return on firm i, r_{mt} is daily return on a value weighted market portfolio of all OSE-listed firms. The estimation period is a total of 471 trading dates, starting on trading day -310 relative to the announcement date and ending on trading day +160 relative to the announcement date. The dummy variable d_{1t} takes on a value of one on trading days -130 through -4. The dummy variable d_{2t} takes on a value of one in either a two-day or a four-day window ending at the announcement day. The percentage abnormal return for a ω-day event window is $\omega \times \delta_{ij} \times 100$. Under the null hypothesis of zero abnormal return, the following test statistic converge in distribution to the standard normal

$$z_j = \frac{1}{\sqrt{N}} \sum_{i=1}^{N} \frac{\hat{\delta}_{ij}}{\hat{\sigma}_{ij}}.$$

Where $\hat{\delta}_{ij}$ is the OLS estimate of δ_{ij}, and $\hat{\sigma}_{ij}$ is the standard error of this estimate. Returns are continuously compounded. The parentheses contain number of observations and p-values. The p-values are for two-sided tests.

	Public equity offerings		Private placements	
	Standby rights	Uninsured rights	Including mergers	Excluding mergers
Six-months runup	4.60 (143; .004)	9.15 (76; .028)	18.52 (136; .000)	20.32 (112 : .000)
Two-day announcement return	−0.58 (143; .234)	0.95 (76; .088)	1.39 (136; .058)	1.00 (112 : .318)
Four-day announcement return	−0.55 (143; .502)	2.11 (76; .000)	2.66 (136; .022)	2.66 (112; .050)

Table 6
Average adjusted four-day announcement-day abnormal returns to OSE-listed firms making private equity offerings,1984–1996

The return to old shareholders due to the information effect can be measured using an adjusted abnormal return:

$$\mathrm{AAR} = \left(\frac{1}{1-\delta}\right)\mathrm{AR} - \left(\frac{\delta}{1-\delta}\right)\left(\frac{P_{\mathrm{Offer}} - P_{a-4}}{P_{a-4}}\right),$$

where δ is the fraction of the company owned by the new private investors after the private placements, P_{Offer} is the offer price, P_{a-4} is the market price four days prior to the announcement day, and AR is the four-day abnormal stock return. The sample trimming excludes extreme observations: weak trimming exclude observations with a discount less than 60% or a premium higher than 60%, the medium and strong trimming use 40% and 20% as cutoff percentages respectively.

	Including mergers					Excluding mergers				
Sample trimming	N	Prem	δ	AR	AAR	N	Prem	δ	AR	AAR
None	133	3.56	23.96	2.67	37.19	109	0.92	23.65	2.67	42.34
Weak $[-60\%, +60\%]$	115	0.41	20.79	1.81	5.85	94	0.81	20.13	1.49	5.58
Medium $[-40\%, +40\%]$	109	1.39	20.30	1.38	4.85	90	1.95	19.96	1.46	4.91
Strong $[-20\%, +20\%]$	87	0.70	17.99	1.07	2.29	72	1.06	16.60	1.37	1.79

Table 7
Ownership structure and abnormal announcement period returns for OSE-listed firms making private equity offerings,1984–1996

The regression variables CONC and INSIDE are shareholder concentration and insider holdings respectively. Shareholder concentration is measured as the percentage total shareholdings of the ten largest stockholders. Insider holdings include the shareholdings of the CEO and the board of directors. The regression in panel (b) uses the concentration and insider holdings from the beginning of the offering year.

(a) Change in shareholder concentration and average abnormal announcement period return

	Including mergers			Excluding mergers		
	Decreased shareholder concentration	Increased shareholder concentration	Test of difference (p-value)	Decreased shareholder concentration	Increased shareholder concentration	Test of difference (p-value)
Two-day announcement return	3.02	1.16	.403	3.34	1.62	.491
Four-day announcement return	4.23	2.75	.654	5.01	3.63	.696

(b) Regression: $AR = \delta_0 + \delta_1\text{CONC} + \delta_2\text{INSIDE}$

Dependent variable	δ_0	δ_1	δ_2	δ_0	δ_1	δ_2
Two-day announcement return	0.03 (.918)	−0.05 (.333)	0.097 (0.041)	0.04 (.260)	−0.06 (.287)	0.09 (.082)
Four-day announcement return	−0.01 (.831)	0.05 (.520)	0.04 (.532)	−0.00 (.999)	0.04 (.607)	0.05 (.537)

Table 8
Three-year buy-and-hold returns (%) to OSE-listed firms making public and private equity offerings, and their matched control sample, 1980–1993

The matches are chosen using size- and size/book-to-market matching. The size-matching is done using the equity market value of the issuer in the month prior to the issue announcement. Size/book-to-market matching is done by first selecting all companies that have an equity market value within 30% of that of the issuer. Then the company with the closest book-to-market value is chosen as the matched firm. Monthly book-to-market rankings in year t are created by dividing the end-of-year book-value from year $t-1$ with monthly market capitalizations for year t. Numbers in the columns marked "issuer" and "match" are computed using:

$$\frac{1}{N}\sum_{i=1}^{N}\left[\prod_{t=\tau_i}^{T_i}(1+R_{it})-1\right]\times 100$$

The p-values in the column marked $p(t)$ are p-values of the t-statistic using a two-sided test of no difference in average five-year buy-and-hold return for issuer and matched firms. The p-values in the column marked $p(N)$ are bootstrapped $p-$values of a two-sided test.

Issue type	N	Issuer	Match	Difference	$p(N)$	$p(t)$
(a) Size matching						
All public offerings	227	44.5	51.6	-7.1	0.640	0.458
All private placements	150	20.4	45.3	-24.9	0.078	0.080
Standby rights	147	31.8	45.5	-13.7	0.360	0.261
Uninsured rights	80	67.9	62.7	5.1	0.795	0.731
Below Median takeup	114	39.7	49.8	-10.1	0.548	0.461
Above Median takeup	113	49.3	53.4	-4.1	0.902	0.762
(b) Size- and book-to-market matching						
All public offerings	221	42.6	65.2	-22.6	0.080	0.033
All private placements	147	20.0	30.4	-10.4	0.302	0.390
Standby rights	143	30.9	53.1	-22.2	0.072	0.087
Uninsured rights	78	64.1	87.4	-23.3	0.296	0.193
Below Median takeup	111	38.8	56.1	-17.3	0.285	0.222
Above Median takeup	110	46.5	74.4	-27.9	0.089	0.077

Table 9
Summary statistics on risk factors and information variables used in the conditional factor models of expected returns

The excess return on the market portfolio (RM) is computed as the difference between the return on the Oslo Stock Exchange (OSE) total index and the return on 1-month NIBOR. The term structure factor (ΔTerm) is computed as the change in long-maturity government bonds (from OECD) and 3-month NIBOR. The exchange-rate factor (ΔUSD/NOK) is computed as the change in the NOK/USD exchange rate. The oil-price factor (ΔBrent) is the change in the Brent Blend (crude oil) spot price. The information variables are: The return on the Morgan Stanley World Index in excess of the return on the 1-month NIBOR (MSWI excess return), the dividend yield on the Morgan Stanley World Index (Dividend Yield), a dummy variable that takes on the value of one in January and zero otherwise (January Dummy), and real per capita growth rate of industrial production (Industrial Production Growth). Except for the January dummy, the numbers in panel (a) and (b) are percentages.

	Mean	Min	Max	Std.
(a) Risk factors in the conditional factor model				
RM	0.50	-26.59	20.20	6.29
ΔTerm	0.00	-0.29	0.36	0.06
ΔNOK/USD	0.23	-6.14	7.56	2.40
ΔBrent	0.37	-28.51	53.86	9.76
(b) Information variables Z_{t-1}				
MSWI excess return	0.31	-18.13	10.40	4.09
Dividend Yield	3.26	0.39	6.05	1.21
January dummy	8.06	0.00	1.00	27.28
Industrial Production Growth	-0.17	- 3.14	2.31	0.69
(c) Correlation matrix for risks in the conditional factor model				
	RM	ΔTerm	ΔNOK/USD	ΔBrent
RM	1.00			
ΔTerm	0.12	1.00		
ΔNOK/USD	0.07	0.02	1.00	
ΔBrent	0.14	-0.03	0.04	1.00

Table 10
Jensen's alpha for private and public equity issuer using a conditional multi-factor asset pricing model as an expected return benchmark

The four risk variables in r_m are the excess return on the market portfolio (RM) is computed as the difference between the return on the Oslo Stock Exchange (OSE) total index and the return on 1-month NIBOR. The term structure factor (ΔTerm) is computed as the change in long-maturity government bonds (from OECD) and 3-month NIBOR. The exchange-rate factor (ΔUSD/NOK) is computed as the change in the NOK/USD exchange rate. The oil-price factor (ΔBrent) is the change in the Brent Blend (crude oil) spot price. The information variables Z_{t-1} are listed in table 9. The model

$$r_{pt} = \alpha_p + b'_{p0} r_{mt} + b'_{p1}(Z_{t-1} \otimes r_{mt}) + e_{pt}$$

is estimated using OLS. Standard errors are computed using the heteroskedasticity consistent estimator of White (1980). The column labeled Adj.-R^2 contains adjusted R^2 for the regression. The numbers in parentheses are p-values.

		Betas at mean Z_{t-1}					
Portfolio[a]	$\hat{\alpha}_p$	RM	ΔTerm	ΔUSD/NOK	ΔBrent	Adj.-R^2	$F(Z)$
(a) Standby rights							
EW issuer	0.20 (0.551)	1.03 (0.000)	34.86 (0.000)	0.16 (0.080)	−0.05 (0.702)	0.684	0.003
VW issuer	0.70 (0.030)	1.15 (0.000)	7.55 (0.490)	0.21 (0.062)	−0.09 (0.151)	0.753	0.231
EW M−I	0.65 (0.154)	−0.19 (0.195)	−15.33 (0.104)	0.14 (0.948)	−0.04 (0.590)	0.035	0.756
VW M−I	0.34 (0.416)	−0.18 (0.050)	−5.08 (0.502)	−0.04 (0.480)	0.05 (0.205)	0.061	0.239
(b) Uninsured rights							
EW issuer	0.21 (0.730)	0.62 (0.000)	−2.95 (0.994)	−0.04 (0.631)	−0.08 (0.320)	0.198	0.563
VW issuer	0.59 (0.327)	0.72 (0.000)	−2.39 (0.942)	−0.08 (0.934)	−0.03 (0.647)	0.237	0.653
EW M−I	1.06 (0.130)	0.00 (0.005)	11.99 (0.773)	0.03 (0.791)	0.02 (0.688)	0.040	0.062
VW M−I	0.86 (0.261)	−0.06 (0.022)	8.84 (0.961)	−0.08 (0.710)	0.01 (0.423)	0.022	0.135
(c) Private placements							
EW issuer	−0.91 (0.038)	0.94 (0.000)	21.50 (0.031)	−0.08 (0.406)	0.02 (0.768)	0.567	0.361
VW issuer	0.33 (0.371)	1.16 (0.000)	5.37 (0.302)	0.01 (0.313)	−0.02 (0.385)	0.692	0.290
EW M−I	1.00 (0.051)	−0.10 (0.704)	−4.75 (0.584)	0.12 (0.294)	−0.08 (0.588)	-0.027	0.794
VW M−I	0.16 (0.782)	−0.16 (0.581)	−10.86 (0.057)	−0.13 (0.090)	−0.04 (0.472)	0.039	0.230

[a]Portfolios are either equal-weighted ('EW') or value-weighted ('VW'). The 'M−I' portfolios are zero-investment portfolios with a long position in the matched firms and a short position in the issuing firms.

Table 11

Jensen's alpha for portfolios of issuers with below and above median takeup using a conditional multi-factor asset pricing model as an expected return benchmark

The four risk variables in r_m are the excess return on the market portfolio (RM) is computed as the difference between the return on the Oslo Stock Exchange (OSE) total index and the return on 1-month NIBOR. The term structure factor (ΔTerm) is computed as the change in long-maturity government bonds (from OECD) and 3-month NIBOR. The exchange-rate factor (ΔUSD/NOK) is computed as the change in the NOK/USD exchange rate. The oil-price factor (ΔBrent) is the change in the Brent Blend (crude oil) spot price. The information variables Z_{t-1} are listed in table 9. The model

$$r_{pt} = \alpha_p + b'_{p0} r_{mt} + b'_{p1}(Z_{t-1} \otimes r_{mt}) + e_{pt}$$

is estimated using OLS. Standard errors are computed using the heteroskedasticity consistent estimator of White (1980). The column labeled Adj.-R^2 contains adjusted R^2 for the regression. The numbers in parentheses are p-values.

		Betas at mean Z_{t-1}					
Portfolio[a]	$\hat{\alpha}_p$	RM	ΔTerm	ΔUSD/NOK	ΔBrent	Adj.-R^2	$F(Z)$
(a) Below median takeup							
EW issuer	0.53 (0.188)	0.88 (0.000)	25.28 (0.000)	−0.03 (0.929)	−0.04 (0.640)	0.522	0.087
VW issuer	0.81 (0.032)	1.01 (0.000)	3.83 (0.505)	0.12 (0.647)	−0.07 (0.516)	0.629	0.006
(b) Above median takeup							
EW issuer	0.23 (0.545)	0.71 (0.000)	33.40 (0.000)	0.20 (0.007)	−0.06 (0.595)	0.443	0.018
VW issuer	0.90 (0.014)	0.82 (0.000)	10.13 (0.544)	−0.01 (0.489)	−0.08 (0.166)	0.498	0.663
(c) Zero investment portfolios (Above−Below)							
EW A−B	−0.29 (0.577)	−0.18 (0.107)	7.64 (0.536)	0.23 (0.032)	−0.02 (0.955)	0.022	0.280
VW A−B	0.06 (0.909)	−0.18 (0.005)	5.36 (0.898)	−0.12 (0.626)	−0.02 (0.900)	0.032	0.255

[a]Portfolios are either equal-weighted ('EW') or value-weighted ('VW'). The 'A−B' portfolios are zero-investment portfolios with a long position in the above median takeup portfolio and a short position in the below median takeup portfolio.