Trading Restrictions and Supply Effects

Version A.1, August 9 2017

Abstract

Japanese markets include stocks with and without trading constraints, providing a natural setting to investigate Greenwood's (2009) proposition that demand curves steepen in the presence of trading restrictions; and that easing of the restrictions evokes a negative price reaction. We record a supply effect on the Issue Day for Japanese seasoned equity offerings, where there is an infusion of additional shares but no new information is released. Consistent with Greenwood (2009), the price reaction is significantly negative only for stocks facing trading restrictions. We also find that short-sales constrained stocks are more likely to market-time their equity issuance.

JEL classification: G14, G15, G32
Keywords: Differential Trading Restrictions, Increased Supply, Demand Curve, Market Timing.

Trading Restrictions and Supply Effects

Abstract

Japanese markets include stocks with and without trading constraints, providing a natural setting to investigate Greenwood's (2009) proposition that demand curves steepen in the presence of trading restrictions; and that easing of the restrictions evokes a negative price reaction. We record a supply effect on the Issue Day for Japanese seasoned equity offerings, where there is an infusion of additional shares but no new information is released. Consistent with Greenwood (2009), the price reaction is significantly negative only for stocks facing trading restrictions. We also find that short-sales constrained stocks are more likely to market-time their equity issuance.

JEL classification: G14, G15, G32
Keywords: Differential Trading Restrictions, Increased Supply, Demand Curve, Market Timing.

Introduction:

Several studies have empirically analyzed or modeled factors potentially associated with downward sloping demand curves for common stocks. In a recent study, Greenwood (2009) posits that trading restrictions steepen the demand curve for affected stocks by removing prospective liquidity suppliers. Greenwood argues that as long as there are traders willing and ready to trade but are prevented from doing so, the demand curve for common stocks will be downward sloping. He further posits that stock returns will be negative when the trading restrictions are relaxed. Consistent with Greenwood (2009), Blocher, Reed and Van Wesep (2013) model the role that supply of shares play when short-sales constraints are binding. The key insight from these arguments is that the demand curve for common stocks is downward sloping when trading constraints are in place. The proposition is that when trading restrictions are binding, a change in the supply of shares affects the stock price even though it may be unrelated to any new information about the firm.

Our objective is to examine the foregoing proposition, by analyzing the impact of an infusion of additional shares on common stocks facing differential trading restrictions, at a non-informational event. We choose a setting particularly suited for such an examination which satisfies the strict conditions set out above. First, in Japan, only a certain number of stocks are eligible for short selling on the centralized market; the remaining stocks face short-sales constraints. Since the Japanese stocks "Eligible" for short selling on the centralized market are selected by liquidity, firm size and ease of borrowing shares, these stocks are subject to less binding trading constraints relative to their "Non-Eligible" counterparts. Second, to test our proposition, we employ a sample of Japanese seasoned equity offerings (SEOs) from 1998-2011 made by both Eligible and the Non-Eligible stocks, focusing primarily on their Issue Day, where there is an

infusion of additional shares but no new information is released.[1]

We investigate a possible supply effect (that is, the impact of an increased supply of shares on common stock prices) for each of the two types of stocks, namely those with and without trading restrictions. Consistent with Greenwood (2009) and Blocher et al. (2013) we propose the *Trading Restrictions Hypothesis* and posit that, in the absence of trading constraints, the demand curve would not be steep or could even be flat. Thus if the hypothesis is supported, when there is an infusion of new shares at the issue date of the SEOs, we should not observe a supply effect for the Eligible stocks. On the contrary, a supply effect is predicted for trading restricted Non-Eligible stocks. Our findings can be summarized as follows.

On the Japanese SEOs' issue day, where there is an infusion of additional shares but no new information is released, we find that stock prices decline significantly *only* for the trading restricted stock sample. The difference in the Issue-Day price reaction between the two types of stocks is both economically and statistically significant. Essentially for each of the two types of stocks, the size and significance of the price reactions *reverse* themselves on the Issue Day, from the respective pattern observed on their Announcement Day. [2] In robustness tests, we find similar results even after addressing potential endogeneity concerns. In light of the strong and consistent results that the Issue Day returns are significantly negative only for the trading constrained stocks, we argue that our results are supportive of the *Trading Restriction Hypothesis.*

We document several other important findings. First, a distinctive feature of Japanese SEOs is

[1] Figure 1 has the schedule of events for Japanese SEOs. Institutional details of Eligible and Non-Eligible stocks and the distinctive attributes of the Japanese SEO process follow and are also provided in Section 2 of this manuscript.
[2] We document a significant price drop on the SEOs' Announcement Day for both types of stocks, namely those that are eligible for centralized margin short sales, and those that are not. However, we find that the Announcement Day stock price reaction is significantly more negative for the Eligible sample, relative to that for stocks which face greater trading restrictions. The result is consistent with Nagel (2005) who argues that constrained stocks under-react to bad news because trading restrictions "hold negative opinions off the market" (p. 278). However, the Announcement Day stock price reaction is not the focus of this study because, on that event date, the market's response is affected by the SEOs' attendant information revelation.

that their offer price is determined a minimum of five days before the Issue Day. The separation of the offer-price determination from the SEO's Issue Day implies that the effects of manipulative short selling, if any, should be isolated to the Price Determination day.[3] Accordingly, on the SEO's Issue Day, the impact of any related information contained in the offer-price discount, and/or the effects of manipulative short selling should be minimal to none.[4] Instead for Japanese SEOs, a permanent (or a temporary price pressure) effect due to the increased supply of shares, if there is any, should be observed on their Issue Day. Thus, an examination of Japanese SEOs' actual issue date permits us to distinguish between our *Trading Restriction Hypothesis* and possible temporary price pressure effects. We do not find any evidence supportive of a temporary price pressure effect. It needs to be emphasized that such an analyses is free of the simultaneous confounding effects surrounding SEOs' Issue Day in the U.S.

A scrutiny of the trading volume changes also reveals findings consistent with the idea that short-sales constraints curb the market's ability to incorporate a firm's SEO information into its stock price. We find that the abnormal trading volume of the Non-Eligible stocks is relatively smaller than the corresponding trading volume for Eligible stocks from the announcement of the SEO until the day preceding the SEO's Issue Day (ID – 1 in event time, where ID is the Issue Day). On and after the Issue Day, with the inflow of additional SEO shares, the increased supply of new shares affects the trading volume and stock prices significantly only for the short-sales constrained sample.

Second, a set of studies indicate that firms are likely to "time" their SEO, that is, issue new

[3] A discussion of manipulative short selling around SEOs follows and related details can be found in Section 2.
[4] In contrast, the offer price for U.S. SEOs is typically determined the day before or on the Issue Day itself. Accordingly, studies using U.S. data are not in a position to separate the issue-day effect from the effects associated with the determination and announcement of the offer-price discount, as documented by Altınkılıç and Hansen (2003) and/or the information content of offer-size revision as in Chan, Nayar, Singh and Yu (2017).

shares of their seasoned equity when it is temporarily overvalued. Another set of empirical studies suggest that short sellers are investors with superior information capabilities, and that their trading helps correct overvaluation.[5] The juxtaposition of these bodies of literature provides an interesting context to study seasoned equity offerings of firms with and without short-sales constraints. Bris, Goetzmann and Zhu (2007) note that "…short selling facilitates efficient price discovery" (p. 1032) and find evidence that prices incorporate negative information more quickly when short sales are permitted. Asquith and Meulbroek (1995), Aitken, Frino, McCorry and Swan (1998), and Danielsen and Sorescu (2001) all find that the introduction of, and/or changes in, regulations restricting short sales, short interest, or options, is associated with negative future returns. These findings suggest that negative information is incorporated into prices slowly when stocks are short-sales constrained. In the context of SEOs, prior literature and policy makers have argued that short sales preceding the Issue Day are manipulative.[6,7] However, in the context of SEOs, it is difficult to examine the role short-sales constraints play in the absorption of information into stock prices using U.S. data, because U.S. securities regulations, such as the *Securities and Exchange Commission's* Rule 10b-21 or Rule 105, restrict short-selling around SEOs.

In this context again the Japanese market has a distinct feature that helps us circumvent the abovementioned problem.[8] Specifically, unlike the U.S. *Securities and Exchange Commission's*

[5] See Beneish, Lee and Nichols (2015) for a comprehensive study of short sales and improved informational efficiency. Beneish, Lee and Nichols note that the vast prior literature has consistently shown that short sellers have value-relevant information and suggest that their trading helps correct overvaluation. Further, short-sales constraints can lead to informational inefficiency and that even temporary short-selling bans impact pricing in the banned stocks.

[6] Henry and Koski (2010) examine the relation of the size of short sales prior to announcement on the announcement return but do not examine whether the short sales help to incorporate the public information into stock return on announcement day.

[7] Previous SEO literature has mainly examined the relation of the regulation with the issue costs and stock return around the Issue Day (e.g. Corwin, 2003; Gerard and Nanda, 1993; Henry and Koski, 2010; Kim and Shin, 2004; Safieddine and Wilhelm 1996).

[8] There are other unique attributes of the Japanese equity issuance process that provide an opportunity to examine the slope of the issuers' demand curve in isolation. A more detailed discussion of these features including the classification of stocks into those with and without short-sale constraints follows in Section 2.

rules, the Japanese SEO market setting did not have strict short-sales regulation, until December 2011.[9] Accordingly, employing Japanese data, we are able to examine whether short-sales constraints affect the market's ability to incorporate public information, associated with the offering's announcement, into the stock price at the SEO's Announcement and on its Issue Day. Further, prior studies have not examined the effect of short-sales constraints on the issuers' ability to "time" their SEO. Given that the Japanese SEO's offer price is determined *prior* to its Issue Day, we explore that question as well.

Our results indicate that firms with Eligible stocks issue their shares at prices that more accurately incorporate the information of the SEO announcement, and also the effect of short-sales preceding the pricing of the offer. Therefore, we argue that firms with Eligible stocks are less likely to time their offerings. On the other hand, firms with Non-Eligible stock are opportunistic and time their offerings when their stock prices are mispriced higher. These findings contribute to the SEOs market-timing literature.

Third, earlier studies have also identified factors that cause demand curves for stocks to be downward-sloping. Miller (1977) argues that stocks with a wide divergence of opinion regarding their intrinsic value are likely to be overpriced if they are short-sales constrained, since the participation of less optimistic investors is restricted in the price discovery process. Hence, there is a need to evaluate the relative importance of the divergence of opinion and trading restrictions' effect on the demand curve when the supply of shares increases, for stocks that are short-sales constrained and those without such restrictions.

Specifically, the divergence of opinion explanation predicts the relation to be significant for SEOs of Japanese stocks with more restrictive short-sales constraints, and especially those within

[9] In December 2011, *Financial Services Agency* of Japan put in place new rules that closely resemble the Rule 10b-21 in the US. A more detailed discussion follows in Section 2.

them that experience relatively greater divergence of opinion. Further, the effect is predicted to be most pronounced specifically for trading restricted stocks, on the Japanese SEOs' Issue Day whereat, as discussed above, no new information is released and the supply of shares actually changes. We find strong and consistent results that the Issue Day returns are significantly negative only for the trading restricted stocks, controlling for the level of the divergence of opinion. Our analyses does not rule out the divergence of opinion as a factor affecting the demand curve for stocks. However, our results indicate that trading restriction is a relatively more robust factor in the incidence of downward sloping demand curves and our findings are supportive of the *Trading Restriction Hypothesis.*

Finally, Japanese SEOs present another important reason to review them. A large number of U.S.-based studies have recorded a significant price drop at the announcement of a proposed SEO. In contrast, using a pre-1994 sample, Cooney, Kato and Schallheim (2003) document a positive stock price reaction for Japanese equity offer announcements. However, among other significant changes, Japan gave up fixed-price offers and adopted the book-building method for SEOs in 1994. In view of these changes, Eckbo, Masulis and Norli (2007) wonder if the Cooney et al. (2003) results would still obtain for the more recent Japanese SEOs. We employ a post-Cooney et al. (2003) sample of Japanese SEOs from 1998-2011. For this more recent period, the Cooney et al. (2003) results do not hold and our findings are not consistent with their pre-1994 period results. In a later section of the paper, we explore possible reasons explaining the change from earlier findings.

The remainder of the paper is organized as follows. Section 2 provides a brief overview of regulations restricting manipulative short sales in the U.S. and Japan, and describes institutional details regarding Japanese SEO procedures, and trading restrictions. We discuss the alternate hypotheses in Section 3. Section 4 describes the data and empirical methods. In Section 5, we

report and discuss the empirical results. Section 6 presents supporting evidence and analyses. The possible reasons for the change in the announcement period returns from earlier studies are explored in Section 7. Section 8 concludes the paper.

2. The institutional framework

2.1. The market for short sales in Japan

As described in Hirose, Kato, and Bremer (2009), investors can sell stock short using either "negotiated" or "standardized" margin transactions. Negotiated margin transactions are usually between financial institutions; the terms and fees of negotiated margin transactions are determined by the respective parties. Any stock can be sold short using negotiated margin transactions. On the other hand, not all stocks under the standardized margin transactions are eligible for short sales. Only certain stocks, called "*taishaku*" stocks, selected by the stock exchange based on liquidity, firm size, and shares outstanding, are eligible for short sales under the standardized margin transactions. [10] It must be noted that across the spectrum of *taishaku*-stocks, a subset of taishaku firms acquire attributes (such as firm size and liquidity) that closely match those of stocks classified as *non-taishaku*. The most likely cause is that such a subset of *taishaku*-stock firms experience adverse performance and their characteristics become close to those of matching non-*taishaku* stocks. In robustness tests to control for potential endogeneity concerns, discussed in Section 5.2.2 of the paper, we exploit this factor to identify matched pairs of eligible and non-

[10] Most of the stocks listed on the First Section of the Tokyo Stock Exchange are included in *taishaku* stocks. The process of standardized margin transactions is presented in Figure 2. Securities companies, accepting orders from investors for standardized margin transactions, check their stock inventory. They match the order with other orders for the same stock by other investors. If the amount of stock ordered by an investor cannot be met with the inventory on hand at the securities company and those made available by the matching process, then the securities firm goes to securities finance companies to fill the gap. Standardized margin transactions have mainly been used by individual investors whose credit base is weak; such transactions are quite convenient for them in that various conditions such as interest rates are fixed by the system regardless of the investor's creditworthiness. The non-taishaku stocks can be used for margin buying only and are not eligible for short sales using the standardized margin transactions.

eligible stocks based on firm size and liquidity.

Short sale transactions using standardized margin transactions must follow the rules determined by the exchange. Although detailed information is not available, search and borrowing costs are usually lower for *taishaku* stocks than for *non-taishaku* stocks. Consistent with these lower costs, Hirose et al. (2009) show that about 90% of *taishaku* stocks had positive short interest during the 2003-2009 period. In comparison, only 20% *non-taishaku* stocks, had positive short interest during this period; and even for the few *non-taishaku* stocks with non-zero short interest, the size of their short interest was relatively small compared to that of *taishaku* stocks.

In summary, negotiated trading is used between financial institutions. However, within standardized margin transactions, short-sales constraints are less restrictive for *taishaku* stocks than for *non-taishaku* stocks. Throughout the paper, *taishaku* stocks are termed "Eligible stocks" and the rest of the stocks are designated as "Non-Eligible stocks." Non-eligible stocks include both *non-taishaku* stocks and non-marginable stocks under the standardized margin transactions.

2.2. **Regulations related to Manipulative Short Sales in the U.S. and Japan**

In 1988, the U.S. *Securities and Exchange Commission* (SEC) adopted the Rule 10b-21 which applied to any short sale established between an SEO's initial filing and its Issue Day. In 1997, the SEC replaced Rule 10b-21 with Rule 105, which did not prohibit short sales during the SEO period. Instead, Rule 105 prohibited traders from covering their short sales, made within five days of the SEO, with shares obtained in the offering. In October 2007 amendments were made to strengthen Rule 105.[11] Pursuant to the 2007 amendments to Rule 105, enforcement activity has increased

[11] Previously, the S.E.C.'s Rule 105 allowed short sellers to purchase shares in the offering, but prohibited the use of those shares to cover short positions taken within five days. Under the amended rule, anyone who executes a short sale in the five-day period before an SEO is prohibited from even purchasing shares in the offering. The October 2007 amendment may be consistent with the idea that short sales, other than manipulative sales, help prevent under-reaction to the SEO information.

markedly. Recently, the number of Rule 105 settlements have increased sharply. From January 2010 to September 2013, the SEC collected over $42 million from disgorgement, civil penalties and pre-judgment interest based on violations of Rule 105.

In Japan, the *Financial Services Agency* amended the Order for Enforcement of the Financial Instruments and Exchange Act (Syouwa 40 cabinet order 321) in December 2011. The new regulation prohibits traders from covering their short position, created between the SEO's announcement and its pricing date, with shares obtained in the offering. These rules closely resemble the *Securities and Exchange Commission's* Rule 10b-21 in the U.S.

2.3. **Timing of the Announcement, Pricing, and Issue Days of the Japanese SEO**

In Japan, firms conduct an official board meeting to approve the SEO and publish the preliminary prospectus/"red herring" on the same day as the board meeting. Figure 1 summarizes the timeline for Japanese SEOs.

We use the publication date of the red herring as the SEO's announcement day (AD). Book-building occurs in three-to-five business days following the release of the preliminary prospectus. The offer-price determination day (PD) occurs immediately after the book-building period ends. The firm and their lead underwriter set the offer price based on the stock's closing price on PD and the expected demand as determined in the book-building process. A final prospectus is published on the offer-price determination day PD. Rule 280 (3-2) of the Japanese Commercial Law indicates that issuers must issue the new shares at least five business days after PD. As noted before, the extended period from the offer-price determination day to the Issue Day is a key difference between U.S. and Japanese SEOs. The new shares are allocated to investors on the Issue Day. However, investors receive notice of their allocation two to three days before the Issue Day.

Another important distinction between SEOs in Japan and the U.S. is that in the U.S. issuing

firms frequently change the offer size, through amendments, during the registration process. Chan, Nayar, Singh and Yu (2017) present evidence that the amended offer size, from the amount filed initially to the final offer size on the Issue Day, signals the quality of the SEO. In sharp contrast for Japanese SEOs, the number of shares to be offered, announced initially, is never revised upwards (or downwards).

Finally, after the offer price is determined at the end of trading on PD in a Japanese SEO, the investment banker is exposed to significant price risk for the next two to three days. This is the subscription period during which investors submit their bids for the new shares. If the issuer's stock price were to fall below the offer price (between PD+1 and the end of the subscription period), the entire offer would devolve on the underwriter. We discuss this point further in Section 6, where we examine the differences and changes in the institutional attributes between the Cooney et al. (2003) sample period and ours.

3. **Hypotheses and previous evidence**

Stock price reactions to equity issues have been used to examine the slope of the demand curve. However, short sellers' trades impact stock prices during the SEO, confounding any inferences. In addition, the stock price reactions associated with these events are also consistent with a temporary price pressure and information effects. We will briefly explore each related strand of literature and frame our hypotheses. A summary of our hypotheses and related predictions is given in Table 1.

3.1. **Trading Restrictions**

Some of the earlier research (Shleifer, 1986; Lynch and Mendenhall, 1997) indicates that the

disclosure of increased supply of shares (a supply effect) impacts the Announcement-Day return.[12] On the other hand, IPO lock-up expirations and the collapse of the internet bubble literature indicate that the supply effect is evidenced on the effective day/ expiration day.[13] Greenwood (2009) examines the restrictions placed on investors to sell their shares in the context of Japanese stock splits and notes that the greater the restrictions imposed on potential sellers, more pronounced are the price effects. Further, Greenwood (2009) finds that these effects are reversed when the restrictions are relaxed and investors are allowed to sell again. In view of the significant effect of supply constraints in the context of stock splits, it an interesting empirical issue to determine, if and when, such a supply effect is evidenced for SEOs.

The adverse selection model proposed by Myers and Majluf (1984) predicts that firms' stock prices react negatively to announcements of their SEOs. Consistent with Myers and Majluf (1984) we posit that, in Japan, the adverse impact of the SEO announcement will be evidenced in the Announcement-Day price reaction. However, as argued by Nagel (2005) and Berkman, Dimitrov, Jain, Koch and Tice (2009) the short-sales constrained stocks may under-react at announcement because investors are kept at abeyance, restricted from trading and the mispricing is removed only gradually. Accordingly, we hypothesize that the Announcement-Day price reaction will be less pronounced for the trading restricted stocks.

If short-sales constraints curb the market's ability to incorporate the SEO information into its stock price, the abnormal trading volume of the Non-Eligible stocks will be relatively smaller than the corresponding trading volume for Eligible stocks from the announcement of the SEO until the day preceding the SEO's Issue Day (ID – 1 in event time, where ID is the Issue Day). Therefore,

[12] Studies that examine the supply-effect at stocks inclusion in major indices analyze the Announcement period stock returns because firms that compose a major index do not face severe short sales constraints.
[13] See Field and Hanka (2001), Hong, Scheinkman and Xiong (2006), Ofek and Richardson (2003), Schultz (2008).

we hypothesize that the supply effect will be most pronounced on the SEO's Issue Day, when the supply of shares actually changes. It must be noted that on the Issue Day for Japanese SEOs, although the supply of shares changes, no new information is released. Given that the trading in Eligible stocks is not constrained, our prediction is that the SEO's Issue Day supply effect should be most pronounced for the trading restricted stocks. On and after the Issue Day, given the inflow of the additional SEO shares, new investors of Non-Eligible stocks will only pay a lower price that fully incorporates the SEO information effects. Therefore, we hypothesize that on Issue Day, an increased supply of new shares should affect the trading volume and stock prices significantly, for the restricted stocks.

Our hypothesis is in keeping with Greenwood (2009). Prior literature related to lock-up expirations and the collapse of the internet bubble, also finds a price effect when restrictions on the supply of a stock's shares are lifted. However, the lock-up and stock-split related literature does not consider under-reaction on the announcement day of an event. We use the intuition as the reason for the market-timing of SEOs by trading restricted firms.

3.1.1 **Trading Restrictions** & **Market Timing**

Short-sales constraints imply that investors are restricted from trading and their opinion is not reflected in the price until the actual issuance day. Thus, there is a relatively greater likelihood that firms with short-sales constraints "time" the market and issue the SEO shares when their stock is overvalued. Accordingly, we can examine the implications of market timing in equity issuance, and we posit that firms with trading restricted stocks are more likely to issue equity opportunistically.[14]

[14] Baker and Wurgler (2002) argue that "managers think investors are irrational and raise equity when the cost of equity is unusually low."(p.4).

3.2. **Information asymmetry**

Myers and Majluf (1984) attribute the average negative return at SEO announcements to an information asymmetry between corporate insiders and outside investors. Outside investors face an adverse selection problem and suspect that the better informed managers are more likely to issue equity when their stock is overvalued.[15] Thus, as per Myers and Majluf (1984), the announcement of an equity offering conveys negative information about firm value. Krasker (1986) extends the Myers and Majluf model to show that there is negative relation between the price reaction and the size of the equity issue.

If Myers and Majluf (1984) is supported, the short sales constraint may not be associated with the timing of SEO, i.e. both Eligible and Non-Eligible firms will time their SEO when their stock is overvalued. However, if Nagel (2005) and Berkman et al. (2009) are supported, the short sales constrained firms will use the market's under-reaction to their SEO announcements and time their stock offerings when they are overvalued. As such, the timing of equity offers for the two types of issuers will differ.

Further, if there are no short-sales constraints and the demand curve is relatively flat, the supply curve shift should not affect the stock price on the SEO's Issue Day; and there should not be a significant price reaction on the Issue Day because no new information is released at that point in time. Therefore, the *Information Asymmetry Hypothesis*, unlike and distinct from the *Trading Restrictions Hypothesis*, does not predict any price reaction related to the offer size or a supply effect on the SEO's Issue Day. This must be true if markets are semi-strong form efficient. On the other hand, if short-sales constraints render the markets semi-strong form inefficient, and the demand curve is downward sloping, there should be a supply-effect for the trading restricted stocks

[15] Therefore, unlike the pecking order hypothesis which predicts equity issuances to be rare, the market-timing hypothesis predicts that issuers may issue frequently to market-time their offerings.

on the Issue Day, when the new supply of shares actually comes on the market. Thus the *Information Asymmetry Hypothesis* and the *Trading Restrictions Hypothesis* have distinctly different predictions for the stock price reaction on the SEO's Issue Day (ID).

3.3. **Temporary price pressure**

Manipulative short sellers establish short positions prior to seasoned equity offerings for the sole purpose of producing an artificial discount in the price of the to-be-issued new shares in the SEO. Later, short sellers cover their positions with shares purchased in the SEO at a discount. Manipulative short selling is expected to occur more often in Japanese offerings because no regulations restricting short sales around SEOs existed in Japan prior to December 2011.

In Japan, the SEO's offer price is determined a minimum of five days before the Issue Day. The separation of the SEO's price-determination day (PD) from its Issue Day (ID) implies that the effects of manipulative short selling, if any, should be isolated to PD. On the other hand, temporary price pressure effects due to the increased supply of shares, if there are any, should be observed on ID.

Gerard and Nanda (1993) argue that temporary price pressure is exerted by manipulative short selling before the offer-price determination day (PD). Their model indicates that when traders are confident in their ability to cover their short positions with new discounted shares from the SEO, they sell in the secondary market even if they do not have negative information about the stock. If a large number of manipulative trades occur before the offer-price determination day, secondary market prices drop temporarily on PD and recover in the post-pricing period market.[16]

[16] Several other studies find evidence of a temporary price pressure around SEOs' Issue Day. Using daily and intra-day stock return data, Barclay and Litzenberger (1988) find a significant price recovery on the Issue Day. They argue that the price recovery after the SEO's Issue Day is a sweetener to compensate investors for the portfolio re-balancing cost incurred from including the new shares in their portfolio. Meidan (2005) finds that the offer size (relative to the size of the issuing firm) is associated with negative abnormal returns before the Issue Day and positive abnormal returns after the Issue Day. Meidan (2005) argues that these results are consistent with a temporary price pressure effect.

Alternately, if the share price is affected by the supply effect from the issuance of the new shares, a larger offering size will be associated with a corresponding greater price decline on the SEO's Issue Day. However, the effect will not be temporary and stock prices will not recover in the days after the offering. Thus a longer lasting or a permanent price decline will be consistent with a supply effect, as predicted by the *Trading Restrictions Hypothesis.*

Prior research, based on samples of U.S. SEOs, has not been in a position to disentangle these issues. In the offering process for U.S. based SEOs, the offer-price determination day is typically the Issue Day (or ID-1, the day before the Issue Day). Accordingly, it is difficult to isolate the effect of the increased supply of shares on the Issue Day from the information effects related to the offer-size revision and/or the offer-price discount. For example, Fig.2 of Corwin (2003) shows that, for U.S. based SEOs, the stock price before the offer date is about 1% lower than the stock price after the offer date. This is especially true for stocks listed on the Nasdaq. The price drop before, and the related price rebound following the offer date, indicate that the information-related and the temporary price pressure effects cannot be readily disentangled around the offer date in U.S.

4. **Description of sample and variables**

4.1. **Data**

The data used in this study cover seasoned equity issues of Japanese stocks listed on all Japanese markets (JASDAQ, OSE, NSE, and TSE) between January 1, 1998, and December 31, 2011. The book building method was introduced in Japan in January 1994. The first book built offer was for "Nihon Jumbo," on March 20, 1994. Since then, all SEOs in Japan have used the book building procedure.

We use the Nikkei NEEDS Financial Quest (FQ) and the eolESPer databases to obtain information on the SEO announcement, the price-determination and the issue dates, the offer price, and proceeds for our sample of Japanese SEOs. Financial data, including the classification of Eligible/Non-Eligible stocks, are obtained from the FQ database. Data on stock prices, stock returns and the three-factor portfolio returns is from the Nikkei Media Marketing database. The total number of offerings during the 1998-2011 sample period is 967. In conformance with previous studies, we exclude financial institutions and securities firms. In addition, we exclude firms with SEOs that occur within 250 days of their IPO. These screens reduce the sample to 755 observations.

4.2. **Description of variables**

4.2.1. **Abnormal returns**

This paper examines the three competing hypotheses by computing abnormal returns around the SEO. Abnormal returns are computed as follows.[17]

$$AR_{i,t} = Return_{i,t} - Return\ on\ the\ Value\ Weighted\ Index \quad (1)$$

$$CAR_i[d,T] = \sum_{t=d}^{T} AR_{i,t} \quad (2)$$

Where, $AR_{i,t}$ is the abnormal return for firm *i* on day *t* calculated as the difference between the stock return on day *t* for firm *i* , and the value-weighted return on an index of all listed Japanese firms. CAR_i[d,T] is the cumulative abnormal return for firm *i* from day *d* to day *T*.[18]

4.2.2. **Other variables**

RelOffSize is defined as the number of new shares issued divided by the number of shares outstanding on the day prior to the Issue Day. The *Trading Restrictions Hypothesis* posits that the

[17] We also conduct the same analyses using the market model to compute abnormal returns. The results remain qualitatively unchanged.

[18] Alternative specifications of CAR based on the market model or the Fama-French three factor model give essentially the same results.

abnormal returns on both the Announcement and the Issue Day are related to *RelOffSize*. However, in accordance with Krasker (1986), the *Information Hypothesis* also argues that *RelOffSize* is a proxy for the degree of negative information. The degree of short-sales constraints is measured by whether the issuer's stock type is Eligible or Non-Eligible. *Eligible* is an indicator variable that is equal to one if the SEO is that of an Eligible stock.

The degree of information asymmetry is represented by the firm size. We use ln(*Asset*), measured as the natural logarithm of the market value of equity on the last day preceding the SEO announcement plus book debts as of the end of the previous fiscal year. [19] We adjust for inflation using purchasing power as of the year 2005. Cooney and Kalay (1993) argue that the opportunity to invest in a positive net present value project is positively related to SEO announcement returns. We use the book-to-market ratio, *BTM*, as a proxy for the opportunity to invest.

5. Empirical results

5.1. Summary statistics

Table 1 provides summary statistics for our SEO sample. Column one shows the summary statistics for all SEOs; summary statistics for the Eligible and Non-Eligible samples are separately documented in columns two and three, respectively. 34% of the 755 observations in our sample are Eligible offerings. Non-Eligible stock offerings are more frequent.

Comparing *Asset* size, we find that Eligible issuers tend to be much larger than Non-Eligible issuers. Further, although issue size (*Proceeds*) is also significantly larger for the Eligible sample, the difference in the relative issue size (*RelOffSize*) between the two sub-samples is marginal. The mean *RelOffSize* of the total sample is nearly 14%, which is smaller than the typical SEO in the

[19] Ln(Asset)= ln(Capitalization + Book Debt)

U.S. For example, Corwin (2003) finds a mean relative issue size of 23.8% in his U.S. sample covering the period from 1980 through 1998.

The book-to-market ratio, *BTM*, is lower for Non-Eligible stocks, which is consistent with Miller (1977) and overpricing of the stock when short-sales constraints are more binding. In keeping with Corwin (2003), *Issue discount* is defined as negative one times the return from the previous day's closing transaction price to the offer price. The average *Issue discount* is 3.5%, which is similar to discounts in the U.S. The *Issue discount* is significantly smaller for the Eligible sample, relative to the corresponding measure for the Non-Eligible stocks.

The average short-sales volume (*Average SSVOL*) for the Eligible stocks is defined as the average number of shares sold short divided by the stock's total volume of trade in the event-time period [PD-1, PD], where PD is the SEO's price determination date. We find that the mean *Average SSVOL* is over 20%, indicating a fairly significant amount of short sale activity on and just before PD for the Eligible stocks. We do not find a significant difference between the underwriters' reputation (*Major UW*) managing the offerings of either group.

5.2. **Hypotheses testing**

5.2.1. S**tock Price Behavior around the SEO Announcement (AD) and Issue Day (ID)**

To examine and evaluate the competing hypotheses, we compute abnormal returns around important event dates in the SEO process. Table 3 shows the stock price reactions around the SEO Announcement and Issue dates. The Announcement-Day (AD) abnormal return is significantly negative. Significantly negative abnormal returns are also observed surrounding the Issue Day (ID). No price recovery is observed after the Issue Day. Permanent negative returns on and after the Issue Day are consistent with the *Trading Restrictions Hypothesis*. The issuing firm's shareholders lose, on average, 7.5% in excess returns during the SEO period.

Panels B and C of Table 3, provide an analysis of the stock price reactions, split along dimensions of individual variables. First, the effect of trading restrictions is examined by splitting the sample based on whether stocks are eligible for short selling, or not. Panel B of Table 3 documents the price drop on the Announcement Day (AD) for Eligible stocks and shows that it is significantly more negative than that for Non-Eligible stocks. This result is consistent with Nagel (2005) and our hypothesis that constrained stocks under-react to bad news. Stock price revision in response to the new information for the Non-Eligible sample may be upwardly biased because of trading restrictions.

Consistent with the *Trading Restrictions Hypothesis*, the pattern reverses itself on the Issue Day (ID). Panel B of Table 3 shows that, on ID, there is a significantly negative price reaction *only* for Non-Eligible stocks. The price drop on ID for Eligible stocks is insignificant. The difference between the ID price reactions for the two sub-samples is both economically and statistically significant. The negative price reaction observed on the Issue Day is consistent with a supply effect and our hypothesis that it should be observed for stocks with trading restrictions.

These findings indicate that, at the SEO announcement, information about new issues is not fully reflected in the stock prices of the Non-Eligible sample; that is, given short-sales constraints, stock prices do not reflect new information in a timely manner. Further, since no price recovery is observed for Non-Eligible stocks following the Issue Day (ID), the results do not support the *Temporary Price Pressure Hypothesis*. Instead, we consider the results to be consistent with the *Trading Restrictions Hypothesis*.

Panel C of Table 3 examines the effect of *RelOffSize* on stock prices during the SEO period. We find that relatively larger the number of new shares issued, the more the stock price declines on both the Announcement and the Issue Day. The implication of this result is discussed in the

following section in a multivariate setting.

5.2.2. Multivariate Analyses

5.2.2.1. Regression Analysis of SEO Announcement Day (AD) and Issue Day (ID) Returns

We next conduct multivariate regression analyses of the Announcement Day (AD) and the Issue Day (ID) returns. The results are presented in Table 4. Models 1 and 2 of Table 4 analyze the AD returns. The ID returns are analyzed in Models 3 and 4. We use the indicator variable *Eligible* to classify the Eligible/Non-Eligible firms' stock offerings. *Eligible* is the proxy for short sales constraint.

In Table 4, in both models 1 and 2, the coefficient for *Eligible* is consistently negative and statistically significant. As hypothesized, the lower the short-sales constraint, the more negative the AD returns. In other words, stocks with lower trading restrictions (Eligible stocks) evoke a significantly more negative AD price reaction.

The coefficient for *RelOffSize* is consistently negative; relatively larger the number of new shares issued, more negative the AD returns. In model 2, the interaction term between *Eligible* and *RelOffSize* is insignificant, indicating that there is no difference in the relative price response to the offer size between the Eligible and the Non-Eligible stocks. It must be noted that the larger *RelOffSize* is also consistent with a more negative information effect (Krasker, 1986). The impact of a potential information effect associated with the announcement of the SEO cannot be parsed out and separated from that of a possible supply-effect by examining the Announcement Date stock price reactions. Therefore, we focus on the offerings' Issue Date to more cleanly identify the supply effect, if any.

The Issue-Day returns analyzed in Models 3 and 4 of Table 4, present a sharp contrast with the Announcement-Day results of Models 1 and 2. In line with the results noted earlier in Table 3, the

coefficient for *Eligible* is consistently positive and statistically significant; the ID price reaction for stocks with trading restrictions (Non-Eligible stocks) is significantly negative, relative to the price reaction for their unconstrained Eligible counterparts. Further, in model 4, coefficient for *RelOffSize* is negative and significant (-15.94, with a t-statistic=-2.53), and the coefficient for the interaction term between *Eligible* and *RelOffSize* is positive and statistically significant (15.94, with a t-statistic= 2.32). The interpretation is simply that for Eligible firm's the price response to the relative offer size is statistically insignificant and not different from zero. The finding is consistent with Greenwood (2009) and is supportive of our contention that, on the actual issue day, when there is an influx of additional shares, only the short-sales constrained stock prices react negatively. Further, the results indicate that the ID returns are negatively related to the relative offer size *only* for stocks with trading restrictions.

5.2.2.2. Robustness check:

It is conceivable that our results discussed in the preceding section are driven by the difference in liquidity between the eligible and the short-sales constrained firms. To ensure that our results are robust to this endogeneity concern, we conduct a detailed analyses controlling for liquidity differences between the two sub-samples. The non-tabulated results are available as an Internet Appendix.

We adopt the following process to find matched pairs from the two sub-samples. The treatment group is the Non-Eligible stocks. We first select observations from the Eligible stocks sub-sample that are listed on the same stock exchange as each specific Non-Eligible stock. We then select the Eligible sample observations with the market value of equity that is within +/- 30% of the treatment firm. Next, using Amihud's (2002) illiquidity measure ILLQ, we identify the control firm with the

nearest liquidity to the treatment and define *Min Abs* |Non_E_{ILLQ} – E_{ILLQ}|.[20]Finally, we exclude firms where the *Min Abs* |Non_E_{ILLQ} – E_{ILLQ}| is greater than 0.3. In all, of the 498 treatment sample, 38 observations are excluded for which do not find a suitable match. Thus, our robustness check employs 460 treatment observations and as many matched control observations.

In the Internet Appendix table IA.1, it can be observed that the difference between the treatment and control observations in their firm size, ILLQ (the liquidity measure), and the key variable *RelOffSize* is statistically insignificant. Thus, the control sample observations (still listed as Eligible by the stock exchanges and which are by definition, not short-sales constrained) have similar characteristics as the short-sales constrained sample observations. However, the book-to-market ratio (BTM) is not the same for the two groups.

The parallel set of tests run for the matched samples, around the critical event dates, produce results that are consistent with our main analyses (Internet Appendix table IA.2). The pre-event stock price run-up is significantly higher for the treatment group. Consistent with our main results, the stock price reaction at announcement is significantly less negative for the treatment group. The control sample, matched on firm size and ILLQ (liquidity) with the treatment observations, experiences a significantly more negative price reaction at announcement.

The examination of the issue date ID returns present an interesting finding. It is to be noted that the stock price reaction on the issue date ID is significantly more negative for the treatment

[20] We follow Amihud (2002) and use ILLQ, the relative price impact variable as a measure of illiquidity from AD-46 to AD-165 (120 days), where:

$$ILLQ_i = 1/D_i \sum_{t=1}^{Di} \frac{|R_{id}|}{VOKD_{id}} * 1{,}000{,}000$$

R_{id} and $VOKD_{id}$ are the daily stock return and the daily volume respectively of firm *i* on day *d*. The unit of the daily volume is yen. *D* is the number of days for which we have available data. We limit the sample at least 60 days of data.

group. However, the control sample also experiences a statistically significant negative price reaction on the issue date. This result implies that there is a supply effect even if the firms are not subject to regulatory short-sales constraint. The control sample is, by construction, made up of less liquid *taishaku*-stocks. Our findings indicate that lower liquidity itself acts as a trading constraint. The trading restriction caused by their low liquidity suggests that the information possessed by many investors who don't own the shares will not be reflected in stock prices early on. Consequently, there will be a supply effect manifested on the issue date when the SEO shares are added to the trading pool.

Finally, the returns following the issue date ID, are similar for treatment and control samples and their difference is statistically insignificant. These results are consistent with the *Trading Restrictions hypothesis.* As noted before for the main results, the stock returns following ID are insignificant and do not support the *Temporary Price Pressure hypothesis.*

In the Internet Appendix table IA.3, we conduct OLS regression of the abnormal returns on the announcement date AD and the issue date ID using the 920 observations (460 treatment observations with the same number of matching, control observations). The results are generally consistent with our main findings reported in the corresponding Table 4. In the Internet Appendix table IA.3 we again see that the Eligible stocks, although matched in terms of firm size and ILLQ (liquidity) by construction, experience a significantly more negative price reaction on the Announcement Date AD. On the other hand, the treatment firms experience a significantly more negative price reaction on the Issue Date ID. These results are supportive of the *Trading Restrictions hypothesis.*

6. Supporting Evidence and Analyses

6. 1. Abnormal Trading Volume

Miller (1977) argues that "A sufficient amount of short selling could increase the volume of the security outstanding until its price was forced down to the average valuation of all investors." When the stock price is overpriced (i.e. when new negative information such as SEO announcement is released), a sufficient volume of short sales of the Eligible stocks could increase the volume of the security outstanding until its price is forced down to the average valuation of all investors. We conduct our analyses with an examination of this logic using abnormal trading volume (ABVOL) where:

$$\text{ABVOL}_{i,t} = \frac{Turnover_{i,t}}{AveTurnover_i} - \frac{Turnover_{market,t}}{AveTurnover_{market}}$$

$Turnover_{i,t}$: Volume/outstanding share before issue of firm *i* on date *t*
$Turnover_{market,t}$: Value weighted average market turnover of all public companies on date *t*
AveTurnover: Average daily turnover (daily volume/daily outstanding share) from AD-46 to AD-95. (50 days)

The findings are reported in Table 5. We find that ABVOL of Eligible stocks is higher *only* in the period from the SEO's announcement to the day before the Issue Day (AD to ID-1) relative to the ABVOL of short-sales constrained stocks. *On* the Issue Day ID, the abnormal trading volume for the two sub-samples is not different. Further, in periods before AD and after ID-1, the ABVOL for the Eligible stocks is not different from that of the short-sales constrained stocks sample.

If trading volume is a proxy for information content, the ABVOL of Eligible stocks on the SEO's announcement (AD) should be larger than the corresponding ABVOL on ID-1, the day preceding the Issue Date. However, our results are not consistent with that idea. On the other hand, ABVOL for the Non-Eligible stocks gradually decreases from AD to ID-1.

These results indicate that the SEO announcements of Eligible stock are associated with

increased trading volume of the security until the price falls to its average value across all investors. On the other hand, although SEO announcement of the trading restricted stocks also conveys negative information, the attendant price reaction and the corresponding trading volume is lower (relative to that of the Eligible stock sample).

6.2. The Probability of SEO Announcements

The information of the stock issuance is revealed on the SEO's announcement day. If the market is semi-strong efficient, the markets modify their valuation of the stock immediately. This would be consistent with Myers and Majluf (1984)'s idea. Therefore, firms are less likely to be overvalued by their Issue Day (that is, firms are less likely to be able to issue overpriced shares in an efficient market, relative to firms in non-efficient market). We posit that such is the case for Eligible stocks. Accordingly, consistent with the pecking-order theory that predicts equity issues to be relatively rare, we posit that Eligible stocks are likely to issue equity less frequently.

On the other hand, if short-sales constraints render the markets inefficient, the SEO's announcement effect cannot be fully incorporated into the stock price before the offer's price determination day because markets are not able to modify their valuation of the stock immediately. The implication is that issuers will be able to sell overpriced equity. If indeed that is the case, external equity is not necessarily more expensive than external debt, and a firm might want to take advantage of a temporary overvaluation of its stock by raising external capital through SEOs when its equity is overvalued. As a result, firms with short-sales constraints will issue equity more frequently. We posit that such is the case for trading restricted stocks.

In Table 6, we employ *Previous Return* (Panel A) and *BTM* (Panel B) as proxies for market timing (issuance of overvalued stock), respectively. In Panel A, Table 6 it can be seen that both the Eligible and the Non-Eligible issuers are likely to time their SEO when the stock is overvalued,

i.e. at their SEO announcement, the probability of *high-previous return* is larger than the probability of *low-previous return*. These results are consistent with both the pecking order and the market timing theories. However, when we examine the *high-previous return* sub-sample (overvalued stock), the probability of the short-sales constrained firms' offer is larger than the probability of Eligible stock issuance. For the *low-previous return* sub-sample (undervalued stock), the probability of the Non-Eligible firms' stock issuance is lower than the probability of the Eligible stock offer. These results are consistent with the idea that stocks with trading restrictions are more likely to market-time their equity issuance.

Finally, we obtain consistent results in Panel B, Table 6, where we use *BTM* as the proxy for overvaluation. As in Panel A, Table 6, the short-sales constrained stocks are more likely to issue stock when they are relatively overvalued and less likely to issue equity when they are relatively undervalued.

6.3. Factors related to the incidence of downward sloping demand curves:

Miller (1977) argues that stocks with a wide divergence of opinion regarding their intrinsic value are likely to be overpriced if they are short-sales constrained, since the participation of less optimistic investors is restricted in the price discovery process. Chen, Hong and Stein (2002), formally develop a model in which the slope of the demand curve becomes steeper as divergence of opinion among investors widens. Boehme, Danielsen and Sorescu (2006) argue that both conditions, namely short-sales constraints and the divergence of opinion, must apply to get a downward sloping demand curve.

Is the divergence of opinion a key factor without which the demand curve for stocks is unaffected? We have already demonstrated that stocks with trading restrictions exhibit a supply effect on the Issue Date for Japanese SEOs. The above discussion motivates the need to examine

the effect of the change in the supply of shares for both types of stocks, namely those that are short-sales constrained and those without such trading restrictions, while controlling for the divergence of opinion. Accordingly, we now discuss the proxies employed to measure the divergence of opinion and to control for its effect in our analyses.

Consistent with Boehme et al. (2006), we use the mean square error, *MSE*, as a proxy for the divergence of opinion among investors. The mean square error is computed as the deviation from the value predicted by the Fama-French three-factor model for the period from -70 days to -11 trading days before the Announcement Day.[21] The descriptive statistics in Table 2 show that *MSE* is significantly higher for Non-Eligible stocks, which indicates a greater divergence of opinions among investors.

To capture divergence of opinion we use *D_Breadth* as an alternate measure for the divergence of opinion, which is defined as the change in *Breadth*, a variable introduced by Chen et al. (2002). If t_0 is the event year, then *Breadth* is defined as the ratio of the number of mutual funds that own the stock in the year prior to the equity offerings (t_{-1}) divided by the total number of mutual funds in the year t_{-1}. However, Chen et al. (2002) note that *Breadth* is highly correlated with firm size, indicating that more funds hold large stocks. To purge their measure from firm fixed effects, we follow the Chen et al. (2002) suggestion and develop *D_Breadth*. If t_0 is the event year, then *D_Breadth* is defined as the change in *Breadth* from event year t_{-2} to event year t_{-1}. It measures the relative change in the level of mutual fund interest in the stock. The descriptive statistics in Table 2 show that *D_Breadth* is significantly larger for the Non-Eligible sub-sample. Consistent with *MSE, D_Breadth* also indicates a greater divergence of opinion for the short-sales constrained stocks.

[21] We also use dispersion of analysts' earnings forecasts as a proxy for the divergence of opinion. The sample size for which analysts' forecasts are available is significantly smaller but the results are qualitatively the same.

Table 7 presents the multivariate analyses of the divergence of opinion (*MSE, D_Breadth*) effect on stock prices around SEOs. *MSE* and *D_Breadth* are as defined earlier. The layout of the Table 7 follows that adopted in Table 4. Models 1 through 5 of Table 7 pertain to the announcement date (AD) and models 6 through 10 analyze the issue date (ID) returns. Model 1 is reproduced from Table 4 for ready reference and ease of comparison. In models 2 through 5 of Table 7 we use different proxies for the divergence of opinion. In models 2 and 4 we employ *MSE* and D*_Breadth*, respectively. We introduce an indicator variable in each of models 3 and 5. In Model 3, *High MSE* is a dummy variable which takes the value of one if *MSE* is higher than the median for the total sample. Likewise, in model 5, *High D_Breadth* is an indicator variable that takes the value of one if D*_Breadth* is higher than the median for the total sample.

In models 2 and 3, the short-sales constraint variables *MSE* and *High MSE*, are significantly positive. However, the results are less clear in Models 4 and 5. In Models 4 and 5, where we employ D*_Breadth* and *High D_Breadth*, we find that the divergence of opinion proxies are, at best, only marginally significant. These results do not offer a robust support for the argument that divergence of opinion is as critical a factor in the incidence of a downward sloping demand curve. The AD results noted earlier in Table 4 are unaffected by the introduction of the divergence of opinion proxies.

Models 6 through 10 of Table 7 focus on the effect of divergence of investor opinion and the impact of the supply shock from the newly issued shares at the SEOs' Issue Date (ID). The layout of the last five models of Table 7 mirror the analyses in the corresponding models 1 through 5 which analyze the announcement date (AD) returns. Model 6, of Table 7 is identical to Model 3 of Table 4, reproduced for ready reference and ease of comparison.

The coefficient of *RelOffSize* is negative and significant in each of the models (7 through 10)

for the short sales constrained sample. On the other hand, the *RelOffSize* coefficient is statistically insignificant and not different from zero in any of the four models. These findings indicate that, regardless of the level of the divergence of opinion, the offer size is not related to the Issue Day returns for the stocks which do not face trading restrictions. On the other hand, the results for the trading restricted stocks exhibit a supply effect. These findings are consistent with the results documented in Table 4. As with the AD results, the ID results noted earlier in Table 4 are also unaffected by the introduction of the divergence of opinion proxies.

In three of the four models (7, 8 and 10) the divergence of opinion proxy is insignificant. These results again do not provide robust support for the divergence of opinion as a critical factor in the incidence of a supply effect or a downward sloping demand curves.

It must be noted that no new information is revealed on the Issue Day. However, this is the day when new shares from the SEO are actually released into the market. The supply effect is noted only for the short-sales constrained sample. On the other hand, the demand curve is close to horizontal for low volatility stocks, so the supply shock impact on Eligible stock returns is negligible. These results are robust to the introduction of different proxies for the divergence of opinion. Our results are supportive of the proposition that trading restrictions play a more important role in the incidence of downward sloping demand curves for stocks. We consider these findings to be supportive of our *Trading Restrictions hypothesis.*

7. Japanese SEO Process: Pre- and Post-1994

Using a sample of Japanese SEOs from 1974-1991, Cooney et al. (2003) document a positive stock price reaction for Japanese equity offer announcements. Eckbo et al. (2007) wonder "…whether this surprising result holds up in samples of Japanese SEOs after 1992, as well as

internationally as other countries start to adopt the firm commitment method, remains an interesting issue for future research."(p. 321). As noted before, book-built, firm-commitment offering process was introduced in Japan in 1994. Since March 1994, all SEOs in Japan have used the book building procedure. Eckbo's (2007) conjecture is very apt. We find that the introduction of the book-built SEOs did indeed change the landscape.

To analyze the changes that have taken place since the Cooney et al. (2003) study, we need to briefly reacquaint ourselves with the institutional arrangements in their sample period (1974-1993) and then discuss the changes and their effect. In the Cooney et al. (2003) sample period, during the pre-book-building stage, underwriters were exposed to significant price risk.[22] Cooney et al. (2003) argue that the positive price reaction to SEO announcements reflect the underwriters' exposure to that risk. Thus the investment banks' decision to underwrite an SEO was viewed as a certification of the issuer.

However, there have been several changes in the institutional details since the Cooney et al. (2003) sample period. First, as noted in Section 2, the subscription period begins after the offer price is determined at the end of trading on PD and extends for 2-3 days, until the end of the subscription period. During this period, the banker is exposed to considerable price risk. If the stock's price drops below the offer price, the entire offer would devolve on the underwriter. The average number of days in the subscription period has been reduced from an average of approximately 6.5 days in the Cooney et al. (2003) sample period to less than 3 days now. Thus, in the post-1993 period, the number of days of exposure to price risk for the investment banker has

[22] In Japan, the investment banker is exposed to price risk as soon as the offer price has been determined until the end of the subscription period. Once the firm-commitment price is set, the underwriter is exposed to price risk from any new information about the issuer which can potentially move the issuer's stock price below the SEO's offer price. In such an event, the investors will choose not to buy any of the new shares from the offer and the entire offer will devolve on the underwriter. It is for this reason that underwriters are allowed to provide price support during the subscription period. Nonetheless, if the underwriter were to provide price support, she would be exposed to the possibility of purchasing and holding the new shares of stock.

been reduced significantly.

Second, the investment banker now prices the SEO after considerable information-acquisition from building the book in the pre-offer price determination period. The SEO process allows the underwriter to augment her information set with help from informed investors during the book-building procedure. Accordingly, the underwriting risk is considerably reduced. Thus, the underwriter has less reason to be compensated for taking on the risk of issuing stock in a potentially overvalued firm.

The findings of our analysis are reported in Tables 8 and 9. Underwriters can alleviate their price-support risk by using higher discounts (lower offer price relative to the concurrent stock price). In this regard, the results in Table 8 indicate that (i) the offer-price discount is higher for Non-Eligible SEOs, and that (ii) the offer-price discount for Non-Eligible SEOs, is positively associated with subscription period whereas the offer-price discount for Eligible stock SEOs is not. Specifically, the results in Models 4 and 5, Table 8 show that the number of days between PD and ID is significantly related to the price discount for the trading restricted stocks only. Corwin (2003) argues that even if there is no information asymmetry, the "time lag between offer pricing and distribution may lead to uncertainty and underpricing." (pg. 2253-2254). Accordingly, it is our contention that these results indicate that the underwriter views the days between PD and ID indicative of greater uncertainty for the trading restricted stocks; the offer is priced lower (greater discount) the longer the interval between the two event days, for the short-sales constrained stocks only. These findings are consistent with our hypothesis that underwriters realize that the trading restricted stocks under-react to bad news because they are short-sales constrained and are thus more likely to be overvalued; with the accompanying risk that some overvalued stock may fall to their intrinsic price during the subscription period.

In Table 9, we present evidence related to the frequency of withdrawn offerings and the change in the number of days in the subscription period from 1980 through 2010. With the exception of the very atypical Japanese real-estate bubble-bust period of 1990-1991, the number of withdrawn SEOs was very limited in the 1974-1989 period. The number of withdrawn SEOs has increased significantly since 1994. The ability to withdraw an SEO allows the investment banker to reduce her price risk. Also as noted above, the number of days in the subscription period has declined significantly from an average of 6.5 days to under 3 days in the more recent period.

To sum, we infer that institutional attributes of SEOs changed significantly in the post-1993 period. The revised norms have significantly diluted "certification" effects documented by Cooney et al (2003) for their sample period. There is greater variability in the quality of the issuers and the fact that investment bankers are more closely assessing their risk from underwriting a more varied clientele implies that they are no longer "certifying" issuers as they may have done in the past.

8. Conclusions

Greenwood (2009) argues that trading restrictions steepen the demand curve for affected stock by removing prospective liquidity suppliers. Greenwood argues that as long as there are traders willing and ready to trade but are prevented from doing so, the demand curve for common stocks will be downward sloping. Further, stock returns will be negative when the trading constraints are relaxed. The key insight from Greenwood's (2009) proposition is that when trading restrictions are binding, a change in the supply of shares affects the stock price, even though it may be unrelated to any new information about the firm.

Japan provides an ideal setting to examine Greenwood's proposition. First, there are groups of stocks in Japan with and without trading restrictions. We refer to the short-sales constrained stocks

as Non-Eligible and the unconstrained stocks are termed Eligible. Second, the use of Japanese SEO data offers several advantages. The Japanese underwriting process separates the offer-price determination date from the Issue Day by a minimum of five days. Thus, we are able to directly examine the impact of an influx of new SEO shares, from issuers with and without short-sales restrictions on their stocks, while circumventing several confounding effects associated with the offer-date in U.S. based SEOs.[23] Our main findings are as follows.

At the SEOs' announcement, the abnormal returns of the Non-Eligible sample are significantly less negative than that of the Eligible sample. We argue that this effect, consistent with Nagel (2005), is driven by the fact that investors are restricted from participating in the stock's price discovery process due to trading restrictions.

On the SEO's Issue Day, the price reaction is significantly negative only for the Non-Eligible issuer's stock. The difference in the price reaction between the two types of issuers is economically and statistically significant. Consistent with our argument above, we posit that short-sales constraints restrict investors from joining in the price discovery process. As a result, the market under-reacts to the information initially. However, on the Issue Day, when there is an increased supply of new shares, the stocks with trading restrictions experience a significant price decline. The lack of a post-issue price recovery is inconsistent with a temporary price pressure. The price drop on the Issue Day, exclusively for the trading restricted stock SEOs. Further, our finding that the size of the new issue is associated with a significant permanent price drop on the Issue Day *only* for the trading restricted sample is consistent with Greenwood (2009) and supports the *Trading Restrictions Hypothesis*. We conduct further tests to allay potential endogeneity concerns

[23] U.S.-based studies are not in a position to disentangle the confounding effects surrounding the offer's Issue Day. In the US, the offer-price determination date coincides with the offer's Issue Day. Hence, the effects related to manipulative short-sales, the information content of the offer price discount, the offer-size amendment and the possible temporary price effects related to the size of the offer, all potentially impact the offer-date price reaction.

that our results could be driven by liquidity differences between the two sub-samples. The robustness analyses, employing a sample of Eligible and Non-Eligible observations matched on firm-size and liquidity, provides results consistent with our main findings.

We also examine and find trading volume changes consistent with the idea that short-sales constraints curb the market's ability to incorporate the SEO information into its stock price. The abnormal trading volume of the Non-Eligible stocks is relatively smaller than the corresponding trading volume for Eligible stocks from the announcement of the SEO until the day preceding the SEO's Issue Day (ID – 1 in event time, where ID is the Issue Day). On and after the Issue Day, the increased supply of new shares affects the trading volume and stock prices significantly only for the short-sales constrained sample.

Prior literature has argued that short sale constraints and the divergence of opinion are both critical factors that cause demand curves for stocks to be downward-sloping. Hence, there is a need to evaluate the relative importance of the divergence of opinion and trading restrictions' effect on the demand curve when the supply of shares increases, for stocks that are short-sales constrained and those without such restrictions. Our results are robust and hold controlling for the level of the divergence of opinion. The analyses does not rule out the divergence of opinion as a factor affecting the demand curve for stocks. However, the results indicate that trading restriction is a relatively more robust factor in the incidence of downward sloping demand curves. These findings are consistent with Greenwood (2009) and are supportive of the *Trading Restriction Hypothesis.*

References

Aitken, M.J., A. Frino, M.S. McCorry, and P. Swan, 1998. Short Sales are almost Instantaneously Bad news: Evidence from the Australian Stock Exchange. *Journal of Finance*, 53, 2205-2223.

Altınkılıç, O., and R. Hansen, 2003. Discounting and Underpricing in Seasoned Equity Offers. *Journal of Financial Economics*, 69, 285–323.

Amihud, Y., 2002. Illiquidity and Stock Returns: Cross-section and Time-series Effects. *Journal of Financial Markets*, *5*, 31–56.

Asquith, P. and L. Meulbroek, 1995. An Empirical Investigation of Short Interest. *Harvard Business School working paper*.

Baker, M., and J. Wurgler, 2002. Market Timing and Capital Structure. *Journal of Finance*, 57, 1-32.

Barclay, M.J., and R.H. Litzenberger, 1988. Announcement Effects of New Equity Issues and the Use of Intraday Price Data. *Journal of Financial Economics*, 21, 71–99.

Beneish, M.D., C.M.C. Lee, and D.C. Nichols, 2015. In Short Supply: Short-Sellers and Stock Returns. *Journal of Accounting and Economics*, 60, 33–57.

Berkman, H., V. Dimitrov, P. Jain, P. Koch, and S. Tice, 2009. Sell on the News: Differences of Opinion, Short-sales Constraints, and Returns around Earnings Announcements. *Journal of Financial Economics*, 92, 376–399.

Blocher, J., A.V. Reed, and E.D. Van Wesep. 2013. Connecting Two Markets: An Equilibrium Framework for Shorts, Longs, and Stock Loans. *Journal of Financial Economics*, 108, 302–322.

Boehme, R.D., B.R. Danielsen and S.M. Sorescu, 2006. Short-Sale Constraints, Differences of Opinion, and Overvaluation. *Journal of Financial and Quantitative Analysis*, 41, 455–487.

Bris, A., W. Goetzmann, and N. Zhu, 2007. Efficiency and the Bear: Short Sales and Markets around the World, *Journal of Finance*, 62, 1029-1079.

Chan, K., N. Nayar, A.K. Singh and W. Yu, 2017. Information Content of Offer-Date Revelations: A Fresh Look at Seasoned Equity Offerings. *Working Paper,* Lehigh University.

Chen, J., H. Hong, and J.C. Stein, 2002. Breadth of Ownership and Stock Returns. *Journal of Financial Economics*, 66, 171–205.

Cooney, J.W. and A. Kalay, 1993. Positive Information from Equity Issue Announcement. *Journal*

of Financial Economics, 33, 149–172.

Cooney, J.W., H.K. Kato, and J.S. Schallheim, 2003. Underwriter Certification and Japanese Seasoned Equity Issues. *Review of Financial Studies*, 16, 949–982.

Corwin, S.A., 2003. The Determinants of Underpricing for Seasoned Equity Offers. *Journal of Finance*, 58, 2249–2280.

Danielsen, B. and S. Sorescu, 2001. Why Do Option Introductions Depress Stock Prices? A Study of Diminishing Short Sale Constraints. *Journal of Financial and Quantitative Analysis*, 36, 451-484.

Eckbo, B., R. W. Masulis, and O. Norli, 2007. Security Offerings. E. Eckbo (ed.), *Handbook of Corporate Finance: Empirical Corporate Finance*, North-Holland/Elsevier, Chapter 13.

Field, L., and G. Hanka, 2001. The Expiration of IPO Share Lockups. *Journal of Finance*, 56, 471–500.

Gerard, B., and V. Nanda, 1993. Trading and Manipulation around Seasoned Equity Offerings. *Journal of Finance*, 48, 213–245.

Greenwood, R. 2009. Trading Restrictions and Stock Prices. *Review of Financial Studies*, 22, 509-539.

Henry, T.R., and J.L. Koski, 2010. Short Selling around Seasoned Equity Offerings. *Review of Financial Studies*, 23, 4389–4418.

Hirose, T., H.K. Kato, and M. Bremer, 2009. Can Margin Traders Predict Future Stock Returns? *Pacific Basin Finance Journal*, 17, 41–57.

Hong, H., J. Scheinkman, and W. Xiong, 2006. Asset Float and Speculative Bubbles. *Journal of Finance*, 61, 1073-1117.

Kim, K.A., and H.H. Shin, 2004. The Puzzling Increase in Underpricing of Seasoned Equity Offerings. *Financial Review*, 39, 343-365.

Krasker, W.C., 1986. Stock Price Movements in Response to Stock Issues under Asymmetric Information. *Journal of Finance*, 41, 93-106.

Lynch, A.W. and R.R. Mendenhall, 1997. New Evidence on Stock Price Effects Associated with Changes in the S&P 500 Index. *Journal of Business*, 70, 351-383.

Meidan, D., 2005. A Re-Examination of Price Pressure around Seasoned Equity Offerings. *Working Paper*, Northwestern University.

Miller, E., 1977. Risk, Uncertainty and Divergence of Opinion. *Journal of Finance*, 32, 1151-68.

Myers, S., and N. Majluf, 1984. Corporate Financing and Investment Decisions when Firms Have Information that Investors do not. *Journal of Financial Economics*, 13, 187–221.

Nagel, S., 2005. Short Sales, Institutional Investors and the Cross-section of Stock returns. *Journal of Financial Economics*, 78, 277-309.

Ofek E., and M. Richardson, 2003. Dotcom Mania: The Rise and Fall of Internet Stock Prices. *Journal of Finance*, 58, 1113-1137.

Safieddine, A., and W.J. Wilhelm, 1996. An Empirical Investigation of Short-Selling Activity prior to Seasoned Equity Offerings. *Journal of Finance*, 51, 729-749.

Schultz, P., 2008. Downward-Sloping Demand Curves, the Supply of Shares, and the Collapse of Internet Stock Prices, *Journal of Finance*, 63, 351-378.

Shleifer, A. 1986. Do Demand Curves for Stocks Slope Down? *Journal of Finance*, 41, 579-590.

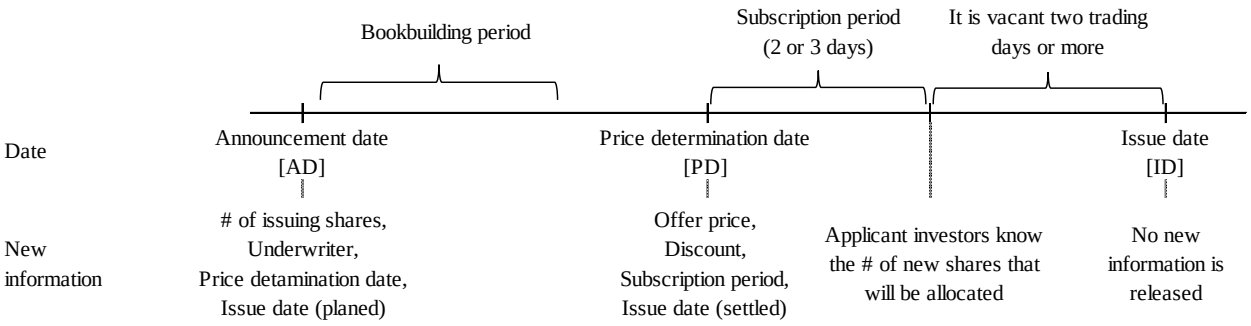

Figure 1: The schedule of events for Japanese SEOs from announcement (AD) to the Issue Day (ID)

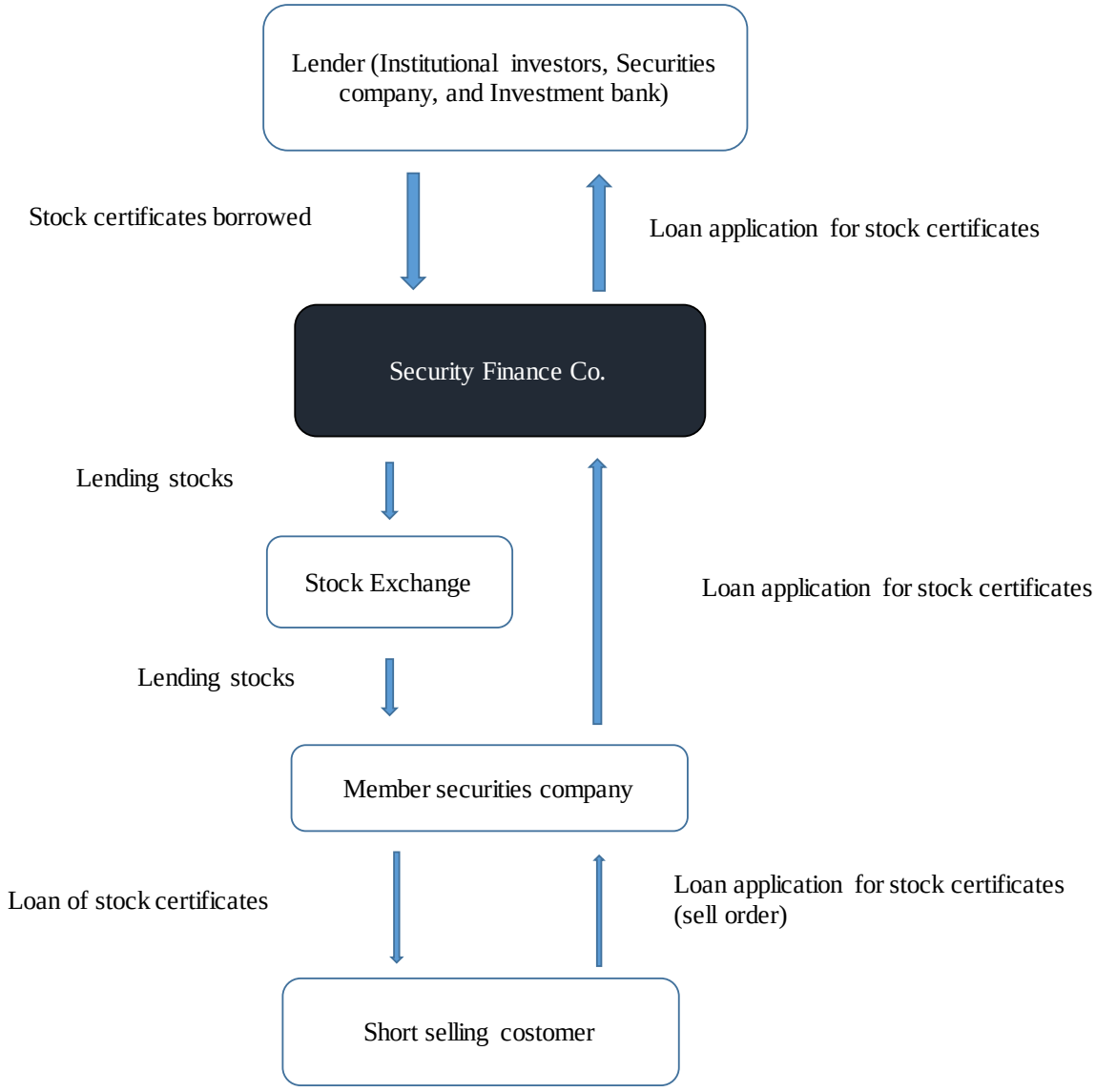

Figure 2: Outline of Short Selling Transactions (margin trading) in Japan

Table 1
Summary of hypotheses

Hypotheses	Short-sales constraints	Prediction			
		Announcement day return	Issue day return	Volume change	Timing
Trading Restriction	Short-sales constrained (Non-Eligible stock)	Under-reaction; Less negative price reaction than for unconstrained stocks.	Negative and Permanent effect; Not a Temporary effect. (The price reaction should be negatively associated with issue size)	Positive (High)	Frequent offers; SEOs "time" overpriced stock
	No short-sales constraints (Eligible stock)	Negative	No effect	Positive (Low)	Less frequent; Less able to "time" sale of overpriced equity
Information asymmetry	Short-sales constrained (Non-Eligible stock)	Under-reaction; Less negative price reaction than for unconstrained stocks.	No effect		Frequent offers; SEOs "time" overpriced stock
	No short-sales constraints (Eligible stock)	Negative	No effect		Less frequent; Less able to "time" sale of overpriced equity
Temporary Price pressure			Temporary effect; that is, Negative before/on Issue Date and Positive after Issue Date (Price reversal associated with issue size)		

Table 2
Summary statistics

This table provides summary statistics for the SEO sample. The sample consists of 755 SEOs of Japanese listed firms from 1998-2011. The first column shows summary statistics for the total sample. The second and third columns provide summary statistics for the Eligible and the Non-Eligible samples. *Eligible* is the dummy variable that takes a value equal to one if the issuer is an eligible stock and a value of zero otherwise. *MSE* is defined as the mean square error, is computed as the deviation from the value predicted by the Fama-French three factor model for the period from -70 days to -11 trading days before the announcement date. *Breadth* is defined as the ratio of the number of mutual funds that own the stock in the year prior to the equity offerings (t_{-1}) divided by the total number of mutual funds in the year t_{-1}, where t_0 is the event year. *D_Breadth* is defined as the change in *Breadth* from event year t_{-2} to event year t_{-1}. *Asset* is the sum of the market value of the firm's equity at the last day of the month preceding the SEO announcement and the book-value of assets, as of the previous fiscal year end. *Proceeds* are the total proceeds of the offering. *Asset* and *Proceeds* are adjusted for 2005 purchasing power. *RelOffSize* is defined as the total number of new offering shares divided by the outstanding shares prior to the offering. *BTM* is the book-to-market ratio. *Issue discount* is defined as negative one times the return from the previous day's closing transaction price to the offer price. *Major UW* is the dummy variable that takes a value equal to one if the underwriter is one of the Top three underwriters (Daiwa, Nikko, and Nomura) in Japanese SEO market and a value of zero otherwise.

		Total (N = 755)	*Eligible* (N = 257)	*Non Eligible* (N = 498)	Diff	t-stat	
Eligible	Mean	0.340					
MSE	Mean	2.991	2.348	3.322	-0.974	-9.87	***
	Median	2.736	2.180	3.161			
	Std.dev	1.365	1.078	1.381			
D_Breadth	Mean	0.0009	0.0005	0.0011	-0.001	-2.22	**
	Median	0.0004	0.0004	0.0005			
	Std.dev	0.0032	0.0044	0.0023			
	N	714	253	461			
Asset	Mean	315.07	765.04	82.85	682.19	5.57	***
(billion yen)	Median	44.74	127.09	32.35			
	Std.dev	1626.80	2687.71	367.85			
Proceeds	Mean	11.500	26.200	3.950	22.250	7.42	***
(billion yen)	Median	2.280	5.080	1.730			
	Std.dev	40.500	65.700	9.430			
RelOffSize	Mean	0.138	0.144	0.135	0.008	1.69	*
	Median	0.127	0.126	0.128			
	Std.dev	0.065	0.078	0.056			
BTM	Mean	0.506	0.606	0.454	0.153	5.07	***
	Median	0.409	0.510	0.344			
	Std.dev	0.399	0.420	0.378			
Issue discount	Mean	3.476	3.095	3.673	-0.577	-8.48	***
	Median	3.060	3.030	3.500			
	Std.dev	0.928	0.866	0.898			
Average SSVOL	Mean		0.203				
	Median		0.157				
	Std.dev		0.173				
Major UW	Mean	0.738	0.774	0.719	0.055	1.64	
	Median	1.000	1.000	1.000			
	Std.dev	0.440	0.419	0.450			

Table 3
Abnormal returns and cumulative abnormal returns around the SEO

This table shows the average abnormal returns (*AR*) and cumulative abnormal returns (*CAR*) around the announcement day and the issue date for the total sample. Panel A shows the *AR* and *CAR* for total sample. Panels B to D present the *AR* and *CAR* for the sample divided by the short sales constraint, the issue size, and the divergence of opinion (*Eligible* vs. *Non-Eligible*, *Low RelOffSize* vs. *High RelOffSize*). *Eligible* is the dummy variable that takes a value equal to one if the issuer is an eligible stock and a value of zero otherwise. *RelOffSize* is defined as the total number of new offering shares divided by the outstanding shares prior to the offering. Statistical significance levels of the average *AR* and *CAR* are based on a cross-sectional t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

Panel A: Total

(N=755)	Mean	t-statistics	# of negative sample	% of negative sample
CAR[AD-45, AD-2]	8.45	10.41 ***	281	37.22%
AR[AD]	-2.55	-11.19 ***	558	73.91%
CAR[AD-1, AD]	-2.48	-9.39 ***	545	72.19%
CAR[AD+1, ID-1]	-2.46	-5.17 ***	474	62.78%
CAR[AD-1, ID-1]	-4.93	-8.87 ***	518	68.61%
CAR[AD-1, ID]	-6.76	-12.14 ***	566	74.97%
AR[ID]	-1.83	-11.17 ***	522	69.14%
CAR[AD-1, PD]	-4.26	-9.64 ***	543	71.92%
CAR[PD+1, ID]	-2.50	-7.66 ***	505	66.89%
CAR[ID+1, ID+10]	-0.71	-1.87 *	441	58.41%
CAR[ID+1, ID+20]	-0.80	-1.55	424	56.16%

Panel B: Eligible vs. Non Eligible

	Eligible (a)		*Non Eligible (b)*		(a) - (b)	t-statistics
	Mean	t-statistics	Mean	t-statistics		
CAR[AD-45, AD-2]	3.61 ***	3.75	10.95 ***	9.86	-7.34	-4.33 ***
AR[AD]	-4.44 ***	-12.68	-1.57 ***	-5.52	-2.87	-6.12 ***
CAR[AD-1, AD]	-4.80 ***	-12.23	-1.28 ***	-3.84	-3.52	-6.50 ***
CAR[AD+1, ID-1]	-4.10 ***	-6.25	-1.61 **	-2.54	-2.49	-2.49 **
CAR[AD-1, ID-1]	-8.90 ***	-11.56	-2.88 ***	-3.97	-6.02	-5.22 ***
CAR[AD-1, ID]	-9.09 ***	-11.36	-5.55 ***	-7.60	-3.53	-3.02 ***
AR[ID]	-0.19	-1.03	-2.67 ***	-12.13	2.48	7.46 ***
CAR[AD-1, PD]	-8.17 ***	-11.66	-2.24 ***	-4.13	-5.93	-6.54 ***
CAR[PD+1, ID]	-0.91 **	-2.29	-3.31 ***	-7.44	2.40	3.52 ***
CAR[ID+1, ID+10]	-0.52	-1.27	-0.81	-1.51	0.29	0.36
CAR[ID+1, ID+20]	0.53	0.89	-1.49 **	-2.08	2.02	1.86 *
N	257		498			

Panel C: Low RelOffSize vs. High RelOffSize

	Low RelOffSize (a)		*High RelOffSize (b)*		(a) - (b)	t-statistics
	Mean	t-statistics	Mean	t-statistics		
CAR[AD-45, AD-2]	7.19 ***	6.88	9.71 ***	7.83	-2.52	-1.56
AR[AD]	-1.85 ***	-6.36	-3.25 ***	-9.36	1.40	3.10 ***
CAR[AD-1, AD]	-1.62 ***	-4.58	-3.34 ***	-8.61	1.72	3.28 ***
CAR[AD+1, ID-1]	-1.64 **	-2.53	-3.27 ***	-4.72	1.62	1.71 *
CAR[AD-1, ID-1]	-3.26 ***	-4.49	-6.60 ***	-7.93	3.34	3.02 ***
CAR[AD-1, ID]	-4.53 ***	-6.08	-8.99 ***	-11.07	4.47	4.05 ***
AR[ID]	-1.26 ***	-5.81	-2.39 ***	-9.93	1.12	3.46 ***
CAR[AD-1, PD]	-2.90 ***	-4.83	-5.62 ***	-8.77	2.72	3.09 ***
CAR[PD+1, ID]	-1.62	-3.57	-3.37 ***	-7.27	1.75	2.69 ***
CAR[ID+1, ID+10]	-0.57	-1.25	-0.85	-1.40	0.28	0.38
CAR[ID+1, ID+20]	-0.46	-0.64	-1.14	-1.55	0.68	0.66
N	377		378			

Table 4
Ordinary least square regressions of the abnormal announcement-day return and the abnormal issue day return

This table shows ordinary least square regressions of the abnormal return on the announcement day and the issue day. We use *Eligible* as measure of the short sales constraint. *Eligible* is the dummy variable that takes a value equal to one if the issuer is an eligible stock and a value of zero otherwise. *RelOffSize* is defined as the total number of new offering shares divided by the outstanding shares prior to the offering. *ln(Asset)* is the natural logarithm of the sum of the market value of the firm's equity at the last day of the month preceding the SEO announcement and the book-value of assets, as of previous fiscal year end. *Assets* are adjusted for 2005 purchasing power. *BTM* is the book-to-market ratio. Heteroscedasticity-adjusted t-statistics are presented in parentheses below the regression coefficients. *, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

	Announcement return		Issue day return	
VARIABLES	Model 1	Model 2	Model 3	Model 4
Eligible	-2.56***	-37.53***	2.17***	15.06***
	(-5.29)	(-4.13)	(6.44)	(2.68)
RelOffSize	-15.04***	-19.67***	-9.13**	-15.94**
	(-3.37)	(-3.35)	(-2.44)	(-2.53)
Eligible x RelOffSize		5.76		15.94**
		(0.65)		(2.32)
ln(Asset)	-0.17	-0.97***	0.35***	0.61***
	(-0.96)	(-3.16)	(3.24)	(3.13)
Eligible x ln(Asset)		1.38***		-0.60***
		(3.80)		(-2.74)
BTM	0.43	0.03	-0.81*	-1.01**
	(0.71)	(0.05)	(-1.85)	(-2.36)
Constant	4.37	24.74***	-9.60***	-14.93***
	(0.98)	(3.19)	(-3.65)	(-2.99)
Observations	755	755	755	755
Adjusted R-squared	0.067	0.084	0.101	0.118

Table 5
Abnormal volume around announcement date and issue date

This table shows the abnormal trading volume (*ABVOL*) around the announcement date and the issue date. ABVOL is defined as follow,

$$ABVOL_{i,t} = \frac{\text{Turnover}_{i,t}}{\text{AveTurnover}_i} - \frac{\text{Turnover}_{m,t}}{\text{AveTurnover}_m}$$

$\text{Turnover}_{i,t}$ is defined as daily volume/outstanding share before issue of firm i on date t. $\text{Turnover}_{m,t}$ is defined as value weighted average market turnover of all public companies on date t. AveTurnover is defined as average daily turnover (daily volume/daily outstanding share) from AD-95 to AD-46. ABVOL is winsorized at the 99th percentile & 1st percentile. First column shows results for the total sample. The other columns present results for the sub groups divided by the short sales constraints (*Eligible* and *Non-Eligible*). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

	Total	*Eligible*	*Non Eligible*	Diff	
AD-10	0.09	0.21	0.03	0.19	
AD-9	0.11	0.26	0.04	0.22	**
AD-8	0.16	0.13	0.17	-0.04	
AD-7	0.16	0.07	0.20	-0.13	
AD-6	0.19	0.13	0.22	-0.09	
AD-5	0.13	0.06	0.16	-0.11	
AD-4	0.10	0.10	0.10	0.01	
AD-3	0.18	0.19	0.18	0.01	
AD-2	0.27	0.20	0.31	-0.11	
AD-1	0.42	0.38	0.44	-0.06	
AD	1.85	2.21	1.67	0.54	**
AD+1	1.49	2.39	1.02	1.37	***
AD+2	0.71	1.25	0.43	0.82	***
AD+3	0.52	1.04	0.25	0.79	***
AD+4	0.71	1.33	0.39	0.94	***
ID-4	1.45	2.49	0.91	1.58	***
ID-3	1.23	2.04	0.81	1.23	***
ID-2	1.06	1.75	0.70	1.05	***
ID-1	1.39	2.60	0.77	1.83	***
ID	10.39	10.40	10.39	0.02	
ID+1	3.28	2.98	3.43	-0.45	
ID+2	2.61	2.29	2.77	-0.48	
ID+3	2.35	2.11	2.47	-0.36	
ID+4	1.94	1.86	1.98	-0.12	
ID+5	1.84	1.59	1.97	-0.38	
ID+6	1.90	1.84	1.94	-0.10	
ID+7	1.91	1.53	2.10	-0.57	
ID+8	1.86	1.41	2.09	-0.68	
ID+9	1.69	1.29	1.90	-0.61	
ID+10	1.49	1.38	1.54	-0.16	

Table 6
Probability of SEO announcements.

The table shows yearly SEO announcement probabilities as functions of the market timing and the variables of short sales constraints and the divergence of opinion. We use the market timing variable as the previous one year's index-adjusted stock return (*Previous return*) and book-to-market ratio (*BTM*) on previous fiscal year end. At the beginning of each fiscal year, firms are independently sorted into three groups based on the market timing variables (*Previous return* and *BTM*) and the variable of short sales constraints (*Eligible* and *Non Eligible*). Our sample of potential SEO announcers consists of 49,594 firm-year observations from 1998 to 2011. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, in two-tailed tests.

Panel A: Previous return

	Previous return	SEO probability						
		Total	*Previous return*			(A) - (B)	t-stat	
			Low (A)	Middle	High (B)			
Total	-0.81%	1.51%	0.60%	0.98%	2.93%	-2.33%	-16.13	***
Eligible	0.39%	1.08%	0.73%	0.79%	1.68%	-0.95%	-5.09	***
Non Eligible	-1.76%	1.84%	0.52%	1.15%	3.97%	-3.45%	-16.47	***
E minus Non-E	2.15%	-0.76%	0.21%	-0.36%	-2.29%			
t-statistics	6.98***	-6.90***	1.72*	-2.34**	-8.69***			

Panel B: BTM

	BTM	SEO probability						
		Total	*BTM*			(a) - (b)	t-stat	
			Low (a)	Middle	High (b)			
Total	1.26	1.51%	3.03%	1.10%	0.39%	2.64%	18.63	***
Eligible (a)	1.14	1.08%	1.75%	0.84%	0.54%	1.21%	6.37	***
Non Eligible (b)	1.36	1.84%	4.15%	1.36%	0.30%	3.85%	19.02	***
(a) - (b)	-0.21	-0.76%	-2.40%	-0.52%	0.24%			
t-statistics	-26.24***	-6.90***	-8.99***	-3.18***	2.38***			

Table 7
Ordinary least square regressions of the abnormal announcement-day return and the abnormal issue-day return

This table shows ordinary least square regressions of the abnormal return on the announcement day and the issue day. We use *Eligible* as measure of the short sales constraint. *Eligible* is the dummy variable that takes a value equal to one if the issuer is an eligible stock and a value of zero otherwise. We use *MSE* and *D_Breadth* as a measure of the divergence of opinion. *MSE* is defined as the mean square error, is computed as the deviation from the value predicted by the Fama-French three factor model for the period from -70 days to -11 trading days before the announcement date. *High MSE* is a dummy variable which take a value equal one if the *MSE* is higher than the median of total sample. *Breadth* is defined as the ratio of the number of mutual funds that own the stock in the year prior to the equity offerings (t_{-1}) divided by the total number of mutual funds in the year t_{-1}, where t_0 is the event year. *D_Breadth* is defined as the change in *Breadth* from event year t_{-2} to event year t_{-1}. *High D_Breadth* is a dummy variable which take a value equal one if the *D_Breadth* is higher than the median of total sample. *RelOffSize* is defined as the total number of new offering shares divided by the outstanding shares prior to the offering. *ln(Asset)* is the natural logarithm of the sum of the market value of the firm's equity at the last day of the month preceding the SEO announcement and the book-value of assets, as of previous fiscal year end. Assets are adjusted for 2005 purchasing power. *BTM* is the book-to-market ratio. Heteroscedasticity-adjusted t-statistics are presented in parentheses below the regression coefficients. *, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

	Announcement return					Issue day return				
DOO proxy		*MSE*	*High MSE*	*D_Breadth*	*High D_Breadth*		*MSE*	*High MSE*	*D_Breadth*	*High D_Breadth*
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Eligible	-2.56***	-39.81***	-39.75***	-37.02***	-35.21***	2.17***	15.62***	15.46***	15.21**	14.66**
	(-5.29)	(-4.35)	(-4.35)	(-3.92)	(-3.73)	(6.44)	(2.76)	(2.73)	(2.57)	(2.46)
DOO proxy		0.58***	1.80***	-25.11	-0.82*		-0.14	-0.33	79.81**	0.37
		(2.61)	(3.58)	(-0.42)	(-1.83)		(-1.03)	(-0.89)	(2.21)	(1.19)
RelOffSize	-15.04***	-21.27***	-21.37***	-20.95***	-21.11***	-9.13**	-15.54**	-15.63**	-16.64**	-16.59**
	(-3.37)	(-3.64)	(-3.68)	(-3.48)	(-3.52)	(-2.44)	(-2.43)	(-2.47)	(-2.58)	(-2.58)
Eligible x RelOffSize		4.62	4.21	6.96	7.04		16.23**	16.23**	17.62**	16.91**
		(0.53)	(0.48)	(0.77)	(0.78)		(2.36)	(2.36)	(2.51)	(2.40)
ln(Asset)	-0.17	-1.00***	-1.02***	-0.96***	-0.89***	0.35***	0.62***	0.62***	0.60***	0.59***
	(-0.96)	(-3.24)	(-3.33)	(-2.94)	(-2.75)	(3.24)	(3.16)	(3.16)	(2.88)	(2.83)
Eligible x ln(Asset)		1.49***	1.50***	1.35***	1.27***		-0.63***	-0.62***	-0.61***	-0.59**
		(4.09)	(4.10)	(3.57)	(3.38)		(-2.85)	(-2.80)	(-2.63)	(-2.50)
BTM	0.43	0.69	0.84	-0.10	-0.20	-0.81*	-1.17**	-1.16**	-0.94**	-0.98**
	(0.71)	(1.05)	(1.29)	(-0.16)	(-0.32)	(-1.85)	(-2.57)	(-2.36)	(-2.09)	(-2.21)
Constant	4.37	23.35***	22.88***	24.60***	24.28***	-9.60***	-14.59***	-14.59***	-14.72***	-15.03***
	(0.98)	(3.00)	(2.97)	(3.03)	(3.00)	(-3.65)	(-2.93)	(-2.94)	(-2.80)	(-2.84)
Observations	755	755	755	714	714	755	755	755	714	714
Adjusted R-squared	0.067	0.094	0.098	0.087	0.091	0.101	0.118	0.118	0.128	0.126

Table 8
Ordinary least square regressions of issue discounts

This table shows ordinary least square regressions of *Issue discounts*, defined as negative one times the return from the previous day's closing transaction price to the SEO's offer price. Columns 1 to 3 show the regression results for total sample. Columns 4 and 5 present the regression results for *Eligible* and *Non Eligible* sample, respectively. Non Eligible is the dummy variable that takes a value equal to one if the issuer is a non-eligible stock and a value of zero otherwise. *Average SSVOL* is defined as the average the number of short selling divided by the number of total volume from PD-1 to PD. *Days from PD to ID* is the number of days from pricing day to issue day. *RelOffSize* is defined as the total number of new offering shares divided by the outstanding shares prior to the offering. *ln(Asset)* is the natural logarithm of the sum of the market value of the firm's equity at the last day of the month preceding the SEO announcement and the book-value of assets, as of previous fiscal year end. Assets are adjusted for 2005 purchasing power. *BTM* is the book-to-market ratio. *Major UW* is the dummy variable that takes a value equal to one if the underwriter is one of the Top three underwriters (Daiwa, Nikko, and Nomura) in Japanese SEO market and a value of zero otherwise. Heteroscedasticity-adjusted t-statistics are presented in parentheses below the regression coefficients. *, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

	Total			*Eligible*	*Non Eligible*
	Model 1	Model 2	Model 3	Model 4	Model 5
Eligible		-0.21***			
		(-3.03)			
Average SSVOL			-0.76***		
			(-4.77)		
Days from PD to ID	0.07***	0.07***	0.07***	0.05	0.07***
	(7.75)	(6.67)	(7.06)	(1.55)	(6.77)
RelOffSize	2.21***	2.18***	2.11***	2.67***	1.56**
	(3.64)	(3.58)	(3.54)	(2.64)	(2.29)
ln(Asset)	-0.21***	-0.18***	-0.20***	-0.16***	-0.22***
	(-10.52)	(-8.58)	(-9.55)	(-6.86)	(-5.62)
BTM	0.57***	0.57***	0.59***	0.50***	0.59***
	(6.17)	(6.09)	(6.30)	(3.39)	(5.05)
Major UW	0.13	0.13*	0.11	0.02	0.19**
	(1.64)	(1.71)	(1.46)	(0.17)	(1.99)
Constant	4.33***	4.15***	4.27***	3.92***	4.53***
	(18.14)	(17.45)	(17.96)	(10.68)	(11.45)
Observations	755	755	755	257	498
Adjusted R-squared	0.228	0.235	0.238	0.174	0.157

Table 9
Withdrawals and Subscription periods of SEOs from 1980 to 2011

This table shows that the frequency of withdrawn SEOs from 1980-2011. It also shows the average number of days in the subscription period from 1980 to 2011.

	Withdraw			Subscription period			
				Fixed offerings		Bookbuilding offerings	
Year	# of withdraw	# of issue	%	Average	# of issue	Average	# of issue
1980	0	205	0.00%	8.05	133		
1981	0	238	0.00%	7.79	166		
1982	0	201	0.00%	8.38	155		
1983	1	69	1.45%	8.65	43		
1984	0	119	0.00%	6.52	100		
1985	0	98	0.00%	6.68	95		
1986	0	75	0.00%	6.21	75		
1987	3	100	3.00%	6.43	97		
1988	0	167	0.00%	5.81	154		
1989	3	244	1.23%	4.71	238		
1990	27	156	17.31%	4.58	118		
1991	7	39	17.95%	4.88	25		
1992	0	6	0.00%	4.80	5		
1993	0	11	0.00%	4.70	10		
1994	1	33	3.03%	4.00	5	2.33	27
1995	0	30	0.00%			2.03	30
1996	0	99	0.00%			2.00	100
1997	3	45	6.67%			2.21	38
1998	0	26	0.00%			2.58	26
1999	2	94	2.13%			2.73	94
2000	1	80	1.25%			2.79	80
2001	0	35	0.00%			3.00	35
2002	1	45	2.22%			3.18	45
2003	1	67	1.49%			3.10	67
2004	0	159	0.00%			3.04	159
2005	1	127	0.79%			2.74	121
2006	3	108	2.78%			2.70	105
2007	0	64	0.00%			2.71	59
2008	2	21	9.52%			2.33	21
2009	0	50	0.00%			2.04	47
2010	0	49	0.00%			2.00	38
Total	56	2,860	1.96%	6.47	991	2.65	1,092
(1) 1980-1993 excluding 1990-1991	7	1533	0.46%				

Table IA.1

The difference between the treatment and control observations in their firm size, liquidity and the offer size

Asset is the sum of the market value of the firm's equity at the last day of the month preceding the SEO announcement and the book-value of assets, as of the previous fiscal year end. *Proceeds* are the total proceeds of the offering. *Asset* and *Proceeds* are adjusted for 2005 purchasing power. *RelOffSize* is defined as the total number of new offering shares divided by the outstanding shares prior to the offering. *ILLQ* is Amihud's (2002) illiquidity measure, and is defined in footnote#20 of the main text.

		Treatment *Non-Eligible (A)* (N = 460)	*Control Eligible (B)* (N = 460)	Diff *(A) - (B)*	t-stat	*Eligible (C)* (N = 257)	Diff *(A) - (C)*	t-stat	
Asset	Mean	86.914	73.324	13.590	0.68	765.04	-678.13	-5.33	***
(billion yen)	Median	34.325	33.942			127.09			
	Std.dev	382.041	191.387			2687.71			
ILLQ	Mean	0.273	0.270	0.003	0.13	0.076	0.20	9.43	***
	Median	0.156	0.158			0.013			
	Std.dev	0.311	0.307			0.162			
Proceeds	Mean	4.104	3.394	0.710	1.20	26.200	-22.10	-7.10	***
(billion yen)	Median	1.815	1.343			5.080			
	Std.dev	9.622	8.343			65.700			
RelOffSize	Mean	0.135	0.138	-0.003	-0.83	0.144	-0.01	-1.44	
	Median	0.127	0.140			0.126			
	Std.dev	0.056	0.052			0.078			

Table IA.2
Abnormal returns and cumulative abnormal returns around the SEO

	Treatment *NonEligible (a)* *(N = 460)*		*Control* *Eligible (b)* *(N = 460)*		(a) - (b)	t-statistics
	Mean	t-statistics	Mean	t-statistics		
CAR[AD-45, AD-2]	11.02 ***	9.46	2.94 ***	4.13	8.08	5.92 ***
AR[AD]	-1.69 ***	-5.94	-3.94 ***	-19.10	2.25	6.42 ***
CAR[AD-1, AD]	-1.41 ***	-4.20	-4.29 ***	-22.59	2.88	7.45 ***
CAR[AD+1, ID-1]	-1.58 **	-2.39	-4.23 ***	-8.09	2.65	3.14 ***
CAR[AD-1, ID-1]	-2.99 ***	-3.95	-8.52 ***	-14.97	5.52	5.83 ***
CAR[AD-1, ID]	-5.62 ***	-7.40	-9.56 ***	-15.67	3.94	4.04 ***
AR[ID]	-2.67 ***	-11.58	-0.97 ***	-5.24	-1.70	-5.75 ***
CAR[ID+1, ID+10]	-0.70	-1.23	0.38	1.08	-1.08	-1.62
CAR[ID+1, ID+20]	-1.26 *	-1.67	-0.48	-0.97	-0.79	-0.87

Table IA.3
Ordinary least square regressions of the abnormal announcement-day return and the abnormal issue day return

	Announcement return		Issue day return	
	Model 1	Model 2	Model 3	Model 4
Eligible	-2.06***	-2.36	1.76***	19.64***
	(-5.86)	(-0.26)	(5.53)	(2.79)
RelOffSize	-21.32***	-18.20***	-12.16***	-16.97**
	(-5.57)	(-2.94)	(-2.75)	(-2.56)
Eligible x RelOffSize		-6.79		10.31
		(-0.93)		(1.24)
ln(Asset)	-0.62***	-0.64**	0.33**	0.68***
	(-3.24)	(-2.32)	(2.43)	(3.15)
Eligible x ln(Asset)		0.05		-0.79***
		(0.14)		(-2.88)
BTM	-0.62	-0.55	-0.12	-0.24
	(-1.23)	(-1.08)	(-0.29)	(-0.63)
Constant	16.61***	16.59**	-9.13***	-16.92***
	(3.46)	(2.40)	(-2.58)	(-3.08)
Observations	920	920	920	920
Adjusted R-squared	0.090	0.089	0.060	0.071