

Informed trading before rights issues

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Abstract

This paper provides evidence of informed trading before and after a rights issue. First, we find significant net buying and selling activity by informed traders prior to the announcement date leading to a temporary price pressure effect. Even though those results are consistent with the presence of short-term manipulative traders, we find little evidence of manipulative trading on announcement effects. Second, we show that informed traders are able to identify the issuer's quality once all issue characteristics have been released. They trade in a direction consistent with their private information before and after the issue: they will buy (sell) shares in SEO firms with better (worse) post-issue price performance leading to a permanent price impact.

JEL classification: G24; G38; G39

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1. Introduction

There is a growing literature centered on informed trading around equity issuance that is mainly concerned with the investment strategies of informed traders and their impact on returns around U.S. firm commitment offers. The present paper aims to contribute to this literature and offers new insights into informed trading around equity offering by studying the specific context of rights issues.

There are several reasons for why there is merit to investigate informed trading around this type of corporate event. First, previous studies showed that informed trading affects the level of subscription and underpricing. Rock (1986) finds that when investors are asymmetrically informed, rationing of oversubscribed offerings causes uninformed investors to receive relatively large (small) allocation of overvalued (undervalued) offers (IPOs). Similarly, Gerard and Nanda (1993) developed a model where manipulative informed traders have an incentive to short sell before the pricing of a public offer in order to force the price to decline. Hence, they increase the issue discount and so aggravate the “winner’s curse”. Safieddine and Wilhelm (1996) and Henry and Koski (2010) also provided evidence of a temporary downward price pressure before public offerings due to manipulative trading on the offer price.

Second, one can imagine that informed trading affects the equity issuance choice. Indeed, in a Myers and Majluf (1984) and Eckbo and Masulis (1992) framework, firms decide to issue equity when the net present value of investment exceeds the cost of issuing equity. The cost of issuing equity depends on the direct flotation costs as well as the wealth transfer costs from current shareholders to outside investors. Those adverse selection costs arise because of information asymmetry between the issuer and outside investors and can be reduced by the proportion of the issue taken up by shareholders as well as quality certification. Nevertheless, it is safe to assume that the level of adverse selection costs could also be related to the presence of differentially informed outside investors : some investors may have private information on the forthcoming offering and/or, on the issuer’s future prospects, or may engage in costly information production.

However, the above cited studies on informed trading focus on firm commitments on the U.S. market, whereas rights offers are still the most frequent flotation method in Europe and Asia.

Rights issues differ from public offerings in several ways. First, since the rights issue offer price is determined jointly by underwriters and issuers and since the offer discount is offset by the value of the rights, price manipulation on the offer price shouldn't be a concern. Second, since outside investors can only acquire shares in rights issues by buying rights on the rights market during the offer (if shareholders don't exercise their rights), their trading strategy is likely to be different than during firm commitments. Third, prior research showed that rights issues are characterized by negative abnormal returns on the announcement date which could lead to manipulative trading strategies on announcement effects. Fourth, the standby guarantee of rights issues offers distinctive features compared to the firm commitment guarantee and may lead to alternative trading strategies. Finally, the time lines of rights issues and public offerings are different: all characteristics of rights issues are released on the announcement date whereas offer price and gross proceeds are only known at the issue date during public offers.

Those important economic differences between rights issues and public offerings give rise to new empirical research questions. The first set of research questions pertains to whether or not there is evidence of informed trading in the rights issue pre-offer market. The second set of research questions investigates how informed traders (if any) make use of their private information to trade in the equity of issuers. In other words, what are the trading patterns of informed traders around rights issues? Are they able to identify SEOs with better post-issue price performance? The third set of research questions relates to the impact of traders with private information on the dynamic of returns around rights issues. In particular, do they enhance price efficiency or on the contrary make prices less efficient?

In this paper, we use a sample of French rights issues merged with intraday transactions and quotes data to address the above questions. France provides a unique confluence of institutional features desirable for our study. First, French firms can choose between standby rights offerings and uninsured rights issues, allowing us to analyze the impact of underwriters on trading dynamics. Next, the French equity market is dominated by closely held firms and the maintenance of control is a major consideration in the investment decisions of shareholders and could therefore impact the trading behaviors prior to the issue. Finally, we argue that market microstructure can affect the investors reactions to the announcement of a corporate event. Previous research into trading patterns around equity offerings has been conducted in U.S.

markets with mostly dealer-based market microstructure. This makes research on order-driven markets especially called for. Contrary to the U.S. market, the French stock market is a continuous market based on a consolidated electronic open-limit order book with a high and symmetrical transparency, without designated market makers and where strict price and time priorities are imposed.

Our empirical study was designed to answer the three sets of research questions outlined above and provides a number of new results on rights issues and informed trading. First, we provide evidence of the existence of traders with private information around rights issues. Using order imbalances as a measure of trading activity, we show that selling (resp. buying) pressure is applied by informed traders and both in the pre-offer and post-offer market. In particular, we find significant net buying or selling activity prior to the announcement leading to a temporary price pressure effect: pre-announcement returns are positively related to order imbalances but post-issue returns are negatively related to pre-announcement order imbalances. Even though those results are consistent with the presence of short-term manipulative traders, we find little evidence of manipulative trading on announcement effects.

Next, we find that announcement effects and post-issue price performance are positively related to order imbalances on the announcement date. Skilled traders are able to process the information contained in the SEO announcement and buy (resp. sell) in case they interpret it positively (resp. negatively). This result leads us to argue that the announcement of a rights issue can also convey a positive signal (as in Cooney and Kalay, 1993). Finally, prior to the issue date and once all SEO characteristics have been released, we still report significant buying (resp. selling) activity related to informed investors who are able to identify SEOs with better (worse) post-issue stock returns. They buy (resp. sell) before and after the issue, shares in SEO firms about which they obtain favorable (resp. unfavorable) information and thus enhance price efficiency.

The remainder of the paper is organized as follows. In section 2, we discuss the security offering process in France as well as the sample's characteristics. Section 3 describes hypotheses and trading activity variables used in our study. Section 4 reviews univariate and multivariate results of trading patterns. In section 5, we conclude.

2. Institutional Framework and data

2.1. The security offering process in France

A seasoned equity offering has to be approved at a general shareholders' meeting (AG). French law grants shareholders the right to purchase new shares (rights issues), but the general shareholders' meeting may waive this pre-emptive right. Approval for an issue may be given for a maximum amount to be raised within five years (rights), three years (without rights) or 26 months (when the type of security and flotation method is not specified). In France, unlike in the U.S., the most common flotation method is a rights issue in which short-lived warrants (rights) are issued to current shareholders on a pro-rata basis. Once a rights issue has been approved, the board of directors (CA) sets within the authorized period and amount, all the issue characteristics (offer price, offer size, underwriting agreement). Subsequently, the issuer has the obligation to file with the AMF an issuance note describing all those characteristics as well as shareholder takeover intentions and the use of the proceeds (if known). Usually, the issue is announced (AD) in the press few days prior to or at the AMF filing date.

In non-underwritten rights issues (also called uninsured rights issues), the firm avoids paying underwriter fees by marketing the new shares through current shareholders, but the gross proceeds of the offering are not guaranteed. In rights with standby underwriting (also called standby rights offering), a standby underwriter guarantees the gross proceeds by agreeing to purchase and resell all shares not marketed through the rights method. During rights issues, shareholders have to decide whether or not to subscribe to the new equity offering. They can either subscribe to the offer by exercising their rights or sell them on the open market during the subscription period, thereby, accepting a reduction in their firm ownership.

Table 1 summarizes important dates of the rights issue issuance process in France as well as the mean and median days between each date.

[Insert Table 1]

2.2. NYSE Euronext Paris Microstructure

The NYSE Euronext Paris market is an order-driven and fully electronic market without designated market makers. It operates through an electronic trading system (Nouveau Système de

Cotation) which manages the matching between buying and selling orders. Traders can use different types of orders such as market orders, limit orders, stop orders and pegged orders. They have to specify the trade direction, the quantity and the period for which the order is active as well as a limit price for limit orders. Securities are traded either through continuous matching of orders at opposite sides of the order book or through call auction procedures following a period in which orders have been accumulated without execution. Considering the continuous trading, the trading day begins at 7.15 am, with a pre-opening phase during which traders can place, modify or cancel orders in the order book. The market opens at 9 am or 10 am depending on the period¹ studied with a call auction which determines the opening price. From the opening time until 4.55 pm or 5.25 pm², trading takes place on a continuous basis. Similarly to the pre-opening phase, the market closes with a pre-closing phase of 5 minutes and the closing price is determined through a closing auction. Regarding the call auction trading, participants place orders in the central order book without giving rise to transactions. Twice a day (11.30 am and 4.30 pm) the system then, determines a price so as to produce the maximum executable orders.

2.3. Windows of event

We defined three windows of event prior to the issue date in order to take into account the major dates detailed in table 1:

- **W1: The pre-announcement period** defined as the period of 3 days prior to the announcement date
- **W2: The Announcement date** defined as the day of the SEO announcement
- **W3: The pre-offer period** defined as the period between the announcement date and the issue date

2.4. Sample

Our initial sample consists of 173 rights issues held between 1995 and 2006 on the French market and listed in the annual reports of the AMF. We hand-collected all data on issue and issuer characteristics from the registration statements filed with the AMF. We excluded:

- all issues involving more than a single type of security (22)

¹ Trading started at 9 am the 20/09/1999

² Stocks are trades until 5.30 pm since the 03/04/2000

- with missing characteristics (3)

We also excluded issuers whose stocks were not traded on the stock market during the pre-announcement period AND on the announcement date (27).

Our final sample consists of 121 rights issues of which 66 are underwritten. The sample's main characteristics are displayed in table 2.

[Insert table 2]

Considering the characteristics of the issues, we observe several differences between the flotation methods. The mean (median) number of shares in an uninsured rights issue scaled by the total number of shares after the issue is 32% (25%) compared to only 21.88% (17.42%) in standby rights issues. The subscription price offers a mean (median) discount from the stock market of 18.58% (19.82%). The discount for standby rights (24.03%) is significantly larger than for rights issues (12.31%). This result suggest that underwriters use discounts to ensure that shareholders will exercise their rights during the offer and therefore reduce their risk exposure. Moreover, the mean (median) size of standby rights issues is 458M€ (127M€) compared to 201M€ (10M€) for uninsured rights issues. Table 2 also provides the average relative direct costs for the different flotation methods: average flotation costs of standby rights issues are of 3.11% and of 2.68% for uninsured rights issues.

Next, with regard to the characteristics of the issuers, we find that larger firms tend to choose to underwrite the issue. Their mean (median) market value is 5,038 M€ (614M€) compared to 2,537 M€ (36M€) for firms choosing uninsured rights issues. The average percentage of shares held by the main shareholder is 37.09% and is more important for uninsured rights issues (43.74%) than for standby rights issues (31.30%). Similarly, the average percentage of shares held by all blockholders³ is 61.88% for uninsured rights offers and only 44.27% for standby rights offers. We report a lower blockholder takeover during standby rights than during uninsured rights issues since the mean percentage of those issues offered to external investors is 71.14% but only 50.35% for uninsured rights issues. Finally, the mean (median) reduction in

³ Shareholders holding more than 5% of the shares

blockholdings equals 2.93% (0.67%) for the entire sample and no significant differences were observed between the two flotation methods.

3. Hypotheses and methodology

3.1. Theory and Hypotheses

Prior literature highlights that selling or buying pressure before an equity offering may represent trading by informed traders or manipulative traders.

Consistent with asymmetric information models (for example Kyle, 1985), informed traders who receive a negative (positive) private information will sell (buy) to profit from this information. The market prices will gradually reflect this new information leading to more informationally efficient stock prices.

Manipulative traders, on the other hand are driven by the sole purpose of producing an artificial discount in the price of newly issued shares (Gerard and Nanda, 1993). They will short sell the issuing firm's shares prior to the offer in spite of private information suggesting that the firm is undervalued therefore reducing the informativeness of the secondary market. As discussed above, due to the mechanism of rights, we don't expect manipulative traders to force the price to decline before standby rights or uninsured rights issues. Indeed, Gerard and Nanda (1993) state that traders will only profit from manipulative trading if the expected profit arising from the allocation of newly issued shares at a discount exceed the expected costs of trading contrary to private information. Thus, since outside investors can only subscribe to the issue by buying rights on the open market and since the offer price discount is offset by the value of the right, informed agents will have no incentive to manipulate the issue price. However, one form of manipulative trading strategy that could arise from information leakage before the announcement date of rights issues is the following : the trader predicts that the market will overreact to the news (negative announcement effects) and he builds up a position which he intends to unwind partially after the public announcement even if he holds positive private information about the issue or the issuer (Brunnermeier, 2005).

Although the present study focuses on buying and selling activity by informed and manipulative traders, it is worth noting that underwriters and noise traders represent another possible class of sellers and buyers around SEOs. However, we don't believe that underwriters

will drive our results prior to the offer date for several reasons. First, as opposed to public offers, underwriters of rights issues have no incentive to hedge their risk related to the placement of newly issued shares before the offer date as described by Marsh (1980) and Singh (1997)⁴. Second, regarding price stabilization activity, underwriters do not engage in price stabilization until the expiration of a rights issue. Indeed, the outcome of the standby guarantee is uncertain until the expiration of the offer. Constrained by the contingent nature of this standby underwriting contract, underwriters do not provide price support in the rights pre-offering or offering period (Singh, 1997). Nevertheless, we argue that underwriters will still be compelled to intervene on the market after the expiration of the offer in order to defend their reputation (Chowdry and Nanda, 1996) or in order to bond with investors⁵ (Benveniste, Busaba, Wilhelm, 1996).

Previous studies on informed trading use proprietary and restricted data on either institutional or insider trading which fails to give a full picture of trading patterns around SEOs. We focus on order imbalances around rights issues. It seems reasonable to assume that order imbalances are an indicator of private information because random orders are unlikely to have a consistent direction. Practitioners typically use order imbalance measures as a proxy of underlying information. Kyle (1985) models the trading strategy of a rational investor, who has private information. The informed investor places skewed orders based on the private information which in turn generates order imbalances. Easley, Kiefer, O'Hara, and Paperman (1996), and Easley, Kiefer, and O'Hara (1997) also argue that private positive or negative information generates buying or selling pressure respectively. Another advantage of order imbalances compared to insider trading or institutional trading measures is the instant availability of data which makes it a powerful tool for investors and analysts if its determinants and effects are known.

Our preliminary hypothesis is therefore that investors with private information are trading before rights issues and cause significant order imbalance.

H0: Order imbalances before the offer are due to traders with private information

⁴ For a detailed analysis see Matsoukis (2010)

⁵ Stabilizing bids may have the effect of rewarding investors who participate in an SEO that appears overpriced.

We further develop our hypotheses of informed and manipulative trading and their impact on returns by studying separately the following windows of events: prior to the announcement date, and prior to the offer date.

✓ **Prior to the announcement date**

After the board meeting and before the announcement date, some agents like corporate insiders⁶ and their favored analysts can receive signals about this information before it is disclosed to the general public. This is also true in case of an underwriting agreement since the issuing firm invites investment banks to value the rights and to set the issue discount, so that some traders and their clients thus may be tipped about the offer before the official announcement. As discussed above, two types of traders may coexist on the pre-announcement market : the ones trading according to their information allowing prices to adjust more quickly to more accurate fundamental values and the ones short selling the issuer's stock in spite of favorable information in order to profit from negative announcement effects. Thus, we argue that the difference between those two types of trading strategies can be induced through their impact on market prices. Indeed, we expect informed trading to generate a permanent price impact whereas manipulative trading should have a temporary price impact. We therefore, developed the following hypotheses in order to differentiate between those two trading strategies :

If traders detain positive private information before the announcement date but want to profit from the overreaction of the market at the offer's announcement (manipulative traders) then :

H1 : They will put a temporary downward pressure on the issuer's stock price prior to the announcement date. In other words, pre-announcement returns should be positively related to pre-announcement order imbalances but post-issue returns should be negatively related to pre-announcement order imbalances since we expect a post-issue price reversal. Moreover, if they predict an overreaction of the market at the announcement date, announcement effects should be positively related to pre-announcement order imbalances. Finally, since they will unwind (at least partially) their positions after the offer, post-offer imbalances should be negatively related to pre-announcement order imbalances.

⁶ Managers or controlling shareholders

On the other side, if traders detain private information before the announcement date and reflect their information in their orders (informed traders) then :

H2 a: They will put a permanent downward or upward pressure on the issuer's stock price. Further, In a Chemmanur and Jiao (2005) setting, informed traders with private information will buy shares before **and** after the issue of issuers with better long term performance and sell shares otherwise. In other words, pre-announcement returns, post-issue returns and post-offer order imbalances will all be positively related to pre-announcement order imbalances.

However, since both trading strategies are not mutually exclusive, it could prove difficult to differentiate between informed and manipulative traders at this point of time

✓ **At the announcement date and prior to the offer date**

Informed traders can also be present on the market once all characteristics of the issue have been released⁷ : they may hold private information on the issuer's future prospects (such as information regarding the efficacy of the firm's products or the competitive position of the firm (Chemmanur, He and Hu, 2009)) or may be able to better process the information given at the announcement date by engaging in costly information production (Chemmanur and Jiao, 2005). In this context, they will be able to identify the quality of the firm and will trade accordingly. Further, we do not expect any trading from manipulative traders at or after the announcement date due to the specificities of rights issues as stated above. Hence, traders with private information should enhance price efficiency as stated in **H2 a** and :

H2 b : They will put a permanent upward (downward) pressure on the issuer's stock price and buy (sell) shares before **and** after the issue of issuers with better (worse) long term performance. In other words, pre-offer returns, post-issue returns and post-offer order imbalances will all be positively related to pre-offer order imbalances

3.2. Trading activity variables

✓ **Buying and selling pressure**

⁷ Which happens on the announcement date in case of rights issues (on contrary to U.S. firm commitments where the offer price is known at the offer date).

We determined trade initiation using a modified version of the Lee and Ready (1991) procedure in order to account for the fully automated nature of trading on NYSE Euronext Paris. We did not impose any time delay between a quote and a transaction and we did not aggregate transactions occurring within the same second. We then, defined the following order imbalance measures : NOIB (the number of buyer-initiated trades less the number of seller-initiated trades divided by the sum of the two types of trades); buying activity (net positive trade order imbalances) as well as selling activity (net negative trade order imbalances).

✓ Informed trading

In order to assess whether there is indeed a relation between order imbalances and investors with private information, we must identify trades executed by informed traders. We defined *adverse selection costs* as a proxy of informed trading. It reflects the compensation given to uninformed traders to trade against privately informed traders (Stoll, 1989). Among the different models proposed in the literature, we applied the Lin, Sanger and Booth (1995) methodology, in order to extract the adverse selection component, mainly because of the specificity of the French market. Indeed, The LSB model doesn't consider inventory holding costs (which is probably less relevant on the French market) but order processing and order persistence costs as temporary costs. We, therefore, estimated, the proportion of spread due to adverse selection λ using intraday data for each window by performing the following regression for the LSB model:

$$\Delta M_t = \ln\left(\frac{M_t}{M_{t-1}}\right) = \lambda \ln\left(\frac{P_t}{M_t}\right) + e_t$$

Where M_t is the quote Midpoint at date t and P_t the trade price at time t .⁸

✓ Abnormal returns

Abnormal returns prior to the issue and during the short-term post-offer period (8 days after the end of the issue) were calculated by performing a standard event study.⁹ The estimation of the market model coefficients is obtained for the estimation period (-180 to -30 trading days prior to the offer announcement) and the market index return used is the MSCI Europe index¹⁰.

⁸ The model is estimated by OLS

⁹ We used trade-to-trade adjusted returns and a scaled version of the market model in order to take the misspecification due to thinly traded stock into account.

¹⁰ We verified that our results remain qualitatively unchanged with the SBF 250 as the market index return

- ✓ Post-issue price performance

We defined post-issue performance as the performance over the period [30,150] after the expiration of the issue. To evaluate this performance, we used cumulative average abnormal returns (CARs). Daily benchmark-adjusted returns are calculated as the daily returns on an SEO stock minus the benchmark returns (MSCI index). Following Ritter (1991), the benchmark-adjusted returns for stock i is defined as:

$$AR_{it} = R_{it} - R_{bt}$$

The average benchmark-adjusted return on a portfolio of N stocks is the equally-weighted arithmetic average of the benchmark-adjusted returns. The cumulative benchmark-adjusted aftermarket performance from day 30 to 150 after the expiration of the issue is the sum of the average benchmark-adjusted returns.

4. Results on trading patterns

4.1. Univariate results on trading patterns

In table 3., we computed abnormal returns and trade number order imbalances for the whole sample as well as for those issues that experience net-buying (resp. net-selling) pressure before the announcement date, on the announcement date and prior to the issue date.

[Insert table 3]

First, table 3 Panel A exhibits significant negative order imbalances (according to the Wilcoxon test) for uninsured rights only. However, as mentioned above, we argue that investors could trade in different directions and could thus mitigate our results. We, therefore, split the sample into two subsamples: issues that experience net buying activity and issues experiencing net selling activity before the announcement date. By doing so, we observe that issues experience either significant buying pressure or significant selling pressure: before one given issue traders trade in the same direction. Next, investors seem to trade more aggressively before uninsured rights issues since buying (resp. selling) pressure before those type of issues is on average 42.48%

(resp. -40.74%) compared to 22.93% (resp. -28.54%) before standby rights issues. Moreover, a bigger proportion of uninsured rights experience net selling activity prior to the announcement (64% compared to 50% for standby rights). Similarly, cumulative abnormal returns over the 3 days prior to the announcement of the issue are insignificant but are positive and significant in the buying pressure case (3.43% on average) and negative and significant in the selling pressure case (-1.79% on average). Those results suggest that investors apply an upward (downward) pressure on returns prior to the announcement. Considering the flotation method, we found no significant differences between abnormal returns before standby rights and before uninsured rights.

Second, on the announcement date, table 3 Panel B shows negative and significant order imbalances of -9.93% due to selling pressure before uninsured rights issues. Indeed, 62% of uninsured rights issues in our sample experience a significant selling pressure compared to only 52% of standby rights. Furthermore, for those issues experiencing selling pressure, we observe more aggressive trading at uninsured rights issues announcement dates (-55.26%) than at standby rights issues announcement dates (-31.77%). Considering buying pressure, order imbalances are on average 33.16% for the whole sample (31.38% for standby rights and 35.86% for uninsured rights issues). Next, issues experiencing selling pressure exhibit negative and significant abnormal returns. Indeed, the average abnormal returns for rights issues are -2.11%, significant at the 1% level. Regarding issues experiencing buying pressure, we found positive cumulative abnormal returns for standby rights only (1.81%). Those results suggest that SEO announcements can also convey a positive signal and lead to positive announcement effects.

Finally, during the pre-offer period¹¹, 65% of our sample of uninsured rights still experience significant selling pressure compared to only 47% of our sample of standby rights and selling pressure is more important for uninsured rights issues than for standby rights (-30.64% vs. -21.36%). However, no significant differences in order imbalance measures were found between standby rights and uninsured rights experiencing buying pressure. Abnormal returns during this window of event are negative and significant in the case of selling pressure, but positive and significant for standby rights only in the case of buying pressure. It's interesting to note that in an efficient market, prices should take into account all available information the day the offering is

¹¹ Only 113 issues have a waiting period between the AD and the issue date

announced or the day the AMF issuance note is filed and no abnormal returns should be observed prior to the issue date.

4.2. Multivariate results on trading patterns

We performed three sets of multivariate studies aimed to verify our above research hypotheses:

1. Determinants of order imbalances
2. Price pressure effects
3. Post issue performance

✓ Determinants of order imbalances

First, in order to assess if buying or selling pressure is indeed driven by informed trading (**H0**), we studied the determinants of the absolute value of order imbalances ($|NOIB|$). Our univariate results clearly suggest that if the trade number order imbalances of issuers stock are due to private information, they will offset each other when they are aggregated and therefore mitigate our results (as shown by Subrahmanyam (1991) for the whole market). The absolute value of order imbalances seeks to overcome this issue.

$$|NOIB| = a_0 + a_1 \text{Informed trading proxy}_{it} + a_2 \text{Ownership concentration}_i + a_3 \text{Institutional ownership}_i + a_4 \text{Standby rights} + a_6 \text{Firm size}_i + a_7 \text{Offer size} + a_8 \text{Use of proceeds} + a_9 \text{Year fixed effects} + \varepsilon_i$$

Where Informed trading proxy is adverse selection costs obtained over the period of interest, Ownership concentration is the percentage of shares held by the main shareholder, Institutional ownership is a dummy equal to 1 if the main shareholder is a corporate or a financial institution, Standby rights is a dummy equal to 1 if the issue is underwritten, Use of proceeds is a dummy equal to 1 if funds are raised to finance a specific investment or acquisition, Firm size is the log of firm market capitalization and Offer size is the percentage of change in shares.

In addition, we performed several robustness tests. First, we tested absolute abnormal order imbalances as dependent variable. Second, we tested the following explanatory variables:

average quoted bid-ask spread as informed trading proxy, an interaction variable between informed trading and underwriter, shareholders' takeup, discount, shareholders guarantee¹² and SEOs held specifically in the context of an acquisition¹³. Finally, we performed the regressions before the announcement and at the announcement date on a reduced sample of 113 rights issues (sub-sample of rights issues with a waiting period between the announcement date and issue date). All results detailed in table 4. remain qualitatively unchanged.

[Insert table 4]

Table 4 model 2 and 4 confirm that order imbalances before the announcement date and before the issue date are driven by informed trading since the coefficient of adverse selection costs is positive and significant. This result suggests that investors with private information are present on the pre-announcement market and prior to the issue. Next, our results show that order imbalances prior to the announcement are also positively correlated to ownership concentration. Indeed, the major shareholder participates in the board meeting (during which all issue characteristics are fixed) and therefore holds private information concerning the forthcoming SEO.

Table 4 model 3, on the other hand, exhibits no significant relation between informed trading and order imbalances at the announcement date. It is possible that sophisticated traders interpret the characteristics more efficiently and perceive the SEO announcement as a positive (negative) signal. As presented by Kim and Verrechia (1994) and Harris and Raviv (1993) using asymmetric information models, traders who receive the same common signals can differ in their ability to interpret them. Moreover, noise traders are more likely to trade at the announcement date and thus mitigate our results. Next, similarly to the pre-announcement window, ownership concentration has a positive impact on order imbalances. Model 3 and 4 also exhibit a significant negative coefficient for firm size: larger firms benefit from better analyst coverage which reduces information asymmetry and probability of informed trading.

¹² Dummy equal to 1 if issue is guaranteed by existing shareholders

¹³ Dummy equal to 1 if funds are raised to finance an acquisition

Overall Table 4 (model 1) confirms our preliminary hypothesis **H0** since we find that order imbalances before an SEO are mainly driven by investors with private information and firm size, while other SEO and issuer characteristics have marginal effects.

Next, we analyzed (in table 5) the impact of pre-issue order imbalances on post-offer order imbalances by performing the following regression model:

$$\text{COIB}_{[1,30]} = a_0 + a_1 \text{COIB}_{\text{Pre-issue}} + a_2 \text{Standby rights} + a_3 \text{Firm size}_i + a_4 \text{Offer size} + a_5 \text{Ownership concentration}_i + a_6 \text{Use} + a_7 \text{Institutional ownership} + a_8 \text{Year fixed effects} + \varepsilon_i$$

Where $\text{COIB}_{[1,30]}$ is cumulative order imbalances 30 days after the expiration of the offer and $\text{COIB}_{\text{Pre-issue}}$ is cumulative order imbalances during our 3 windows of events (Table 5 model 1 to 3).

Similarly to the previous study, we verified that the results remain unchanged with cumulative abnormal order imbalances as dependent variable and shareholders take-up, discount, shareholders guarantee and SEO held to finance a specific acquisition as explanatory variables.

[Insert table 5]

Table 5 model 2 and 3 exhibit positive relations between announcement, pre-offer and post-offer order imbalances implying that informed investors trade in the same direction prior to the issue date and after the issue. These results are consistent with our informed trading hypothesis (**H2a and H2b**). Model 1, however shows no significant relation between pre-announcement order imbalance measures and post-offer order imbalances. As underlined above, manipulative and informed traders may be present on the pre-announcement market and could, thus, mitigate our results.

Next, model 1 and 2 show that post-offer order imbalances are negatively related to the existence of an underwriter. This observation is consistent with an underwriter's price support activity: the underwriter places large limit orders to buy a stock (bid side) and, therefore, enhances selling incentives by offering sellers a better price. When the quote is above the shares usual price level, sellers are more able to trade and buyers are more likely to delay trades.

Model 2 also exhibits a significant coefficient for institutional ownership: institutional ownership increases net-buying activity. Previous empirical evidence suggests that the presence

of institutional investors is a positive signal for the market since they are likely to mitigate information asymmetry between firm management and the capital market and act as effective monitors in controlling the use of SEO proceeds. Ljungqvist, Marston, Starks, Wei and Yan (2007) also report that the presence of institutional investors helps to reduce the over-optimism of financial analysts and is related to more accurate earning forecasts. Finally, all three models show that the use of SEO proceeds is a key factor in the investment decision.

✓ Price pressure effects

In order to distinguish between informed and manipulative trading strategies, we analyzed the impact of pre-offer order imbalances on pre-offer and short term post-offer returns. By doing so, we want to assess whether the price impact of buying/selling pressure is temporary or permanent. We therefore considered cross-sectional regressions of cumulative abnormal returns. Table 6 reports the estimation results from the following regression:

$$CAR_{Pre-Offer} = \alpha + \beta_0 OIB_{Pre-offer} + \beta_1 Standby\ rights + \beta_2 ABTURN_i + \varepsilon_i$$

$$CAR_{Post-Offer} = \alpha + \beta_0 OIB_{Pre-offer} + \beta_1 Standby\ rights + \beta_2 ABTURN_i + \varepsilon_i$$

Where $CAR_{Pre-Offer}$ is either cumulative abnormal returns before the announcement date, at the announcement date or prior to the issue date (model 1 to 3), $CAR_{Post-offer}$ is cumulative abnormal returns 8 days after the expiration of the issue (model 4) and $OIB_{Pre-offer}$ is trade number order imbalance prior to the announcement, on the announcement day and prior to the offer. Henry and Koski (2010) as well as Meidan (2005) analogously regress post-issue returns on pre-issue short selling and pre-issue returns to test whether price pressure before SEOs is temporary or permanent. We also include in the analysis the dummy standby rights and a scaled volume measure (abnormal turnover) as control variables (see Huh and al., 2005).

According to H1, order imbalances prior to the announcement should have a positive impact on pre-announcement returns and a negative impact on post-issue returns since we expect a post-issue price reversal. According to H2a and H2b, however, order imbalances prior to the issue date should have a positive or insignificant impact on pre-offer returns as well as post-offer returns.

[Insert table 6]

Table 6 confirms **H1** since the coefficient of order imbalances is positive in model 1 and negative in model 4 with a significance level of 5%. However, Table 6 model 2, exhibits no significant relation between pre-announcement order imbalances and announcement effects which is inconsistent with **H1**. As a consequence, we found weak evidence of manipulative trading prior to the announcement.

Next, model 2, 3 and 4 show that order imbalances at the announcement date have a positive effect on returns suggesting a permanent price impact of the selling and buying pressure applied at the announcement date. This observation is consistent with the presence of sophisticated traders able to interpret information contained in SEO announcements. They will buy shares in case the announcement contains a positive signal and sell shares otherwise.

With regard to pre-offer order imbalances, Model 3 and 4 exhibits a positive but insignificant relation with pre-offer returns and short term post issue returns. Those results are either consistent with informative trading or lack of power in the tests.

✓ Post-issue price performance

In addition to looking at the relation between order imbalances and abnormal returns around the offer, another means of distinguishing between manipulative and informative trading strategies is to look at the effect of order imbalances on post-issue price performance. We therefore modeled post-issue price performance as a function of order imbalances prior to the issue. In particular, we performed the following regression:

$$PIR_i = a_0 + a_1 \text{Buying pressure}_{Pre-offer} + a_2 \text{Selling pressure}_{Pre-Offe} + a_3 \text{Firm Size} + a_4 \text{Offer size} + a_5 \text{Standby rights} + a_6 \text{Year Fixed effects} + \varepsilon_{it}$$

Where PIR_i is the post-issue price performance as detailed previously. Buying pressure (resp. selling) is cumulative positive (resp. negative) order imbalances over the period of interest and standby rights is a dummy equal to 1 if the issue is underwritten¹⁴. We added Firm size, offer size and year fixed effects as control variables.

[Insert table 7]

¹⁴ We tested several other explanatory variables such as use of funds, shareholder's guarantee, shareholders' takeup, institutional ownership and all results remain qualitatively unchanged.

Table 7 model 2 and 3 show that buying (resp. selling) activity at the announcement date and prior to the issue date has a positive (resp. negative) impact on post-issue price performance confirming, therefore, **H2**. Before French rights issues, informed investors and/or sophisticated traders trade in a direction consistent with their private information, thus, enhancing price efficiency. Indeed, they buy shares before and after the offer of firms with better post issue price performance and sell shares otherwise.

Table 7 model 1, however, highlights no significant relationship between buying and selling activity prior to the announcement and post issue performance. Overall, the insignificant results obtained in Table 5, 6 and 7 during the pre-announcement window suggest that both manipulative and informed traders co-exist on the pre-announcement market.

5. Conclusion

While numerous studies have been performed on informed trading before public offers, the case of rights issues has been overlooked even though, outside the U.S., firms choose mainly rights issues to raise equity. This paper addresses this shortcoming and examines selling and buying activity by informed traders as well as the relation between informed trading and returns around rights issues.

First, we used intraday transaction and quotes data in order to compute order imbalance measures and showed that buying and selling activity before rights issues are driven by traders with private information. Second, we developed several hypotheses and empirical studies aimed to assess the informed trading strategies around rights issues. Before the announcement date, we found support that informed trading leads to a temporary price impact suggesting that traders with private information about the forthcoming SEO announcement pursue a short-term trading strategy. We found, however, little evidence of manipulative trading focused on announcement effects and relate this to the co-existence of informed (long-term) and manipulative (short-term) traders in the pre-announcement market. Further, on the announcement date, we observe that skilled traders are able to process positive and negative information contained in the SEO announcement and trade accordingly, thereby enhancing price efficiency. Finally, once all issue characteristics have been released, we show that some traders engage in costly information production and pursue a long term trading strategy leading to a permanent price impact. They buy

(resp.sell) before and after the issue, shares in SEO firms with better (worse) post-issue performance.

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Table 1: Important dates related to French rights issues

	<i>All Offers</i>	<i>Standby Rights issues (SRI)</i>	<i>Rights issues (RI)</i>
	Mean Median	Mean Median	Mean Median
Nber	121	66	55
AG-CA	164.0 111.5	185.5 142.0	145.2 71.0
CA-AD	10.1 4.0	9.6 3.0	10.6 5.0
AD-AMF	0.8 0.0	0.2 0.0	1.6 0.0
AMF-ID	9.0 8.0	9.0 8.0	9.0 8.0

This table reports the mean and medians of the difference in days between important days related to French rights issues. AG is the general shareholders' meeting date, CA is the Board meeting date, AD, the announcement date, AMF the AMF filing date and ID the issue date.

Table 2: Descriptive Statistics

	<i>All Offers</i>	<i>Standby Rights issues (SRI)</i>	<i>Rights issues (RI)</i>	<i>p-value for mean/median differences</i>
	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>SRI vs RI</i>
	<i>Median</i>	<i>Median</i>	<i>Median</i>	
Nber obs.	121	66	55	
Change in shares(%)	26.59%	21.88%	32.00%	0.004 ***
	21.24%	17.42%	25.00%	0.001 ***
Discount	-18.58%	-24.03%	-12.31%	0.009 ***
	-19.82%	-23.14%	-11.94%	0.000 ***
Proceeds (M€)	338.4	457.9	201.2	0.071 *
	34.7	126.6	9.6	0.000 ***
Costs/Proceeds	2.91%	3.11%	2.68%	0.198
	2.48%	2.99%	2.15%	0.101
Size (M€)	3874.0	5038.4	2537.1	0.265
	121.3	613.7	36.0	0.000 ***
Main shareholder	37.09%	31.30%	43.74%	0.006 ***
	32.64%	24.06%	46.99%	0.004 ***
Blockholders	52.47%	44.27%	61.88%	0.000 ***
	57.89%	41.63%	64.18%	0.000 ***
Corporate	0.42	0.37	0.48	0.234
	0.00	0.00	0.00	0.233
Financial	0.16	0.21	0.11	0.148
	0.00	0.00	0.00	0.156
External	61.47%	71.14%	50.35%	0.000 ***
	61.96%	74.50%	45.51%	0.000 ***
Free Float variation	2.93%	2.65%	3.25%	0.653
	0.67%	0.60%	0.99%	0.978
Widely held firms	31.90%	41.94%	20.37%	0.012 **
	0.00%	0.00%	0.00%	0.013 **

The sample includes 121 rights issues held on the French Stock Exchange from 1995 to 2006. This table reports the mean and the median of each variable and the significance for the differences in means and medians between Standby Rights issues and uninsured rights issues.

Percentage of change in the number of shares is number of shares issued at number of shares after the issue; Discount is offer price less stock price at stock price; Proceeds is gross proceeds (Euro M).

Size is market value (Euro m); Main shareholder is % of the shares held by the main shareholder; Blockholders is the % of the shares owned by the shareholders whose names are included in the registration statement filed with the AMF; Institutional is a dummy equal to 1 if main shareholder is a corporate or bank, External is % of the issue not taken up by blockholders; free float expected variation is the difference between free float after the issue and free float before the issue where free float after the issue is measured by the following ratio : (Market value*Free float before the issue + Gross proceeds*percentage of the issue offered to external investors)/(Gross proceeds +Market value);Widely held firms is % of firms with Main shareholder less than 20%.

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

Table 3: Trading activity before French rights issues

	All Offers			Buying activity			Selling activity		
	Nb.	CAR	NOIB	Nb..	CAR	NOIB	Nb.	CAR	NOIB
Panel A: Pre-announcement period [-3,0[
All Offers	121	0.51%	-6.29%	53	3.43% ***	30.31% ***	68	-1.79% **	-34.82% ***
		-0.33%	-2.47% *		2.40% ***	18.04% ***		-1.49% ***	-26.61% ***
Standby Rights	66	0.64%	-2.80%	33	3.10% **	22.93% ***	33	-1.90% **	-28.54% ***
		-0.12%	-0.30%		1.81% **	18.04% ***		-1.95% **	-15.60% ***
Rights issues	55	0.37%	-10.48%	20	3.97%	42.48% ***	35	-1.69%	-40.74% ***
		-0.35%	-15.12% **		3.59% *	23.15% ***		-0.91%	-36.67% ***
p-value for dif. (SRvsRI)		0.855	0.373		0.740	0.069 *		0.896	0.108
		0.908	0.053 *		0.709	0.294		0.713	0.026 **
Panel B: Announcement date									
All Offers	121	-0.58%	-9.93% **	53	1.35%	33.16% ***	68	-2.11% ***	-43.51% ***
		-0.72% *	-4.61% *		0.90% *	25.77% ***		-1.92% ***	-33.33% ***
Standby Rights	66	-0.05%	-1.15%	32	1.81% **	31.38% ***	34	-1.86%	-31.77% ***
		-0.80%	-1.62%		0.82% **	24.16% ***		-1.68% ***	-21.16% ***
Rights issues	55	-1.20%	-20.47% ***	21	0.65%	35.86% ***	34	-2.34% ***	-55.26% ***
		-0.62% *	-18.52% **		0.90%	30.43% ***		-2.19% ***	-39.82% ***
p-value for dif. (SRvsRI)		0.328	0.039 **		0.578	0.604		0.743	0.005 ***
		0.464	0.048 **		0.964	0.598		0.554	0.006 ***
Panel C: Between the announcement date and issue date									
All Offers	113	-0.64%	-3.47%	51	1.57%	24.28% ***	62	-2.31%	-26.30% ***
		-1.24% **	-5.20%		-0.69%	16.66% ***		-2.51% ***	-16.15% ***
Standby Rights	62	0.00%	0.73%	33	3.49% **	20.14% ***	29	-3.61%	-21.36% ***
		-0.72%	1.60%		1.30% *	15.51% ***		-1.25% **	-14.02% ***
Rights issues	51	-1.41%	-8.58%	18	-1.95%	31.87% ***	33	-1.13%	-30.64% ***
		-2.57% ***	-11.23% *		-1.86%	22.19% ***		-2.87% **	-23.57% ***
p-value for dif. (SRvsRI)		0.667	0.184		0.016 **	0.153		0.625	0.169
		0.018 **	0.035 **		0.014 **	0.204		0.561	0.038 **

This table reports the mean and the median of each variable and the significance for the differences in means and medians between Standby Rights issues and uninsured rights issues. Panel A reports figures 3 days prior to the announcement date, panel B at the announcement date and Panel C reports figures for a reduced sample of 113 rights issues with a waiting period between announcement date and issue date. CAR are cumulative abnormal returns, NOIB are trade number order imbalances. We reported the data for the whole sample as well as for issues experiencing net-buying activity and net-selling activity.

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

Table 4: Determinants of order imbalances before rights issues

	Model 1 Before the announcement until the offer date	Model 2 Pre- announcement period	Model 3 Announcement date	Model 4 Pre-offer period
Intercept	0.434 *** <i>0.006</i>	1.311 <i>0.000</i>	0.600 <i>0.004</i>	0.516 ** <i>0.014</i>
Informed trading proxy	0.422 *** <i>0.000</i>	0.316 ** <i>0.020</i>	-0.064 <i>0.602</i>	0.239 * <i>0.061</i>
Firm size	-0.026 *** <i>0.004</i>	-0.020 <i>0.119</i>	-0.032 ** <i>0.008</i>	-0.026 ** <i>0.025</i>
Offer Size	-0.085 <i>0.376</i>	-0.047 <i>0.737</i>	-0.017 <i>0.896</i>	-0.088 <i>0.475</i>
Use of proceeds	-0.023 <i>0.536</i>	-0.088 <i>0.103</i>	0.032 <i>0.530</i>	0.028 <i>0.624</i>
Institutional ownership	0.050 <i>0.144</i>	0.058 <i>0.245</i>	-0.036 <i>0.443</i>	0.027 <i>0.594</i>
Onownership concentration	0.072 <i>0.319</i>	0.358 *** <i>0.002</i>	0.177 * <i>0.083</i>	0.001 <i>0.994</i>
Standby rights	0.024 <i>0.550</i>	0.017 <i>0.768</i>	0.069 <i>0.194</i>	0.005 <i>0.940</i>
Year fixed effects	Yes	Yes	Yes	Yes
Ad. R²	28.48%	31.01%	8.85%	24.04%

This table reports results of the multivariate analysis of absolute order imbalances determinants during the whole period studied (Model 1), before the announcement date (Model 2), on the announcement date (Model 3) and before the issue date (Model 4)

Model :

$$|NOIB_{it}| = a_0 + a_1 \text{Informed trading proxy}_{it} + a_2 \text{Ownership concentration}_i + a_3 \text{Institutional ownership}_i + a_4 \text{Standby rights}_i + a_5 \text{Firm size}_i + a_6 \text{Offer size}_i + a_7 \text{use}_i + a_8 \text{Year fixed effects}_i + \varepsilon_i$$

Where |NOIB| is absolute trade number order imbalances, informed trading proxy is adverse selection costs obtained over the period of interest, Ownership concentration is the percentage of shares held by the main shareholder, Institutional ownership is a dummy equal to 1 if the main shareholder is a corporate or a financial institution, Standby rights is a dummy equal to 1 if the issue is underwritten, Firm size is the log of firm size, offer size is percentage of change in shares, use is a dummy equal to 1 if SEO proceeds are used to finance a specific investment or acquisition.

*, **, *** represent the significance level of 10%, 5% and 1% respectively. P-values are in italic

Table 5: Determinants of post-offer order imbalances

	Model 1 Pre- announcement period	Model 2 Announcement date	Model 3 Pre-offer period
Intercept	-4.913 <i>0.312</i>	-6.287 <i>0.275</i>	-8.273 <i>0.265</i>
COIB	0.607 <i>0.111</i>	2.216 * <i>0.068</i>	0.196 * <i>0.095</i>
Firm size	0.492 ** <i>0.057</i>	0.365 * <i>0.194</i>	0.431 * <i>0.085</i>
Offer size	0.899 <i>0.757</i>	-1.921 <i>0.558</i>	1.977 <i>0.478</i>
Standby rights	-2.376 ** <i>0.044</i>	-3.494 *** <i>0.009</i>	-1.442 <i>0.228</i>
Use of proceeds	2.047 ** <i>0.054</i>	2.654 ** <i>0.031</i>	1.848 * <i>0.077</i>
Institutional ownership	1.374 <i>0.175</i>	1.969 ** <i>0.066</i>	1.088 <i>0.277</i>
Ownership concentration	-3.284 <i>0.120</i>	-0.756 <i>0.738</i>	-2.627 <i>0.207</i>
Year fixed effects	Yes	Yes	Yes
Adj. R²	13.40%	17.21%	8.50%

This table reports results of the multivariate analysis of order imbalance determinants after the offer

Model :

$COIB_{[1,30]} = a_0 + a_1 COIB_{Pre-issue} + a_2 Ownership\ concentration + a_3 Institutional\ ownership + a_4 Standby\ rights + a_6 Firm\ size + a_7 Offer\ size + a_8 Use + a_9 Year\ fixed\ effects + \epsilon$

Where $COIB_{[1,30]}$ is cumulative order imbalances 30 days after the expiration of the offer, $COIB_{Pre-issue}$ is cumulative order imbalances during our 3 windows of events (model 1 to 3), Ownership concentration is the percentage of shares held by the main shareholder, Institutional ownership is a dummy equal to 1 if the main shareholder is a corporate or a financial institution, Standby is a dummy equal to 1 if the issue is underwritten, Firm size is the log of firm size, offer size is percentage of change in shares, Use is a dummy equal to 1 if funds are raised to finance a specific investment or acquisition.

*, **, *** represent the significance level of 10%, 5% and 1% respectively. P-values are in italic

Table 6: Impact of order imbalances on Pre-offer and post offer abnormal returns

	Model 1 Pre- announcement CAR	Model 2 Announcement date CAR	Model 3 Pre-offer period CAR	Model 4 Post Offer CAR
Intercept	0.005 <i>0.659</i>	-0.004 <i>0.658</i>	0.030 <i>0.402</i>	-0.007 <i>0.768</i>
OIB Pre-Announcement	0.048 ** <i>0.021</i>	-0.005 <i>0.706</i>	0.005 <i>0.936</i>	-0.079 ** <i>0.028</i>
OIB Announcement		0.041 *** <i>0.001</i>	0.121 ** <i>0.018</i>	0.052 * <i>0.092</i>
OIB Pre-Offer			0.146 <i>0.226</i>	0.039 <i>0.331</i>
Standby rights	0.004 <i>0.811</i>	-0.004 <i>0.738</i>	-0.032 <i>0.413</i>	0.001 <i>0.986</i>
Abnormal turnover	0.065 <i>0.201</i>	0.004 *** <i>0.002</i>	0.038 ** <i>0.044</i>	0.005 <i>0.518</i>
Adj.R²	5.11%	17.45%	11.40%	5.35%

This table reports multivariate analysis of abnormal returns 3 days prior to the announcement date (model 1), on the announcement date (model2), prior to the issue date (model 3) and 8 days after the expiration of the offer (model4).

Model:

$$CAR = \alpha + \beta_0 OIB_{Pre-offer} + \beta_1 Abnormal\ turnover_i + \epsilon_i$$

Where CAR is cumulative abnormal returns during the period of interest, OIB_{Pre-offer} is order imbalance measure prior to the announcement, on the announcement date and during the pre-offer period and abnormal turnover is abnormal turnover during the window of interest.

*, **, *** represent the significance level of 10%, 5% and 1% respectively. P-values are in italic

Table 7: Multivariate analysis of Post issuance performance

	Model 1 Pre- announcement period	Model 2 Announcement date	Model 3 Pre-offer period
Intercept	0.323 <i>0.469</i>	-0.176 <i>0.704</i>	-0.148 * <i>0.731</i>
Buying pressure	0.006 <i>0.933</i>	0.371 * <i>0.065</i>	0.033 ** <i>0.089</i>
Selling pressure	0.033 <i>0.610</i>	-0.311 * <i>0.042</i>	-0.049 *** <i>0.002</i>
Firm size	0.003 <i>0.874</i>	0.028 <i>0.246</i>	0.017 <i>0.137</i>
Offer size	0.076 <i>0.767</i>	0.204 <i>0.430</i>	0.561 ** <i>0.022</i>
Standby rights	-0.092 <i>0.388</i>	-0.091 <i>0.398</i>	-0.111 <i>0.293</i>
Year fixed Effects	Yes	Yes	Yes
Adj. R²	1.94%	5.34%	18.48%

This table reports multivariate analysis of Post issue performance on Buying and selling activity prior to the announcement (Model1), on the announcement date(Model2) and before the offer date (model 3).

Model

$PIR_i = a + a_1 \text{Buying pressure} + a_2 \text{Selling pressure} + a_3 \text{Firm Size} + a_4 \text{Offer size} + a_5 \text{Standby} + a_6 \text{Year Fixed effects} + \epsilon_i$

Where PIR_i is the post-SEO price performance, Buying/Selling pressure is cumulative net buying activity/net selling activity over the period of interest, Standby rights is a dummy equal to 1 if the issue is underwritten. We added Firm size, offer size and year fixed effects as control variables.

*, **, *** represent the significance level of 10%, 5% and 1% respectively. P-values are in italic

