Stock price informativeness versus liquidity as determinants of subsequent financing choices

Thi Xuan Dung **Nguyen**[1]

Université Grenoble Alpes, Grenoble INP, CERAG, 38000 Grenoble, France*

Radu **Burlacu**

Université Grenoble Alpes, Grenoble INP, CERAG, 38000 Grenoble, France*

Sonia **Jimenez-Garcès**

Université Grenoble Alpes, Grenoble INP, CERAG, 38000 Grenoble, France*

* Institute of Engineering, Univ. Grenoble Alpes

Abstract

This paper investigates and compares the impact of stock price informativeness and liquidity following a Seasoned Equity Offering (SEO) on the firm's subsequent choice between equity and debt financing on the European market over the period 2000-2017. We find that stock price informativeness and liquidity affect the subsequent financing choices following SEOs differently. Greater stock price informativeness around a given SEO leads to a higher propensity for subsequent equity financing but a lower propensity for subsequent debt financing in the following three years. The preference for equity financing over debt financing supports the market feedback hypothesis. In contrast, higher stock liquidity favors both subsequent equity and debt financing, with the propensity for debt issuance being higher. We also find evidence that stock liquidity is more predictive of the subsequent equity financing decision than stock price informativeness.

Keywords: Seasoned equity offering, debt issue, liquidity, stock price informativeness, market-feedback

JEL classification: G10, G15

[1]Corresponding author: NGUYEN Thi Xuan Dung, Centre d'Etudes et de Recherches Appliquées à la Gestion (CERAG), Université Grenoble Alpes, 150 rue de la Chimie, Saint-Martin-d'Hères, 38400, France. Email address: thi-xuan-dung.nguyen@univ-grenoble-alpes.fr

1 INTRODUCTION

Studying the determinants of the firm's financing choice between debt and equity is an important research topic in corporate finance. In particular, the "market feedback effect" (Bond et al., 2012a; Goldstein, 2023), according to which firms make financing decisions in response to the aggregate information from the market, has received insufficient attention. The market comprises different participants with different information sources; some may be news to managers (Hayek, 1945). Thus, when making decisions, the firm's management is expected to take into account the market's perceptions about the firm, as reflected by stock prices, and incorporate this feedback to regulate financing decisions. SEOs are associated with significant amounts of information disclosure and market scrutiny (e.g., Almazan, Suarez, and Titman, 2002); therefore, firms might receive significant market feedback that can be used in their subsequent financing decision-making. Previous research on equity reissue finds a positive relationship between post-equity issue returns and the probability of subsequent SEOs (Garfinkel, 1993; Hovakimian and Hutton, 2010; Jegadeesh et al., 1993; Jiang et al., 2015).

Nevertheless, managers may also gain further insights by considering other factors beyond the stock price on the market: in addition to the stock price itself, other stock characteristics such as price informativeness and liquidity also experience variation after SEO. Fulghieri and Lukin (2001) and Chemmanur and Jiao (2011) present models where managers with favorable private information issue equity and induce sophisticated investors to generate information about the firm, thus reducing information asymmetry. Both the two hypotheses about equity reissue decision, the "Signalling by IPO underpricing" (Allen and Faulhaber, 1989; Welch, 1989)[2] and "market-feedback hypothesis" (Jegadeesh et al., 1993)[3], imply a better-informed stock market after SEOs for firms that decide to reissue equity. The former posits that information revelation between the IPO and the first SEO is the rationale behind the underpricing decision as a signal of quality, whereas the latter suggests that the manager's absorption of favorable information from the market after SEO explains equity issuance following after-market return run-ups. Concerning the liquidity variation after

[2] The hypothesis of signaling by IPO implies that likelihood of subsequent Seasoned Equity Offering increases with IPO underpricing level. The signaling by IPO underpricing hypothesis stipulates that issuers with private information use IPO underpricing to signal their quality to the investors. By bearing the cost of IPO underpricing, issuers rationally separate themselves from low-quality firms and thus can realize subsequent equity offerings at more favorable conditions. The reason behind is that good firms can be expected to recoup the loss from underpricing their equity offering after that, when their fundamental value is realized after IPO, whereas bad firms do not.

[3] The market-feedback implies that likelihood of subsequent Seasoned Equity Offering increases with after-IPO return. The market-feedback hypothesis posits that the market has some informational advantages that managers do not have about a firm's project's fundamental value. High after-SEO return reflects that the issuer has underestimated the marginal project return in their IPO; in other words, the project is better evaluated by the market. Consequently, firms with higher after-market returns are more likely to raise additional capital for their project in the short term after an IPO than firms with lower after-market returns.

SEO, many studies prove that stock liquidity generally increases after SEOs, for example, Bilinski et al. (2012), Gopalan et al. (2012), and He et al. (2014).

This paper's primary objective is to investigate whether changes in stock price informativeness and liquidity triggered by equity offerings can explain the subsequent financing decisions. Stock price informativeness, captured by firm-specific return variation, measures the rate of the amount of firm-specific information incorporated in price via trading (Roll, 1988). A higher stock price informativeness, captured by the firm's specific return variation, implies that the stock price is tracking the firm's fundamental value more closely (Fernandes and Ferreira, 2009), lowering the firm's information risk. Meanwhile, stock liquidity reflects how easily investors can buy or sell a stock without a significant price change. Increases in aggregate market liquidity accelerate the convergence of prices to fundamentals (Sadka and Scherbina, 2007).

Information risk and liquidity are two critical determinants of capital structure. Notwithstanding, existing research simultaneously investigating these two factors' effects on the subsequent financing decision is scarce. Investors demand a lower risk premium in anticipation of their losses when purchasing well-informed and better-liquid stocks, which favors subsequent equity financing. Since issuing equity is more sensitive to market response than debt or an information imbalance between insiders and outsiders (Sony and Bhaduri, 2021; Yulianto et al., 2021), follow-on debt might be the more optimal choice for firms with worse stock price informativeness. Brogaard et al. (2017) find that enhanced stock liquidity decreases default risk – an aspect that satisfies debt investors, implying that high liquidity facilitates funding by debt. We expect the different impacts of post-SEO stock price informativeness and liquidity on the follow-on debt and equity likelihood, as well as the preference between follow-on debt and equity following SEOs.

By examining the effect of pos-SEO stock price informativeness and liquidity on the subsequent financing decision, we also add value to the debate about whether the equity reissue results from market mispricing or the additional financing demand of the firm's projects that remain in the literature[4]. Higher stock price informativeness and liquidity after the SEO facilitates stock price discovery, lowering mispricing issues. We argue that if the equity reissue decision is not caused by market mispricing, firms with higher stock price informativeness and liquidity levels will engage in equity reissuing.

Furthermore, it is noteworthy that price informativeness and liquidity are closely related. Stock price informativeness implies better stock transparency and thereby reduces adverse selection issues. Meanwhile, the adverse selection problem in the secondary markets due to the presence of privately informed traders is

[4] Hovakimian and Hutton (2010) find that a firm's investment rises with its one-year post-SEO returns, suggesting that the market's response is related to its investment strategy rather than market misjudgment of its stock value. However, Jiang et al. (2015) find that companies that issue equity within six months following their IPOs also experience poor long-term financial and operating performance.

a primary cause of illiquidity (Brennan and Subrahmanyam, 1996; Easley et al., 2002; Easley and O'Hara, 2004). Conversely, liquidity might stimulate informed trading and make stock prices more informative (Subrahmanyam and Titman, 2001; Khanna and Sonti, 2004). The second objective of our paper is to compare the predictive importance of stock price informativeness and liquidity after the SEO to the firm's subsequent financing choice.

We measure stock price informativeness by the firm-specific return variation (Durnev et al., 2004; Fernandes and Ferreira, 2009). Stock liquidity is proxied by the Amihud Illiquidity ratio (Amihud, 2002). We use logit and multinomial logit models to examine the impact of liquidity and stock informativeness on the probability of follow-on equity and debt issues and OLS regression to analyze those impacts on the timing of subsequent financing. As suggested by Frank and Goyal (2009)[5], we compare the impacts of stock price informativeness and liquidity between models using AIC and BIC, Akaike's and Schwarz's Bayesian information criteria.

Using a cross-sectional analysis of 12,619 SEOs completed by 5,409 European firms between 2000 and 2017, we find that after-SEO stock informativeness and liquidity significantly impact the probability of following debt and equity financings within the following three years. After SEO, better stock liquidity and a greater extent of liquidity improvement post-SEO encourage additional equity and debt financing within three years after the SEO. In comparison, post-SEO stock price informativeness levels and improvements in stock price informativeness after the SEO increase the likelihood of subsequent SEOs and decrease the probability of issuing new debt. Our results are robust after controlling for other variables related to signaling and market-feedback hypothesis, the SEO underpricing and the after-SEO returns, and for other firm characteristics such as the leverage ratio, the book-to-market ratio, the operating income, the R&D, and the capital expenditures before the SEO. We especially find that stock liquidity implies a higher reduction in AIC and BIC compared to measures of stock price informativeness.

The findings of our analysis have significant implications. Firstly, our findings show that changes in stock price informativeness and liquidity, whether measured by their after-SEO levels and pre-to-post SEO variation, are important determinants of subsequent financing decisions, confirming the close link between the market and the firm's financing decisions. Although stock price informativeness and liquidity are strongly linked, their post-SEO effects on subsequent financing choices differ. Secondly, the preference for equity reissue by firms with informative prices and highly liquid stocks supports the idea that subsequent SEO does not result from market mispricing but rather supports the market-feedback hypothesis. Thirdly, we find that the explanatory power of post-SEO stock liquidity on the probability of subsequent financing is higher

[5] Further references about AIC and BIC, see. Akaike (1998); Raftery (1995); Schwarz (1978)

than that of stock price informativeness, implying the higher importance of potential cost reduction compared to the improved information environment in subsequent financing decisions. This study complements the existing literature by explaining why firms choose equity or debt as their subsequent funding method concerning the changes in their stock market after SEOs.

The paper proceeds as follows. Section 2 indicates the research background and hypotheses. Section 3 describes the data, measures, and our central methodology. Section 4 presents the empirical results and discusses them. Additional tests and robustness tests are included in section 5. The last section concludes.

2 THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

2.1 POST-SEO STOCK PRICE INFORMATIVENESS AND THE EFFECT ON THE SUBSEQUENT FINANCING DECISION

Greater firm-specific return variation results from more intensive informed trading due to the decreased information cost, which signifies a more informative price (Durnev et al., 2004). Fernandes and Ferreira (2009) find that a higher stock price informativeness, proxied by high firm-specific return variation, indicates that the stock price is tracking its fundamental value more closely and that stock markets are more efficient than others. A high level of stock price informativeness implies a lower information cost (Grossman and Stiglitz, 1980) and better transparency (Jin and Myers, 2006), which also implies a lower potential mispricing[6]. If the subsequent SEO following after-SEO return run-up is not caused by market mispricing, firms with greater transparency or higher stock price informativeness levels will engage in equity reissuing.

The notion that post-SEO stock price informativeness may affect subsequent financing decisions relates to the feedback paradigm (Bond, Edmans, and Goldstein, 2012; Goldstein, 2023). In traditional market microstructure-related models, the price only reflects expected future cash flows[7] , or the market is just a sideshow. Under the feedback paradigm, managers learn from the market and modify their behavior and decisions[8].

[6] Kim et al. (2021) define opaqueness as the lack of information that prevents investors from perceiving the operating cash flow and income, which implies a positive relation between mispricing and opaqueness. Jin and Myers (2006) indicate that an increase in opaqueness can lead to higher R2, which also means a low level of stock price informativeness proxied by firm-specific return variation (Roll, 1988)

[7] In models of information and trading of Grossman and Stiglitz (1980), Hellwig (1980), Kyle (1985), and Glosten and Milgrom (1985), there is asymmetric or heterogeneous information about the firm's future cash flows. Speculators produce information about them and trade, and then through the trading process the price aggregates the information, with noise, providing a signal about expected future cash flows

[8] Typically, feedback paradigm can be describle as follow: there is an event, then a market reaction to that event, and afterward, the manager may change its plans or decisions due to what he/she learns from the market. Hayek (1945) argues that in an economic system where the knowledge of relevant facts is dispersed, prices can coordinate the actions of different participants and relay this information back to the manager, allowing her to make better resource allocation decisions. Luo (2005) finds that acquisitions are more likely to be canceled if prices react negatively to their announcements. Jayaraman and Wu (2020) indicate that firms adjust their capital expenditures upward (downward) in response to positive (negative) stock market reactions to their investment forecasts and that they do so more strongly when it is more likely that the price contains new information.

Indeed, both the logic underlying the signaling via IPO underpricing and the market-feedback hypotheses are connected to issues of informativeness and imply a better-informed stock market after SEOs, in which only high-quality firms can reissue equity. The incremental information revelation between the IPO and the first SEO is the rationale behind the underpricing decision as a signal of quality, that only "high quality" firms can recover the expenses of underpricing when incremental information about their actual quality is disclosed to the market following the initial public offering (IPO). Meanwhile, the manager's absorption of favorable information from the market after SEO, reflected in the return run-up, appears to be the key to managers' equity reissue decisions following the market-feedback hypothesis. Managers learn more about how outside investors perceive their projects' worth by observing the return increase following an initial public offering (IPO). They then incorporate this information into their decision-making process to increase their investments.

As induced from the mentioned arguments of IPO underpricing and market feedback hypotheses, better transparency in stock price, reflected in the pre-to-post SEO stock price informativeness changes and its post-SEO levels, could positively affect subsequent SEOs. If these are true, it is more plausible to trust that the equity reissue decision is for expanding business purposes, responding to the favorable feedback market, rather than simply results from manager timing because of the market overvaluation. This expectation is also consistent with corporate finance literature that when firms have better transparency, equity holders typically require lower risk compensation, lowering the cost of equity and encouraging the reissuing decision.

On the other hand, Dasgupta et al. (2010) provide a model showing that stock prices are more informative about future events in more transparent environments. When an event actually occurs, and new information is disclosed and incorporated into stock prices, the firm-specific return variation will increase. However, if most of the relevant information is already reflected in stock prices before the event, there is less "surprise" or less new information impounded into the stock price at SEO; hence, the firm-specific return variation after SEO may be subsequently lower.

Regarding debt financing, it may be more adapted than equity financing for firms with higher levels of opaqueness, given the less sensitivity of debt to market response compared to equity issuance and the information asymmetry that exists between insiders and outsiders (Sony and Bhaduri, 2021; Yulianto et al., 2021). Debt investors are mainly concerned with the firms' debt repayment capability. For firms with high information asymmetry, such as start-ups or firms in specific industries such as high-tech or medical, public disclosure might be costly or infeasible, or their intention is to keep their competitive competencies confidential. With debt financing, those firms are obligated to disclose their specific information solely to the creditors, not the general public, thereby lowering their disclosing costs and the risk of imitation by their

rivals. These reasons might lead to a preference for debt over equity within firms with low stock price informativeness or high opaqueness. These arguments above are consolidated into our first hypothesis:

H1: *Firms with higher (lower) post-SEO stock price informativeness (in its level and improvement) are more likely to issue equity (debt) within the following three years.*

We note that both equity and debt holders might require lower returns after the SEOs when investing in firms with better transparency. Firms with high stock price informativeness might be offered debt at a cheaper cost than equity and, thus, choose debt instead of equity for their subsequent funding[9] following SEOs. Noticing that the degree and the improvement of stock price informativeness could have potential opposite effects on the financing decision choice between equity and debt, examining the impact of stock informativeness on follow-on debt issues and preference between debt and equity is essential for understanding the financing decision-making processs in empirical and the examining the remaining explanatory power of existing related literature hypotheses.

2.2 THE EFFECT OF POST-SEO LIQUIDITY ON SUBSEQUENT FINANCING DECISION

Sadka and Scherbina (2007) document a close link between mispricing and liquidity in the cross-section and the time series. They find that in the cross-section of stocks with high analyst disagreement (as the proxy of earning uncertainty), less liquid stocks are more likely to be mispriced, as evidenced by their low future returns relative to more liquid stocks. In the time series, changes in aggregate liquidity are negatively related to the magnitude of mispricing; that is, increases in liquidity reduce the costs of arbitrage and accelerate the convergence of prices to fundamentals.

Previous studies show evidence that stock liquidity increases after SEOs in the U.S. market (Bilinski et al., 2012; Eckbo et al., 2000; Gopalan et al., 2012; He et al., 2014). Elyasiani et al. (2000) prove that liquidity is strongly linked to market response. They indicate that the change in liquidity, precisely the reductions in illiquidity measures, such as the percentage bid-ask spread and pricing error volatility (Hasbrouck, 1993), can explain most of the stock market's positive response (represented by cumulative abnormal return) to the firm's equity issuing decision.

Higher liquidity has a positive effect on the propensity of equity issues. Following Lin and Wu (2013), firms are more likely to realize SEOs when liquidity risk drops. High liquidity reduces the equity cost of capital, making the equity issue more likely (Butler et al., 2005; Hennessy and Whited, 2005). Hennessy and Whited (2005) provided a theoretical model indicating that less liquid stocks have higher issuance costs. Butler,

[9] The pecking order theory (Myers and Majluf, 1984) suggests that firms prefer debt over equity when they need external funding.

Grullon, and Weston (2005) show that the underwriting fees for SEOs are lower for firms with more liquid stocks. Barclay and Hendershott (2003) find that higher market liquidity fosters trades among liquidity and informed traders and facilitates price discovery, which reduces investors' cost of searching for information and makes SEOs more likely. Cheung et al. (2016) show that the market illiquidity of a firm's stock has a significantly negative effect on the probability of SEOs and the size of the offering.

Concerning debt financing, due to the correlation between elevated interest rates and high default risk, as well as the frequent challenges in accessing capital markets when carrying a high default risk, firms place significant importance on default risk. Literature shows a certain amount of evidence that stock liquidity decreases the default risk. Fang et al. (2009) provide evidence that, compared with their low liquidity counterparties, firms with liquid stocks tend to have higher firm value, implying a lower likelihood of bankruptcy. Besides, liquid stocks also appear to be more marketable for fulfilling debt obligations if necessary. Brogaard et al. (2017) demonstrate that enhanced stock liquidity decreases default risk proxied by the expected default frequency. They find that higher liquidity could decrease default risk by enhancing price efficiency or improving corporate governance through easing investors' ability to exit. Since higher liquidity makes it easier for stockholders to sell stocks, the threat of exit[10] can function as a corporate governance mechanism that disciplines managers to engage in value-enhancing investments and guards against opportunistic management behavior (Admati and Pfleiderer, 2009; Edmans, 2009), potentially leading to lower default probability. Hence, we conjecture that increased liquidity post-SEO positively affects the manager's attitude toward subsequent funding, whether by equity or debt.

Although many previous studies suggest an inverse relationship between liquidity and default risk, others suggest a proportional relationship. An increase in liquidity may amplify the risk of default if it intensifies noise trading, which results in increased firm mispricing and volatility (Baker et al., 2003; Goldstein and Guembel, 2008; Ozdenoren and Yuan, 2008; Polk and Sapienza, 2009) - this issue will be discussed further in the next section. Greater liquidity can also decrease internal firm monitoring (Bhide, 1993). As a consequence, liquidity might also decrease the propensity of debt issues following SEO.

As there are two opposite potential effects of liquidity on the subsequent equity and debt, we examine the impact of liquidity changes after SEO on the follow-on equity and debt issue by testing the following hypothesis:

H2: *After an SEO, firms with greater improvement / higher levels of liquidity are more likely to issue subsequent equity or debt within the following three years.*

[10] Edmans et al. (2013) show that greater stock liquidity results in governance shifting from blockholder's voice to the threat of exit.

2.3 POST-SEO FIRM-SPECIFIC RETURN VARIATION AND LIQUIDITY AS DETERMINANTS OF THE SUBSEQUENT FINANCING CHOICE BETWEEN DEBT AND EQUITY

Sections 2.2 and 2.3 show our conjecture about the potential effect of post-SEO stock price informativeness and liquidity on the follow-on equity and debt likelihoods. However, one question remains: After SEO, which factor, stock price informativeness or liquidity, is more important than the other in the firm's subsequent financing decisions? The relationship between stock price informativeness and liquidity is complex as a win-win relationship in that stock price informativeness could affect liquidity, but liquidity could also affect stock price informativeness.

When an event occurs, for instance, SEO in this paper context, the high stock price informativeness, which implies a low information cost, facilitates more intensive informed trading. In turn, through the trading process, the market absorbs information that realigns the information levels of informed and uninformed investors, thereby reducing the adverse selection component of liquidity premium. The adverse selection problem is the primary cause of illiquidity (Brennan and Subrahmanyam, 1996; Easley et al., 2002; Easley and O'Hara, 2004). Some studies show that post-SEO increase is associated with reduced adverse selection. Bilinski et al. (2012) find that an increase in analyst coverage and institutional ownership appears to cause the post-issue, long-term liquidity increase. He et al. (2014) find significant improvements in information asymmetry, liquidity, and transaction costs following SEO events.

Conversely, liquidity might stimulate informed trading and contribute to more informative stock prices (Khanna and Sonti, 2004; Subrahmanyam and Titman, 2001). Higher liquidity permits informed investors to profit more from their private information, thus incentivizing investors to acquire more information and trade on it, leading to more informed stock prices (Holmström and Tirole, 1993; Subrahmanyam and Titman, 2001). Following Khanna and Sonti (2004), liquidity stimulates the entry of informed investors who make prices more informative to stakeholders. Informed traders factor the effect of their trades on managerial behavior into their trading strategy, trading more aggressively and thus making prices more informative. Barclay and Hendershott (2003) find that higher market liquidity fosters trades between uninformed and informed traders and facilitates price discovery.

However, liquidity and stock price informativeness are still different aspects that may not always be positively linear. Liquidity encompasses not only the adverse selection-related component associated with information asymmetry but also non-adverse selection-related components, which refer to inventory costs,

specialist monopoly profits, and transaction costs such as clearing fees and liquidity shocks[11]. Increased liquidity shows the potential general cost reduction of adverse selection and other costs.

It is also noteworthy that liquidity may increase even with low firm-specific return variation. Uninformed traders might prefer investing in stocks with high systematic co-movement to market rather than high firm-specific volatility. An example is the investors' trading behavior towards large firms. Investing in large-cap firms with high stability and steady dividends is commonly used as a core long-term investment strategy, which makes the liquidity for those stocks higher than small-cap firms. In the meantime, due to the large market capitalization, large firms significantly contribute their returns to the aggregate return of the market; consequently, their stocks undergo a more pronounced return co-movement with market returns.

Some empirical studies report a positive relationship between stock return co-movement with the market and its liquidity (Baruch et al., 2007; Baruch and Saar, 2009; Chan et al., 2013)[12]. Baruch et al. (2007) argue that when an individual stock is highly correlated with the market, market makers can rely more on the information observed from the market movement so that the stock price adjustments are less sensitive to its own order flow. The high return co-movement with the market or low firm-specific volatility implies a low firm-specific risk for investors (Jin and Myers, 2006). However, lower firm-specific risk for investors does not reflect a low-risk stock. Morck et al. (2000) suggest that in less developed financial markets, if the noise traders ''herd'' and trade the market as opposed to individual stocks, market risk may be higher[13]. Jin and Myers (2006) study the effect of limited information on the risk-bearing division between insider managers and outside investors and show that lack of transparency increases R^2 by shifting firm-specific risk to managers[14]. The opaque stocks with high R^2s deliver large negative returns and are also more likely to crash. The liquidity increase resulting from the high return co-movement is unrelated to the information effect. In this study, we claim the notion that high stock price informativeness, or high firm-specific return variation,

[11] Glosten & Milgrom (1985) separate liquidity (as a bid-ask spread) into two components: the permanent (adverse selection) component and the transitory component. Many studies documents that price impact contains both informational and noninformational components: Theoretical studies include Admati & Pfleiderer (1988); Copeland and Galai (1983); Easley and O'Hara (1987); Glosten and Milgrom (1985); Kyle (1985). Empirical evidence is provided in Glosten & Harris (1988); Hasbrouck (1991a, 1991b) among others.

[12] Baruch et al. (2007) and Baruch and Saar (2009) find that a stock will be more liquid when listed on the exchange, in which its returns have a greater correlation with returns of other assets traded on that market. Chan et al. (2013) also find that stocks with higher systematic volatility, proxied by return co-movement to the S&P 500 portfolio or beta ratio, are more liquid. The return co-movement or stock return synchronicity, is measured by systematic volatility (R^2) relative to idiosyncratic volatility ($1-R^2$).

[13] Morck et al. (2000) argue that poor investor protection in less developed markets could make firm-specific information less useful to arbitrageurs, decreasing the number of informed traders relative to noise traders.

[14] Lack of transparency or opaqueness enable manager to manipulate the insiders capture from the firm's operating cash flows. The limits to capture are based on outside investors' perception of the firm's cash flow and value. However, investors' perception is imperfect that they can see some changes in cash flow, but not all changes. When cash flows surpass investor expectations, insiders' capture increases. When cash flows fall short of investor expectations, insiders are forced to reduce capture if they want to maintain control of the firm. Increased capture therefore reduces the amount of firm-specific risk absorbed by outside investors and leads to higher R^2s.

implies a well-informed stock price and, hence, lower information risk (see., Chen et al., 2007; Durnev et al., 2004; Fernandes and Ferreira, 2009; Roll, 1988).

Given the greater cost coverage of liquidity in comparison to stock price informativeness and the potential for liquidity to increase despite low stock price informativeness, we conjuncture the higher importance of the changes in liquidity after SEO compared to stock price informativeness in explaining the subsequent financing decision:

H3: liquidity dominates price informativeness as a determinant of subsequent financings

Nevertheless, even though liquidity covers more types of costs, it cannot ensure that the reduction of the cost of capital concerning liquidity is more significant than the reduction associated with stock price informativeness. In addition, as mentioned above, liquidity might be positively or negatively related to the stock price informativeness. Given the closed and complex link between information risk and liquidity, studying the relative importance of post-SEO information asymmetry and liquidity is valuable to understanding the effect of market response to SEO on a firm's financial decision-making. If liquidity is more important than stock price informativeness, the potential cost of capital reduction seems more important. By contrast, the information effect related to the ability to extend the amount of information that increases market perception about the firm value is more critical in subsequent financing rounds.

3 DATA AND METHODOLOGY

3.1 DATA DESCRIPTION

The sample is composed of listed European firms that issued seasoned equity between 2000 and 2020. As the analysis requires data on the following equity/debt issues within a three-year period after the prior SEO, we build our main dataset of prior SEOs ending in 2017. The data on follow-on debt/equity that occurs within three years following ends in 2020. The data are obtained from Eikon provided by the Thomson Reuters Securities Data Company (SDC) database. The prices and other relevant data are converted into euros for countries outside the Eurozone.

In the first step, we retrieve SEO records corresponding to the period and target market. For the European market during the period 2000-2017, we find that, within the following three years, 65.02% of SEOs are followed by subsequent ones, and 16.57% of SEOs are followed by debt offerings. In the second step, we exclude SEO records for which the information on prices and transaction volume is insufficient to measure the stock price informativeness. The sample remains SEO observations with at least 120 days of trading

data available before (after) the issuing date. Records of SEOs in which data of the SEO offering price/offering amount is unavailable are also excluded.

Some firms conduct more than one SEO within the same year. Given the annual frequency of the financial statement data, such issues cannot be distinguished based on the issuing firm's characteristics. Therefore, only the earliest issue is retained in the sample (Hovakimian and Hutton, 2010). After these steps, there are 12,619 records of SEO observations concerning 5,439 European firms in 39 countries. Within 12,619 SEOs, 6380 SEOs have followed SEOs, 969 SEOs have followed debts, and 1202 SEOs have both followed SEO and debt issues within the following three years.

The sample distribution by country and industry is presented in Table 1. From 2000 to 2017, most of the SEOs were issued by Industrial firms, representing 73.14% of the overall sample, whereas SEOs made by financial firms account for 23.08% of the total issue. The Utility and Agency[15] sectors comprise a small proportion of the overall sample, 3.73%, and 0.04%, respectively. United Kingdom firms conduct nearly 42.09% of SEOs in the sample. Sweden, France, and Germany represent 9.41%, 7.73%, and 7.17% of our sample, respectively. The other 35 countries constitute 33.61% of the total sample, with each making up a proportion of less than 4% (the smallest figure, 0.01%, is about Bosnia and Herzegovina, with only 1 SEO recorded).

Insert Table 1 around here

3.2 MEASURING STOCK INFORMATIVENESS AND LIQUIDITY

We use firm-specific return variation as the proxy for stock price informativeness (Durnev et al., 2004; Fernandes and Ferreira, 2009; Morck et al., 2000; Roll, 1988)[16]. A higher firm-specific stock return variation, henceforth *FSRV*, is correlated with a higher rate of firm-specific information incorporation into prices via trading, which can not be explained by market movements and is unrelated to public announcements. The firm-specific return variation employs the R^2 of the regression of a firm's daily returns on its industry returns and the market returns during a defined period:

$$R_{it} = \alpha_{0i} + \beta_{1i}R_{mt} + \beta_{2i}R_{m,t-1} + \nu_{1j}R_{jt} + \nu_{2j}R_{j,t-1} + \varepsilon_{it}$$

Where R_i, R_j, and R_m are the returns for stock i, industry j, and the market on trading day t, respectively. Lagged industry and lagged market returns are used to control for the potential autocorrelation problem

[15] Eikon database arranging firm's industry into four main industry groups: Industrial, Finance, Utility and Agency. Agency industry includes regional agency and national agency, and is associated with the major SIC group of administration of environmental quality/or the TRBC industry of government activities and services (TRBC: Thomson Reuter Business Classification).

[16] This study uses the formula version of the stock price informativeness of Fernandes and Ferreira (2009).

caused by sparse trading (Cheung et al., 2016). Then, a logistic transformation is applied to circumvent the bounded nature of the R^2 and to yield a variable that better conforms to the normal distribution:

$$FSRV_i = log\left(\frac{1-R^2}{R^2}\right)$$

We measure liquidity by the Amihud illiquidity ratio (Amihud, 2002), which is widely used in the existing literature (Acharya and Pedersen, 2005; Bilinski et al., 2012; Gopalan et al., 2012; He et al., 2014) proxy for price impact. Goyenko et al. (2009) indicate that Amihud's illiquidity ratio as a low-frequency liquidity measure that relates closely to high-frequency TAQ estimates. The Amihud illiquidity ratio is defined as the ratio of absolute price change to absolute excess demand for trading, as follows:

$$Amihud_i = \frac{1}{D_i}\sum_{d=1}^{D_i}\frac{|R_{id}|}{VOLD_{id}}$$

Where R_{id} is the absolute return on stock *i* on day d; $VOLD_{id}$ is the respective daily volume in dollars; and D_i is the number of trading days for stock *i* in a given period (for example, 40 days after the SEO in our study). Since our sample is large and the value of the Amihud illiquidity ratio is in a broad range, we take the logarithm of the *Amihud* to reduce the skewness towards large values:

$$LNAMI_i = \ln(Amihud_i)$$

3.3 VARIABLE DEFINITION

To measure the probability of follow-on equity and debt offering, we initially generate two variables, the *Next_SEO* and the *Next_Debt*. *Next_SEO* is a dummy variable that gets a value of 1 if the firm with SEO in the principal sample (of 12,619 SEOs) has subsequent SEO within the three following years after that SEO and 0 otherwise. Similarly, *Next_Debt* is a dummy variable that gets a value of 1 if the firm with SEO in the principal sample issues debt within the three following years after an SEO and 0 otherwise. The probability of the follow-on equity offering refers to P(*Next_SEO*=1), while the probability of the follow-on debt offering refers to P(*Next_Debt*=1).

The independent variables set consists of variables that capture the value of firm or stock characteristics at time T. Concerning our main explaining variables, we calculate the stock price informativeness and liquidity surrounding the SEO event date at time T. $FSRV_{t-1}$, $FSRV_{t+1}$, and *FSRV_CHA* are, in turn, the stock price informativeness levels during one year before the month of SEO event, one year after the month of SEO event, and the change pre-to-post-SEO, or $FSRV\_CHA = FSRV_{t+1} - FSRV_{t-1}$. Similarly, LN$AMI_{t-1}$, LN$AMI_{t+1}$, and LN*AMI_CHA* are the natural logarithm of illiquidity levels one year before the month of the SEO

event, one year after the month of the SEO event, and the illiquidity change pre-to-post-SEO, *LNAMI_CHA* = $LNAMI_{t+1} - LNAMI_{t-1}$.

The control variables are SEO underpricing level UP and after-SEO abnormal returns *AAR1* and *AAR2*. UP is defined as the difference in ratio between the SEO price and the previous day's closing price: (*Pre-offer price - offer price*)/*Pre-offer* where the *Offer price* is the SEO price, and *Pre-offer price* is the closing price on the day before. *AAR1* and *AAR2* are related to the market-feedback hypothesis, defined as the average abnormal returns (*AR*) corresponding to two periods, from the 1st day to the 20th day (event window [1,20]) and from the 21st day to the 40th day (event window [21,40]) after the SEO event date (day 0)[17]. The daily abnormal return (*AR*) is estimated as the raw daily return minus the daily expected return calculated by the Fama-French 3-factor models.

The other variables in our analysis are defined as follows: *SEOsize* is the natural logarithm of the ratio of the SEO value to the firm market value before issuing. Jegadeesh et al. (1993) suggest that firms that raise relatively small amounts of capital at the prior equity issue may be more likely to return to the capital market with a subsequent SEO. *Size* is the natural logarithm of the firm market capital at the end of the preceding year of the prior SEO. Large firms are more likely to survive and reissue in the future (Garfinkel, 1993). B/M is the ratio between the firm's book value and market value at the end of the preceding year of the prior SEO. A low B/M also means a high M/B ratio, which reflects the market's belief that the firm has good growth prospects (Baker and Wurgler, 2002), thereby facilitating new funding.

We also control for potential differences in subsequent financing decisions by country and periods of years. We set up a series of dummy variables, G7, *L1*, *L2*, and *L3*. G7 *is* the country dummy. For each SEO, G7 is coded 1 if the firm is located in the G7 countries in European (United Kingdom, France, Germany, and Italy) and coded 0 otherwise. *L1, L2, and L3* are time dummies. *L1* is coded 1 if the firm's issue is in the 2000-2005 period; otherwise, it is coded 0. L2 is coded 1 if the firm's issue is in the 2006-2010 period and coded 0 otherwise. L3 is coded 1 if the firm's issue is in the 2011-2015 period and 0 otherwise.

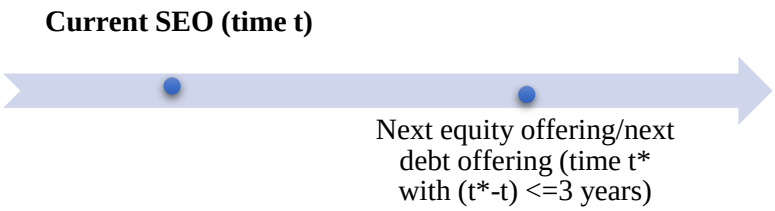
We further control for the impacts of other firm's characteristics in the year preceding the current SEO for additional tests: firm's leverage (*Leverage*), operating income (*OI*), R&D expense (*R&D*), capital expenditure(*Capex*), and Tangibility (*Tang*). These variables are known as important determinants of firm financing decisions in the literature. *Ceteris paribus*, higher leverage implies higher distress risk and, therefore, is anticipated to positively impact the likelihood of equity issuance (Hovakimian and Hutton, 2010). Firms with high R&D/capital expenditure, which refers to higher growth opportunities and product uniqueness, tend to keep their leverage low to avoid debt overhang, maintain investment flexibility, and thus, are more likely to

[17] Suggested by (Jegadeesh et al., 1993)

issue equity (Hovakimian and Hutton, 2010). High operating income increases the firm's recognition. Tangibility is positively associated with leverage (Frank and Goyal, 2009). A detailed description of the variables is presented in Appendix A. Due to the limited available data for these variables, the sample used in the robustness test includes only 6,846 SEO observations.

3.4 METHODOLOGY

We examine whether the stock price informativeness and liquidity, in their levels and changes, after an SEO (at time T) significantly affect the subsequent financing (at time t*), which could be equity or debt within three years (which also means that the time gap between time t* and t is not longer than three years, or t*-t <= 3 years). Our approach is similar to Jegadeesh et al. (1993), with the observing point on the former equity offering (being called "current SEO"/" former SEO" in this study).



Existing empirical studies typically choose among probit, logit, and linear probability models to estimate the likelihood of an event. In this study, we conduct logit regressions for the probability of subsequent SEOs (Garfinkel, 1993; Hovakimian and Hutton, 2010; Jegadeesh et al., 1993; Jiang et al., 2015) and the OLS regression for the SEO-reissue speed. The specification of the empirical model is as follows:

$$(1)\ P\_Y_i = e^{\alpha + x'_i\beta + u_i}$$

The independent variables P_Y_i is the probability that event Y_i occurs within the three years following the former SEO, at any time t* in the period [t, t+3 years]. The event Y_i can be the follow-on equity or debt offering. The probability of the follow-on equity offering (*P_nextSEO*) refers to P(*Next_SEO*=1), while the probability of the follow-on debt offering (*P_nextDebt*) refers = P(*Next_Debt*=1).

The variable x_i is the column vector of the independent variables. We use two independent variable sets that consider separately the pre-to-post SEO changes and post-SEO levels of stock price informativeness and liquidity while other control variables are similar. The first set concerns the pre-to-post SEO changes of stock price informativeness (*FSRV_CHA*) and illiquidity (*LNAMI_CHA*). In the first set, we control for the pre-SEO levels of stock price informativeness and liquidity ($FSRV_{t-1}$ and $LNAMI_{t-1}$), that the greater pre-to-post SEO change in stock price informativeness (liquidity) could induce from higher pre-SEO levels. Hence, the first set includes *FSRV_CHA, LNAMI_CHA,* $FSRV_{t-1}$, $LNAMI_{t-1}$, and CONTROL variables. The

second set is associated with the post-SEO levels of stock price informativeness, including ($FSRV_{t+1}$), post-SEO illliquidity ($LNAMI_{t+1}$), and CONTROL variables.

CONTROL variables are similar for both the two sets, including SEO underpricing level *UP* and after-SEO returns *AAR1* and *AAR2*, SEO size *SEOsize*, *Size* is the natural logarithm of the firm market capital at the end of the preceding year of the prior SEO, book-to-market ratio B/M, the country dummy G7 and the time dummies *L1, L2, and L3*. We further examine the feedback effect of the market, reflected in stock price informativeness and liquidity, on the probability of early refunding by equity and debt while controlling for other firm's characteristics in the year preceding the current SEO: firm's leverage (*Leverage*), operating income (*OI*), R&D expense (*R&D*), capital expenditure(*Capex*), and Tangibility (*Tang*).

Using the two independent variables set, we first test the effects of the pre-to-post SEO changes and post-SEO levels of stock price informativeness and liquidity on the probability of a subsequent SEO, using model (1) with Y=*nextSEO*; P_*nextSEO* = P(*Next_SEO*=1) as the dependent variable. We then examine those effects on the probability of follow-on debt issues using models (1) with Y = *nextDebt* as the dependent variables, P_*nextDebt* = P(*Next_Debt*=1).

We further use the multinomial logit models to test the difference in the impacts of stock price informativeness and liquidity's pre-to-post SEO changes and post-SEO levels on the probability of the next debt and equity issues within the following three years. Using the multinomial logit model allows us to examine the effect of each explanatory variable on the likelihood of reissue separately from their effect on the probability of debt. Treating equity re-issuance and debt as equivalents (1) in the standard logit model would imply an identical impact of all explanatory variables on the likelihood of reissue as on debt. We establish a nominal variable FUNDING that gets a value of 0 if , after the SEO, the firm does not have additional funding, 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The multinomial logit model is as follows:

$$(1)\quad P\_FUNDING = e^{\alpha + x'_i\beta + u_i}$$

In which *P_FUNDING* is the probability of the subsequent financing choice. *FUNDING* gets a value of 0 if the firm does not have any additional funding, a value of 1 if the firm experiences a subsequent equity offering, a value of 2 if the firm conducts a follow-on debt offering, and a value of 3 if the firms issue both debt and equity within three years after the former SEO. The independent set x_i and X_{ij} remain unchanged.

To compare the relative importance of stock price informativeness and stock liquidity in explaining the subsequent financing choice between equity and debt, we calculate the BIC and AIC criteria to examine each factor when other factors are also present in the analysis. This approach is put forward in Frank and Goyal (2009). The Akaike information criterion (AIC) and the Bayesian information criterion (BIC) are the

two most commonly used model selection criteria. AIC and BIC concern the estimators of prediction error and, thereby, measure the relative quality of statistical models for a given set of data.

Given P be the number of parameters and N be the number of observations in a fitted model, The BIC is defined as follows:

$$BIC = -2 \times \text{log-likelihood} + \log(N) \times P$$

The AIC is measured similarly but with the number 2 replacing log(*N*) in the definition.

$$AIC = -2 \times \text{log-likelihood} + 2 \times P,$$

In each case, a smaller BIC indicates a stronger explanatory power of the model. As the log-likelihood increases, both measures fall. As the number of parameters increases, both measures increase. As the number of observations increases, so does the BIC. The BIC is asymptotically consistent compared to the AIC. Typically, given a family of possible models that includes the true model, as the sample size grows to infinity, the probability that the BIC will pick the true model approaches one. It is unclear whether the AIC or BIC is better in small samples. As suggested in Frank and Goyal (2009), when log (N) > 2, the BIC tends to select a more parsimonious model[18]. In our analysis, we report both AIC and BIC.

We compare the importance of stock price informativeness and stock liquidity in explaining the subsequent financing choice by calculating the BIC and AIC of models with and without these variables. For each independent variable set, we start with the regression that includes all *CONTROL* variables (BASE Model), then add the variables of stock price informativeness and liquidity separately to the BASE model. Precisely, we add *FSRV_CHA*, $FSRV_{t-1}$ separately from *LNAMI_CHA*, $LNAMI_{t-1}$ in the first set, and $FSRV_{t+1}$ separately from $LNAMI_{t+1}$ in the second set. Finally, we conduct a regression with all factors in each independent variable set. A greater decrease in BIC and AIC of the regression when adding new variable(s), compared to the BIC and AIC of the base model, shows a higher importance of the new variable(s) added.

4 RESULTS

4.1 DESCRIPTIVE STATISTICS

Table 2 reports descriptive statistics for the main variables: stock price informativeness levels during pre-SEO ($FSRV_{t-1}$) and post-SEO periods ($FSRV_{t+1}$), stock price informativeness change pre-to-post SEO

[18] For a useful discussion of the relative merits of many approaches to model selection, including both the AIC and BIC, see Hastie, Tibshirani, and Friedman (2001)

(*FSRV_CHA*), illiquidity levels before and after SEO with ($LNAMI_{t+1}$, $LNAMI_{t-1}$), illiquidity change surrounding SEO (*LNAMI_CHA*), SEO underpricing (*UNDP*), and average abnormal return post-SEO (*AAR1*, *AAR2*).

Insert Table 2 around here

Firms realizing SEOs within the following three years after a given SEO display higher average stock price informativeness compared to other firms. By contrast, firms with follow-on debt financing within the following three years after the SEO show lower average stock price informativeness than firms without follow-on debt financing.

The average value of *FSRV_CHA* for the main sample of 12,619 SEOs is negative. This is consistent with Dasgupta et al. (2010), who indicate that stock price synchronicity R^2 might increase (firm-specific return variation decreases) when transparency improves. As most of the relevant information is already reflected in stock prices before the event, and on average, less new information is impounded into the stock price at SEO, the firm-specific return variation after SEO is subsequently lower than before SEO. The mean of pre-to-post SEO stock price informativeness change, FSRV_CHA, is less negative for equity reissuers than equity non-reissues and more negative for SEO firms with follow-on debt issues than SEO firms without debt followed. One potential explanation is that, at SEO, a higher amount of new information is embedded in the stock price of the equity reissuers, which partly offset the reduction of stock price informativeness related to the event that occurred, thereby mitigating the FSRV decline pre-to-post SEO, compared to non-reissuers.

The liquidity (in both periods of pre-SEO and after-SEO) is higher in groups of firms that issue follow-on equity (follow-on debt) than in groups that do not. Illiquidity ratio (*ILL_CHA)* decreases, or liquidity increases post-SEO across samples. The liquidity improvement is more remarkable for SEO firms with follow-on equity (debt) than SEO firms with no subsequent equity (debt) issue.

Table 3 reports the correlation matrix for the main independent variables of our study. The illiquidity ratio and stock price informativeness levels in the pre-SEO (after-SEO) period are significantly and positively related. Stock price informativeness and liquidity level are highly and negatively correlated with firm size[19]. Large firms have lower stock price informativeness and higher liquidity levels. Large firms' returns account for a large proportion of average market returns, which could lead to significant co-movement between large

[19] Tabachnick and Fidell (2012) suggest that for logistics regression, as long correlation coefficients among independent variables are less than 0.90 the assumption is met.

firms' returns and market (industry) returns, which implies a greater stock price synchronicity R^2 and, thus, a smaller portion of firm-specific return variation.

Insert Table 3 around here

4.2 STOCK PRICE INFORMATIVENESS AND LIQUIDITY AFTER THE SEO AND THEIR IMPACTS ON SUBSEQUENT FINANCING DECISION

This section analyzes the impact of the liquidity and stock informativeness's pre-to-post SEO changes and their post-SEO levels on the firm's likelihood of follow-on equity and debt within the following three years after the SEO. The results are reported in Tables 4 and 6. Table 4 uses the control variables of SEO underpricing (*UP*), after-SEO returns *(AAR1, AAR2), SEO* size *(SEOSize),* book-to-market ratio (*B/M*), firm size (*Size*), country, industry, and period dummy variables (*G7, I1, I2, L1, L2, L3*).

Insert table 4 around here.

Table 4 shows that a greater improvement and higher level of stock price informativeness after SEO imply a higher probability of having a new SEO but a lower probability of having a follow-on debt issue within the three-year period. Meanwhile, better-improved liquidity, reflected in the reduction and a lower level of the Amihud illiquidity ratio after SEO, is associated with both the higher likelihoods of equity reissue and debt issues within the three years following. These results corroborate hypotheses H1 and H2.

Underpricing levels and after-SEO returns positively affect the probability of equity reissuing within three years following the former SEO. These results are consistent with the signaling by underpricing and market-feedback hypotheses. The follow-on debt offering decision is unrelated to the former SEO underpricing or after-SEO returns. Besides, firms that have a bigger size or issue a larger relative amount of equity in the prior SEO are less likely to reissue equity and more likely to issue the follow-on debt within the following three years.

Industry and country effects in predicting subsequent equity offering, while they are significant in predicting follow-on debt funding. Firms in G7 countries, which are the United Kingdom, France, Italy, and Germany, are more likely to have follow-on debt within three years than firms in other countries. Industrial firms are more likely to have debt within three years following SEO than financial firms and less likely to do so than firms in other industries.

We also conduct an additional analysis of logit regression when extending the control variables set by adding the debt ratio (*Leverage*), tangibility ratio *(Tang),* R&D ratio *(R&D),* capital expenditure ratio *(Capex),* and

operating income *(OI)* is reported in Table 7, Appendix B. The results of the additional analysis are consistent with the results of Table 4.

Table 5 reports the results of estimates from multinomial models about the impact of pre-to-post SEO change and levels of stock price informativeness and liquidity to the subsequent financing choices in the considered period of three years following the SEO, namely, no issue, issue equity only, issue debt only, issue both equity and debt, that correspond to the values 0, 1, 2, 3, respectively. The base outcome is 1, which is "issue equity only".

Insert table 5 around here

As Table 5 shows, while holding all other variables in the model constant, the preference of debt over equity decreases while the stock price informativeness' post SEO levels and pre-to-post SEO changes increase. After the SEO, firms with better stock price informativeness prefer to reissue equity compared to other choices, including non-issuing, issuing debt, or combining debt and equity issues, compared to firms with worse stock price informativeness. Within three years following SEO events, firms with higher levels and greater pre-to-post SEO improvement in stock liquidity prefer issuing equity issues rather than none and prefer debt rather than equity. Concerning other factors, SEO firms with lower pre-SEO stock price informativeness, higher pre-SEO liquidity, lower SEO underpricing levels, higher SEO size, and larger size are more likely to issue follow-on debt than equity. Firms in G7 countries have a higher preference for debt over equity.

An additional analysis of multinomial logit models above with extended independent variables set by adding five variables controlling the firm's characteristics: *Leverage*, *Tang*, *R&D*, *OI*, and *Capex* is reported in Table 8 of Appendix B, which shows the results consistent with Table 5.

An additional multinomial analysis is performed on the subset of SEO firms that have received funding within three years of their SEO efforts. In this analysis, the base outcome is modified to reflect debt issuance or the base outcome FUNDING=2, and an interaction term between Size and stock price informativeness level before SEO (*Interac=Size * $FSRV_{t-1}$*) is added to explain variables in order to eliminate the potential correlation effect between them to the estimation. The results presented in Table 10 of Appendix B are also similarly consistent with results from Table 4 and Table 5. Besides, significant estimates for the interaction terms show that the effect of stock price informativeness is also sensitive to firm size. The larger the firms, the smaller the effect of stock price informativeness on the equity preference over debt.

Our findings also support the market-feedback hypothesis that subsequent SEO results from the financial demand related to investment opportunities rather than market mispricing. Higher stock price informative-

ness corresponds to better transparency, while high liquidity fosters the information revelation from informed to uninformed investors by trading, lowering the possibility of market mispricing. If the information revelation via SEO is efficient and the firm receives favorable feedback on price and liquidity, it can reissue equity at a higher price. If the information revelation is inefficient, as the post-SEO stock price informativeness is still low, but liquidity is high, which positively impacts firm value and favors debt investors, firms issue debt instead of equity to fulfill their investment demands. The different effects of stock price informativeness and liquidity toward debt. Our results indicate that changes in stock price informativeness and liquidity after an SEO are significant determinants of subsequent financing decisions, implying a closed and continuous relationship between the market and the firm's decision-making.

4.3 COMPARING THE EFFECT OF POST-SEO STOCK PRICE INFORMATIVENESS AND LIQUIDITY ON THE SUBSEQUENT FINANCING DECISION

In this part, we analyze whether the feedback effect of stock price informativeness or liquidity is more important in explaining the subsequent financing decision. Table 6 reports the AIC and BIC criteria of the base model without variables related to stock price informativeness and the models that are extended by adding variables related to stock price informativeness and liquidity surrounding SEO. The detailed estimates are reported in Tables 10, 11, 12, and 13 of the Appendix B.

Insert Table 6 around here.

The lower the AIC and BIC are, the higher the explanatory power of the model. AIC and BIC decrease more when adding variables related to liquidity than when adding variables related to stock price informativeness to the base models. We conclude that although both post-SEO stock price informativeness and liquidity (in their improvement and levels) have significant effects on the financing decision, the impact of liquidity seems more important in explaining the subsequent financing choices.

5 CONCLUSION

This paper analyzes the changes and levels of firm-specific information and liquidity after SEO as determinants of the subsequent firm's financing decision. We find that stock price informativeness and liquidity affect the firm's subsequent financing decision differently. Within three years after a given SEO, firms with higher levels and higher improvements of the stock price informativeness around the SEO are more likely to reissue equity and less likely to issue subsequent debt. In comparison, the post-SEO level and pre-to-post SEO improvement of liquidity increase the probability of additional funding within three years, regardless of whether the funding is realized by issuing equity or debt. Firms with greater liquidity improvement prefer debt financing to equity.

Our results are robust after controlling for variables related to signaling and market-feedback hypothesis (namely SEO underpricing and after-SEO return, respectively), as well as for other firm characteristics such as the leverage ratio, the book-to-market ratio, the operating income, the R&D and the capital expenditures before the SEO. Consistent with previous studies, we find that firms with larger sizes, higher B/M, higher leverage, higher operating income, and lower R&D ratios prefer debt over equity.

Overall, our study makes three contributions to the literature. First, it is possible to gain insights into the relationship between the market response and the firm's subsequent financing decision-making process not solely from stock price levels but also other aspects of the stock market: liquidity and stock price informativeness. Firms decide to reissue equity if the information revelation via SEO is efficient and their stock liquidity is improved after SEO. In case of a lack of transparency due to inefficient information revelation or the limited firm-specific information after SEO, but liquidity changes are favorable, firms might choose debt instead of equity to fulfill their additional financing demand.

Second, our findings about the preference for equity reissue in firms with well-informed and high-liquid stocks support the market-feedback hypothesis that subsequent SEO results more from the financial demand of investment opportunities than manager timing due to market mispricing. Higher stock price informativeness means better transparency, while high liquidity fosters the information revelation from informed to uninformed investors by trading, lowering the possibility of market overvaluation for the next round of capital sales. Higher liquidity also implies better firm performance and higher firm value.

Third and most importantly, concerning the relative importance of the effect of the changes in stock price informativeness and liquidity after SEO, we find that stock liquidity seems more substantial than stock price informativeness in predicting the subsequent financing decision. This implies a dominant role of potential cost reduction due to decreased liquidity premium, compared with the extent of stock transparency, in the firm’s consideration for their subsequent financing choices. Understanding the relative importance of post-SEO stock price informativeness and liquidity to subsequent financing decision-making is valuable to understanding the stock market's effect on the firm’s decision.

One limitation of this analysis is the limited availability of data about some firm’s characteristics, namely leverage, operating income, R&D, capital expenditure, and tangibility, which leads to a much smaller sample size when controlling these variables than when not controlling them. Another limitation concerns the SEO issue method. Gajewski and Ginglinger (2002) suggested that the adverse selection effect is greater for rights issues than for public offerings due to stronger underwriter certification for public offerings. We propose that issue methods might affect the magnitude of not only after-returns but also liquidity and stock price informativeness change surrounding SEOs, thus affecting the subsequent financing decisions.

TABLES AND FIGURES

Table 1

Sample distribution by country and industry

Table 1 presents the distribution of SEOs for the pooled sample, the sample stratified by industry (Industrial, Utility, Finance, and Agency), and the sample by country (39 countries in total).

	Number of SEOs	Number of firms
Stratified by industry		
Industrial	**9,230**	**3,906**
Finance	2,913	1,311
Utility	**471**	**189**
Agency	5	3
Stratified by countries		
United Kingdom	5,311	1,993
Sweden	1,187	526
France	975	416
Germany	905	433
Poland	512	321
Norway	441	175
Italy	377	194
Spain	322	128
Netherlands	279	134
Switzerland	277	149
Ireland	217	78
Denmark	216	103
Greece	208	97
Belgium	194	91
Russia	191	100
Guernsey	187	82
Finland	182	96
Jersey	122	47
Austria	103	50
Isle of Man	74	32
Portugal	73	26
Luxembourg	65	30
Cyprus	58	17
Romania	23	15
Croatia	15	11
Monaco	15	6
Malta	13	6
Hungary	13	6
Gibraltar	12	5
Bulgaria	11	10
Lithuania	8	7
Ukraine	7	4
Latvia	5	4
Estonia	4	4
Faroe Islands	4	2
Iceland	4	3
Slovenia	4	3
Czech Republic	4	4
Bosnia and Herzegovina	1	1
Total	12,619	5,409

Table 2
Descriptive analysis

Table 2 reports the descriptive analysis of means and standard variations of the main variables used in the sample. $FSRV_{t-1}$, $FSRV_{t+1}$, and *FSRV_CHA* are stock return synchronicity one year before the month of SEO, one year after the month of SEO, and the pre-to-post SEO change (FSRV=$FSRV_{t+1} - FSRV_{t-1}$). $LNAMI_{t-1}$, $LNAMI_{t+1}$ is the Amihud illiquidity ratio corresponding to one year before and one year after the current SEO event. LNAMI_CHA is the pre-to-post SEO change in Amihud Illiquidity ratio LNAMI_CHA = $LNAMI_{t+1} - LNAMI_{t-1}$. *UP* is the SEO underpricing, calculated as (Pre-offer price–Offer price)/Pre-offer price. *SEOSize* is the natural logarithm of the current SEO size. *AAR1* and *AAR2* are average abnormal returns corresponding to two periods [1,20] and [21,40] after the current SEO (set as day 0). A detailed definition of variables is presented in Appendix A.

Summary statistics								
Whole sample	N	Mean	Std. Dev.	min	max	p25	Median	p75
$FSRV_{t-1}$	12619	1.31	0.594	-0.488	3.572	0.9	1.354	1.72
$FSRV_{t+1}$	12608	1.272	0.602	-0.436	4.337	0.838	1.31	1.703
FSRV_CHA	12608	-0.037	0.538	-2.587	3.126	-0.377	-0.048	0.29
$LNAMI_{t-1}$	12564	-6.142	1.74	-10.934	0.84	-7.4	-5.981	-4.874
$LNAMI_{t+1}$	12574	-6.312	1.799	-10.919	0.391	-7.663	-6.201	-4.991
LNAMI_CHA	12551	-0.171	0.721	-7.289	4.228	-0.508	-0.161	0.198
UP	12619	0.004	1.178	-9.86	1	-0.016	0.063	0.42
SEOSize	11537	0.391	0.608	0	7.765	0.065	0.155	0.433
AAR1	12619	-0.037	0.991	-16.832	10.968	-0.422	-0.042	0.305
AAR2	12619	-0.053	0.917	-21.609	12.675	-0.413	-0.046	0.289
Sub sample 1: subSEO = 0	N	mean	sd	min	max	p25	Median	p75
$FSRV_{t-1}$	5037	1.261	0.598	-0.438	3.572	0.836	1.29	1.679
$FSRV_{t+1}$	5026	1.209	0.606	-0.436	3.406	0.756	1.226	1.642
FSRV_CHA	5026	-0.052	0.531	-2.587	2.418	-0.376	-0.065	0.262
$LNAMI_{t-1}$	5010	-6.265	1.806	-10.778	0.798	-7.602	-6.168	-4.961
$LNAMI_{t+1}$	5011	-6.377	1.896	-10.919	0.391	-7.839	-6.346	-4.991
LNAMI_CHA	4999	-0.112	0.709	-7.289	4.228	-0.436	-0.127	0.225
UND	5037	-0.145	1.343	-9.806	1	-0.034	0.046	0.232
SEOSize	4528	0.419	0.653	0	7.765	0.069	0.167	0.47
AAR1	5037	-0.077	0.899	-16.022	8.811	-0.395	-0.049	0.263
AAR2	5037	-0.095	0.902	-21.609	7.321	-0.395	-0.064	0.243
Sub sample 2: subSEO = 1								
$\boldsymbol{FSRV_{t-1}}$	7582	1.342	0.588	-0.488	3.378	0.947	1.394	1.745
$FSRV_{t+1}$	7582	1.314	0.595	-0.404	4.337	0.9	1.363	1.735
FSRV_CHA	7582	-0.028	0.543	-2.519	3.126	-0.378	-0.039	0.312
$LNAMI_{t-1}$	7554	-6.061	1.69	-10.934	0.84	-7.258	-5.877	-4.824
$LNAMI_{t+1}$	7563	-6.269	1.731	-10.709	0.116	-7.571	-6.128	-4.991
LNAMI_CHA	7552	-0.209	0.727	-5.287	3.883	-0.553	-0.183	0.177
UP	7582	0.104	1.043	-9.86	1	-0.006	0.08	0.798
SEOSize	7009	0.374	0.576	0	6.374	0.062	0.148	0.416

AAR1	7582	-0.011	1.047	-16.832	10.968	-0.447	-0.037	0.345
AAR2	7582	-0.025	0.925	-9.526	12.675	-0.428	-0.036	0.324
Sub sample 3: FollDebt = 0	N	mean	sd	min	max	p25	Median	p75
$FSRV_{t-1}$	10448	1.396	0.565	-0.488	3.572	1.035	1.434	1.771
$FSRV_{t+1}$	10438	1.363	0.575	-0.436	4.337	0.986	1.405	1.759
FSRV_CHA	10438	-0.033	0.549	-2.587	3.126	-0.379	-0.042	0.305
$LNAMI_{t-1}$	10397	-5.82	1.621	-10.934	0.84	-6.852	-5.664	-4.708
$LNAMI_{t+1}$	10405	-5.969	1.686	-10.919	0.391	-7.099	-5.842	-4.796
LNAMI_CHA	10384	-0.149	0.76	-7.289	4.228	-0.517	-0.137	0.261
UP	10448	0.044	1.153	-9.86	1	-0.011	0.075	0.567
SEOSize	9468	0.413	0.625	0	7.765	0.068	0.17	0.473
AAR1	10448	-0.039	1.057	-16.832	10.968	-0.46	-0.048	0.331
AAR2	10448	-0.055	0.974	-21.609	12.675	-0.45	-0.05	0.314
Sub sample 4: FollDebt = 1								
$\boldsymbol{FSRV_{T-1}}$	2171	0.896	0.553	-0.43	3.299	0.493	0.847	1.262
$FSRV_{T+1}$	2170	0.836	0.53	-0.404	2.975	0.449	0.775	1.179
FSRV_CHA	2170	-0.061	0.485	-1.862	2.101	-0.366	-0.065	0.22
$LNAMI_{t-1}$	2167	-7.686	1.435	-10.676	-2.445	-8.753	-7.868	-6.815
$LNAMI_{t+1}$	2169	-7.956	1.365	-10.643	-2.15	-8.936	-8.193	-7.175
LNAMI_CHA	2167	-0.274	0.486	-3.593	2.171	-0.469	-0.221	-0.027
UP	2171	-0.186	1.277	-9.806	1	-0.046	0.033	0.13
SEOSize	2069	0.29	0.512	0	5.833	0.053	0.114	0.29
AAR1	2171	-0.032	0.579	-6.525	6.423	-0.283	-0.017	0.243
AAR2	2171	-0.043	0.563	-3.413	7.321	-0.303	-0.033	0.215

Table 3

Correlation matrix among variables

Table 3 reports the correlation matrix among variables. $FSRV_{t-1}$, $FSRV_{t+1}$, and *FSRV_CHA* are the pre-SEO, post-SEO levels, and the pre-to-post SEO change of stock return non-synchronicity. $LNAMI_{t-1}$, $LNAMI_{t+1}$, and *LNAMI_CHA* are the pre-SEO, post-SEO levels, and the pre-to-post SEO change of the natural logarithm of Amihud illiquidity ratio. Other variables are SEO underpricing (*UP),* after-SEO returns (*AAR1*, *AAR2)*, SEO size (*SEOsize)*, other firm's characteristics before the current SEO, namely, the book-to-market ratio (*B/M*), firm size (*size*), extending for leverage (*Leverage)*, operating income (*OI*), tangibility (tang), R&D expense (*R&D*) and capital expenditure ratio (*capex*). G7 is a dummy variable controlling for industry development levels, *I1*, *I2*, are dummy variables controlling for Industry. *L1*, *L2*, and *L3* are dummy variables controlling for the period. The detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Pairwise correlations

Variables	UND	SEOsize	AAR1	AAR2	Size	B/M	$FSRV_{T-1}$	$FSRV_{T+1}$	FSRV_CHA	$LNAMI_{T-1}$	$LNAMI_{T+1}$	LNAMI_CHA	Leverage	OI	Tang	R&D	Capex
UP	1																
SEOsize	0	1															
AAR1	-0.036***	0.014	1														
AAR2	-0.007	-0.011	0.100***	1													
Size	-0.140***	-0.265***	-0.028***	-0.012	1												
B/M	0.006	0.024**	0.006	-0.015	-0.013	1											
$FSRV_{t-1}$	0.091***	0.105***	-0.006	-0.015*	-0.595***	0.014	1										
$FSRV_{t+1}$	0.109***	0.088***	0.020**	0.016*	-0.608***	0.005	0.594***	1									
FSRV_CHA	0.021**	-0.017*	0.029***	0.034***	-0.024***	-0.011	-0.438***	0.462***	1								
$LNAMI_{t-1}$	0.104***	0.246***	0.030***	0.015*	-0.822***	0.014	0.631***	0.638***	0.017*	1							
$LNAMI_{t+1}$	0.112***	0.204***	0	-0.009	-0.801***	0.011	0.601***	0.635***	0.048***	0.917***	1						
LNAMI_CHA	0.026***	-0.092***	-0.071***	-0.058***	-0.016*	-0.006	-0.021**	0.046***	0.075***	-0.123***	0.282***	1					
Leverage	-0.001	0.029***	-0.008	0.002	-0.026**	-0.009	0	0.004	0.005	0.016	0.014	-0.005	1				
OI	-0.01	0.002	0.01	0.008	0.033***	0.003	-0.019*	-0.028***	-0.012	-0.029***	-0.032***	-0.008	-0.159***	1			
Tang	-0.007	0.056***	0	0.020*	0.047***	0.023*	-0.032***	-0.022*	0.013	-0.046***	-0.051***	-0.015	0.164***	0.006	1		
R&D	0.007	-0.012	0.005	-0.024**	0	-0.004	-0.003	0.017	0.023**	-0.003	0.008	0.028**	-0.001	-0.021*	-0.023*	1	
Capex	-0.01	-0.030***	-0.044***	0.002	0.035***	0.008	-0.028**	-0.017	0.014	-0.034***	-0.038***	-0.012	0.003	-0.002	-0.004	0.008	1

Table 4

Stock informativeness, liquidity, and the probability of follow-on equity and debt issue within three years following the former SEO

Table 4 reports the logit regression estimates of the probability of subsequent SEO within three years following a considered SEO depending on the post-SEO level and improvement before-to-after SEO of stock price informativeness and liquidity. $FSRV_{t-1}$, $FSRV_{t+1}$ is the level of stock return non-synchronicity within one year before and one year after the month of the SEO event. FSRV_CHA is the pre-to-post SEO change of the stock return non-synchronicity. FSRV_CHA = $FSRV_{t+1} - FSRV_{t-1}$. $LNAMI_{t-1}$, $LNAMI_{t+1}$ is the natural logarithm of Amihud illiquidity ratio value within one year before and one year after the month of the SEO event. *LNAMI_CHA* is the change before-to-after SEO of the liquidity. LNAMI_CHA = $LNAMI_{t+1} - LNAMI_{t-1}$. Controlling variables include SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, other firm's characteristics before the current SEO, the book-to-market ratio (*B/M*), firm size (*size*), G7 is a dummy variable controlling for industry development levels, *I1, I2*, are dummy variables controlling for Industry. *L1, L2*, and *L3* are dummy variables controlling for the period. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	P_*nextSEO*	P_*nextSEO*	P_*nextDebt*	P_*nextDebt*
	(1)	(2)	(3)	(4)
FSRV_CHA	0.218***		-0.186**	
	-0.050		-0.075	
$FSRV_{t-1}$	0.280***		-0.375***	
	-0.060		-0.088	
$FSRV_{t+1}$		0.236***		-0.221***
		-0.048		-0.072
LNAMI_CHA	-0.284***		-0.500***	
	-0.031		-0.053	
$LNAMI_{t-1}$	-0.290***		-0.163***	
	-0.027		-0.041	
$LNAMI_{t+1}$		-0.285***		-0.274***
		-0.023		-0.037
UP	0.110***	0.110***	-0.012	-0.016
	-0.018	-0.018	-0.023	-0.023
SEOSize	-0.267***	-0.269***	0.213***	0.249***
	-0.039	-0.039	-0.058	-0.057
AAR1	0.0654***	0.0625***	0.012	0.030
	-0.022	-0.022	-0.040	-0.040
AAR2	0.0570**	0.0548**	0.007	0.023
	-0.024	-0.024	-0.043	-0.043
B/M	0.000	0.000	0.000	0.000
	-0.001	-0.001	-0.001	-0.001
Size	-0.226***	-0.230***	0.437***	0.389***
	-0.018	-0.017	-0.028	-0.026
G7	0.015	0.018	0.259***	0.246***
	-0.046	-0.046	-0.063	-0.063
I1	0.054	0.052	-1.302***	-1.286***
	-0.049	-0.049	-0.079	-0.079
I2	0.113	0.114	0.345***	0.334**
	-0.106	-0.106	-0.131	-0.131
L1	-0.685***	-0.671***	-0.219**	-0.284***
	-0.069	-0.068	-0.099	-0.097
L2	-0.230***	-0.227***	-0.055	-0.103
	-0.063	-0.063	-0.094	-0.094
L3	0.008	0.015	0.368***	0.305***
	-0.060	-0.060	-0.087	-0.086
Constant	-0.436**	0.114	-4.768***	0.334**
	-0.190	-0.106	-0.301	-0.131
Observations	10,991	11,004	10,991	11,004

Table 5

Multinominal logit model – the impact of post-SEO stock price informativeness and liquidity on the probability of financing choices

This table examines whether the SEO underpricing and after-SEO returns explain the probability of the subsequent financing choice between equity and debt within three years following the SEO. The multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. *P_FUNDING* concerns the probability that the firm has no additional funding, conducts a follow-on equity or debt issue, or issues both within three years after the current SEO. The nominal variable FUNDING gets a value of 0 if, after the SEO, the firm does not have additional funding, 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The base outcome is 1, "issue equity only". Models (1) using 1st independent set with pre-to-post SEO change of stock price informativeness and liquidity, *FSRV_CHA* and *LNAMI_CHA*, controlling for their initial levels $FSRV_{t-1}$, $LNAMI_{t-1}$ and other *CONTROL* variables. Models (2) using independent set 2 with the post-SEO levels of stock price informativeness and liquidity, $FSRV_{t+1}$ and $LNAMI_{t+1}$, controlling for *CONTROL* variables. The CONTROL variables include SEO underpricing *UP*, after-SEO return *AAR1, AAR2*, SEO size *SEOsize*, other firm's characteristics before the current SEO, the book-to-market ratio (*B/M*), and firm size (*size*). G7 is a dummy variable controlling for industry development levels, *I1, I2,* are dummy variables controlling for Industry. *L1, L2,* and *L3* are dummy variables controlling for the period. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Model	**With FSRV_CHA, $FSRV_{t-1}$, LNAMI_CHA, $LNAMI_{t-1}$ (1)**				**With both $FSRV_{t+1}$, $LNAMI_{t+1}$ (2)**			
VARIABLES	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3
FSRV_CHA	-0.237***		-0.319***	-0.252***				
	-0.0544		-0.106	-0.0943				
$FSRV_{t-1}$	-0.310***		-0.507***	-0.494***				
	-0.0664		-0.122	-0.11				
$FSRV_{t+1}$					-0.252***		-0.360***	-0.290***
					-0.0526		-0.101	-0.0897
LNAMI_CHA	0.311***		-0.271***	-0.424***				
	-0.0331		-0.0782	-0.0663				
$LNAMI_{t-1}$	0.349***		-0.037	0.00654				
	-0.029		-0.0599	-0.0521				
$LNAMI_{t+1}$					0.328***		-0.120**	-0.139***
					-0.0245		-0.0544	-0.0481
UP	-0.112***		-0.119***	-0.026	-0.114***		-0.122***	-0.0318
	-0.0203		-0.031	-0.0328	-0.0203		-0.0309	-0.0327
SEOSize	0.325***		0.340***	0.387***	0.330***		0.366***	0.433***
	-0.0433		-0.0887	-0.0725	-0.0432		-0.088	-0.0714
AAR1	-0.0643***		-0.0404	0.0136	-0.0605**		-0.0266	0.0361
	-0.0236		-0.0581	-0.0498	-0.0235		-0.058	-0.0499
AAR2	-0.0588**		-0.0252	-0.00649	-0.0561**		-0.0134	0.0139
	-0.0259		-0.0618	-0.0546	-0.0258		-0.0614	-0.0539
B/M	-0.000639		-0.000123	-0.000196	-0.000649		-0.000131	-0.000202
	-0.00115		-0.000819	-0.000735	-0.00117		-0.000797	-0.000681
Size	0.263***		0.556***	0.543***	0.259***		0.527***	0.479***
	-0.0204		-0.0407	-0.0356	-0.0185		-0.0378	-0.0334
G7	-0.0576		0.324***	0.183**	-0.066		0.313***	0.162**
	-0.0527		-0.088	-0.079	-0.0526		-0.0878	-0.0788
I1	0.0747		-1.726***	-0.976***	0.081		-1.714***	-0.953***
	-0.0537		-0.122	-0.0939	-0.0535		-0.122	-0.0937
I2	0.156		0.176	0.618***	0.161		0.173	0.608***
	-0.137		-0.18	-0.16	-0.137		-0.18	-0.161
L1	0.840***		0.243*	0.098	0.824***		0.184	0.0164
	-0.0768		-0.138	-0.125	-0.076		-0.135	-0.123
L2	0.266***		0.122	-0.0057	0.263***		0.088	-0.0667
	-0.0699		-0.132	-0.117	-0.0698		-0.131	-0.116
L3	-0.0131		0.362***	0.367***	-0.0227		0.313***	0.286***
	-0.067		-0.123	-0.107	-0.0665		-0.121	-0.105
Constant	0.594***		-4.841***	-4.230***	0.416**		-5.347***	-4.968***
	-0.208		-0.425	-0.377	-0.179		-0.387	-0.343
Observations	10,991	10,991	10,991	10,991	11,004	11,004	11,004	11,004

Table 6

The relative importance of stock price informativeness and liquidity in their feedback effect on subsequent financing decision

This table presents AIC and BIC criteria among models, and the extent of AIC and BIC decreases when adding variables concerning stock price informativeness and liquidity for explaining the subsequent financing choice. The general multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. Dependent variables of financing choices FUNDING are unchanged among models. In Panel A, the base model is the pre-extended *CONTROL* set, including SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, book-to-market ratio (*B/M*), firm size (*size*), dummy variables controlling for country development, industry and period, G7, *I1*, *I2*, *L1*, *L2*, and *L3*. In Panel A, the base model is the extended control set, which adds leverage (*Leverage)*, operating income (*OI*), tangibility (tang), R&D expense (*R&D*), and capital expenditure ratio (*capex*). Column (1) reports the AIC and BIC of the base model of the multinomial logit model between the FUNDING and all control variables. Columns (2) to (4) report the AIC and BIC for new models when adding variables of pre-SEO levels and pre-to-post SEO change of stock price informativeness, $FSRV_{t-1}$ and *FSRV_CHA (2)* separately with variables of pre-SEO levels and pre-to-post SEO change liquidity $LNAMI_{t-1}$ and *LNAMI_CHA(3)* and adding all four variables (4) to the base model. Columns (5) to (7) report the AIC and BIC for the new models when adding post-SEO stock price informativeness, $FSRV_{t+1}$ *(5)* separately with post-SEO liquidity ($LNAMI_{t+1}$) (6) and adding these two variables (7) into the base model. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Base model (1)	**With FSRV_CHA, $FSRV_{t-1}$ (2)**	**With LNAMI_CHA, $LNAMI_{t-1}$ (3)**	**With FSRV_CHA, $FSRV_{t-1}$, LNAMI_CHA, $LNAMI_{t-1}$ (4)**	**With $FSRV_{t+1}$ (5)**	**With $LNAMI_{t+1}$ (6)**	**With both $FSRV_{t+1}$, $LNAMI_{t+1}$ (7)**
Panel A: pre-extended variable set							
AIC	22176.0	22125.1	21832.5	21784.74	22125.3	21886.6	21843.89
Decreased AIC		50.92	343.52	391.28	50.7	289.42	332.13
BIC	22461.1	22453.98	22161.24	22157.28	22432.3	22193.47	22172.66
Decreased BIC		7.11	299.85	303.81	28.8	267.62	288.43
Panel B: extended variable set							
AIC	11635.8	11625.9	11485.8	11482.0	11622.9	11518.4	11516.8
Decreased AIC		9.9	150.0	153.8	12.9	117.4	119.0
BIC	11992.2	11990.8	11881.7	11880.6	11984.9	11894.5	11769.9
Decreased BIC		2.4	110.5	111.6	7.3	97.7	99.5

APPENDIX A. VARIABLE DEFINITIONS

Variables	Description
AR	The exceeded return between the actual return and the expected return estimated by Fama-French 3-factors model.
AAR1	average abnormal return in 20 days after offering days
AAR2	average abnormal return from the 21st day to the 40th day after offering days
Capex	capital expenditure/total asset
$FSRV_{t-1}$	$FSRV_{t-1} = log\left(\frac{R^2}{1-R^2}\right)$. Where the R^2 is assessed from the regression of a firm's daily returns on industry and market returns over the 12 months before the month in which the SEO occurs: $R_{it} = \alpha_{0i} + \beta_{1i}R_{mt} + \beta_{2i}R_{m,t-1} + \nu_{1j}R_{jt} + \nu_{2j}R_{j,t-1} + \varepsilon_{it}$. R_i, R_j, and R_m are the returns for stock i, industry j, and the market on trading day t, respectively. To ensure reliability, we only consider firms that have at least 120 days of trading data available during the year before/after the issue.
$FSRV_{t+1}$	$FSRV_{t+1} = log\left(\frac{R^2}{1-R^2}\right)$. Where the R^2 is assessed from the regression of a firm's daily returns on industry and market returns over the 12 months after the month during which the SEO occurs. The regression model is similar as calculating the $FSRV_{t-1}$.
FSRV_CHA	The change in Stock return synchronicity between pre-SEO and post-SEO: $FSRV\_CHA = FSRV_{T+1} - FSRV_{T-1}$
G7	*G7* is coded 1 if the firm is located in the G7 countries in Europe (United Kingdom, France, Germany, and Italy) and coded 0 otherwise
I1	Dummy variable, coded 1 if firm's industry is financial, 0 otherwise.
I2	Dummy variable, coded 1 if firm's industry is Utility, 0 otherwise.
I3	Dummy variable, coded 1 if firm's industry is Agency, 0 otherwise.
L1	Dummy variable, coded 1 if the considered SEO is in the period 2000-2005, 0 otherwise.
L2	Dummy variable, coded 1 if the considered SEO is in the period 2006-2010, 0 otherwise.
L3	Dummy variable, coded 1 if the considered SEO is in the period 2011-2015, 0 otherwise.
LNAMI	Ln value of Amihud illiquidity ratio Ln(*Amihud*), in which: $Amihud_i = \frac{1}{D_i}\sum_{d=1}^{D_i}\frac{[R_{id}]}{VOLD_{id}}$, where R_{id} is the return on stock i on day d; $VOLD_{id}$ is the respective daily volume in dollars; and D_i is the number of trading days for stock i in a given period.
$LNAMI_{t-1}$	Ln value of Amihud illiquidity ratio *Ln_Ami* with the period of one year before the month in which the SEO occurs
$LNAMI_{t+1}$	Ln value of Amihud illiquidity ratio *Ln_Ami* with the period of one year after the month in which the SEO occurs
LNAMI_CHA	The change in illiquidity measures LNAMI_CHA= $LNAMI_{t+1}$ - $LNAMI_{t-1}$
Leverage	Debt ratio or leverage, calculated as shorttermdebt+longtermdebt/total asset
Next_SEO	Dummy variable, equal 1 if the considered SEO has a subsequent SEO within three years following it, equal 0 otherwise
Next_Debt	Dummy variable, equal 1 if the considered SEO has a follow-on debt within three years following it, equal 0 otherwise
OI	Operating income EBITDA/total assets
P_nextSEO	The probability that the considered SEO has a subsequent SEO within three years following it
P_nextDebt	The probability that the considered SEO has a follow-on debt within three years following it
R&D_ratio	R&D/net sales
SEOSize	Ln of the size of SEOs
Tang	Tangibility ratio, calculate net property, plant, and equipment/total asset.
UP	The first post-offer return between the offer price and the nearest previous closing price: $SEOUND = \frac{P_{offer} - P_{previous\ daily\ closing}}{P_{previous\ daily\ closing}}$

APPENDIX B. DETAILED ESTIMATES OF MODELS

Table 7

Stock informativeness, liquidity, and probability of the follow-on equity and debt issue within three years following the former SEO (extending the control variables)

Table 8 reports the logit regression estimates of the probability of subsequent SEO within three years following a considered SEO depending on the post-SEO level and improvement before-to-after SEO of stock price informativeness and liquidity. $FSRV_{t-1}$, $FSRV_{t+1}$, and *FSRV_CHA* are the pre-SEO, post-SEO levels, and the pre-to-post SEO change of stock return non-synchronicity. $LNAMI_{t-1}$, $LNAMI_{t+1}$, *LNAMI_CHA* are the pre-SEO, post-SEO levels, and the pre-to-post SEO change of the natural logarithm of Amihud illiquidity ratio. Controlling variables include SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, other firm's characteristics before the current SEO, the book-to-market ratio (*B/M*), firm size (*size*), extending for leverage (*Leverage)*, operating income (*OI*), tangibility (tang), R&D expense (*R&D*) and capital expenditure ratio (*capex*). *G7* is a dummy variable controlling for industry development levels, *I1*, *I2*, are dummy variables controlling for Industry. *L1*, *L2*, and *L3* are dummy variables controlling for the period. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	P_*nextSEO*	P_*nextSEO*	P_*nextDebt*	P_*nextDebt*
	(1)	(2)	(3)	(4)
FSRV_CHA	0.129*		-0.329***	
	-0.072		-0.102	
$FSRV_{t-1}$	0.264***		-0.500***	
	-0.083		-0.114	
$FSRV_{t+1}$		0.210***		-0.376***
		-0.068		-0.095
LNAMI_CHA	-0.230***		-0.765***	
	-0.047		-0.074	
$LNAMI_{t-1}$	-0.0843***		-0.660***	
	-0.028		-0.041	
$LNAMI_{t+1}$		-0.0896***		-0.693***
		-0.024		-0.038
UP	0.123***	0.123***	-0.002	-0.001
	-0.024	-0.024	-0.028	-0.029
SEOSize	-0.081	-0.048	-0.125	-0.112
	-0.058	-0.057	-0.080	-0.078
AAR1	0.0679*	0.0673*	-0.031	-0.023
	-0.037	-0.036	-0.058	-0.057
AAR2	0.044	0.045	-0.028	-0.019
	-0.038	-0.038	-0.058	-0.058
B/M	0.000	0.002	0.0276**	0.0303**
	-0.011	-0.011	-0.014	-0.014
Size	-0.138***	-0.154***	0.461***	0.384***
	-0.028	-0.026	-0.040	-0.037
Leverage	-0.172*	-0.191**	0.877***	0.871***
	-0.089	-0.088	-0.127	-0.127
OI	-1.677***	-1.677***	1.986***	1.991***
	-0.153	-0.152	-0.306	-0.307
Tang	-0.057	-0.061	0.029	0.030
	-0.066	-0.066	-0.087	-0.087
R&D	-0.00282***	-0.00294***	-4.817***	-4.850***
	-0.001	-0.001	-0.806	-0.806
Capex	-0.087	-0.108	0.676*	0.671*
	-0.129	-0.132	-0.374	-0.372
G7	0.013	0.033	0.157*	0.148*
	-0.065	-0.065	-0.082	-0.082
I1	0.095	0.096	-0.739***	-0.734***
	-0.091	-0.090	-0.128	-0.128
I2	0.085	0.057	0.235	0.220
	-0.127	-0.126	-0.156	-0.156
L1	-0.308***	-0.271**	-0.424***	-0.470***
	-0.113	-0.112	-0.145	-0.142
L2	0.072	0.076	-0.332**	-0.346**
	-0.111	-0.111	-0.143	-0.142
L3	0	0	0.236*	0
	-0.112	-0.111	-0.140	-0.139
Constant	-0.598**	0.057	-5.367***	0.220
	-0.293	-0.126	-0.421	-0.156
Observations	5,415	5,419	5,415	5,419

Table 8

Multinominal logit model – the impact of post-SEO stock price informativeness and liquidity on the probability of financing choices (extending the control variables)

This table examines whether the SEO underpricing and after-SEO returns explain the probability of the subsequent financing choice between equity and debt within three years following the SEO. The multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. *P_FUNDING* concerns the probability that the firm has no additional funding, conducts a follow-on equity or debt issue, or issues both within three years after the current SEO. The nominal variable FUNDING gets a value of 0 if, after the SEO, the firm does not have additional funding, 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The base outcome is 1, "issue equity only". Models (1) using 1st independent set with pre-to-post SEO change of stock price informativeness and liquidity, *FSRV_CHA* and *LNAMI_CHA*, controlling for their initial levels $FSRV_{t-1}$, $LNAMI_{t-1}$ and other *CONTROL* variables. Models (2) using independent set 2 with the post-SEO levels of stock price informativeness and liquidity, $FSRV_{t+1}$ and $LNAMI_{t+1}$, , controlling for *CONTROL* variables. The CONTROL variables include SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, other firm's characteristics before the current SEO, the book-to-market ratio (*B/M*), firm size (*size*), extending for leverage (*Leverage)*, operating income (*OI*), tangibility (tang), R&D expense (*R&D*) and capital expenditure ratio (*capex*). *G7* is a dummy variable controlling for industry development levels, *I1*, *I2*, are dummy variables controlling for Industry. *L1*, *L2*, and *L3* are dummy variables controlling for the period. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Model	**With FSRV_CHA, $FSRV_{t-1}$, LNAMI_CHA, $LNAMI_{t-1}$ (1)**				**With both $FSRV_{t+1}$, $LNAMI_{t+1}$ (2)**			
VARIABLES	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3
FSRV_CHA	-0.0979		-0.242*	-0.256*				
	-0.0836		-0.136	-0.133				
$FSRV_{t-1}$	-0.263***		-0.274*	-0.498***				
	-0.101		-0.155	-0.15				
$FSRV_{t+1}$					-0.142*		-0.221*	-0.292**
					-0.0807		-0.128	-0.124
LNAMI_CHA	0.289***		-0.332***	-0.532***				
	-0.0527		-0.103	-0.0964				
$LNAMI_{t-1}$	0.308***		-0.037	0.00625				
	-0.0463		-0.0773	-0.0731				
$LNAMI_{t+1}$					0.286***		-0.133*	-0.165**
					-0.0388		-0.0697	-0.0664
UP	-0.105***		-0.0811**	0.0236	-0.105***		-0.0872**	0.0166
	-0.0295		-0.0397	-0.0432	-0.0294		-0.0395	-0.043
SEOSize	0.244***		0.113	0.286***	0.246***		0.135	0.329***
	-0.0711		-0.124	-0.102	-0.0711		-0.123	-0.1
AAR1	-0.0744*		-0.0356	-0.0693	-0.0653		-0.0236	-0.0424
	-0.0405		-0.0821	-0.0768	-0.0401		-0.0814	-0.0758
AAR2	-0.043		-0.0465	-0.0251	-0.0376		-0.0337	0.00179
	-0.0422		-0.0813	-0.0775	-0.0422		-0.0803	-0.0758
B/M	0.00761		0.0450**	0.0493***	0.00946		0.0470**	0.0539***
	-0.0149		-0.0196	-0.0179	-0.0149		-0.0195	-0.0177
Size	0.199***		0.566***	0.563***	0.203***		0.506***	0.472***
	-0.0336		-0.0543	-0.0516	-0.0303		-0.0501	-0.0477
Leverage	0.224		0.867***	0.931***	0.239*		0.861***	0.914***
	-0.137		-0.16	-0.148	-0.135		-0.161	-0.147
OI	1.643***		2.473***	2.103***	1.654***		2.561***	2.193***
	-0.163		-0.416	-0.395	-0.163		-0.416	-0.391
Tang	0.0539		0.0787	0.0243	0.0531		0.0831	0.029
	-0.0786		-0.118	-0.115	-0.0788		-0.118	-0.114
R&D	0.00288***		-5.733***	-4.168***	0.00292***		-5.757***	-4.247***
	-0.000998		-1.239	-0.977	-0.000991		-1.24	-0.981
Capex	0.064		1.227**	0.258	0.0706		1.225**	0.237
	-0.116		-0.578	-0.409	-0.116		-0.578	-0.402
G7	-0.0538		0.381***	0.124	-0.0722		0.368***	0.0984
	-0.0816		-0.113	-0.108	-0.0811		-0.113	-0.107
I1	-0.0147		-1.280***	-0.503***	-0.0149		-1.262***	-0.474***

	-0.103		-0.196	-0.157	-0.103		-0.196	-0.156
I2	0.0339		-0.197	0.0968	0.0323		-0.193	0.0916
	-0.181		-0.219	-0.208	-0.181		-0.219	-0.207
L1	0.649***		-0.261	0.126	0.612***		-0.266	0.0629
	-0.14		-0.193	-0.195	-0.139		-0.189	-0.191
L2	0.0927		-0.252	-0.0471	0.0891		-0.272	-0.0984
	-0.137		-0.187	-0.19	-0.137		-0.187	-0.189
L3	-0.0205		0.126	0.481***	-0.0441		0.0988	0.406**
	-0.14		-0.184	-0.186	-0.139		-0.183	-0.184
Constant	0.852**		-4.661***	-4.350***	0.561*		-4.987***	-5.095***
	-0.344		-0.561	-0.541	-0.305		-0.516	-0.499
Observations	5,415	5,415	5,415	5,415	5,419	5,419	5,419	5,419
Pseudo R2	0.175	0.175	0.175	0.175	0.172	0.172	0.172	0.172
Log Lik	-5675	-5675	-5675	-5675	-5698	-5698	-5698	-5698

Table 9: Multinominal logit model – the impact of post-SEO stock price informativeness and liquidity on the probability of financing choices (base outcome as subsequent financing by debt issue)

This table examines whether the SEO underpricing and after-SEO returns explain the probability of the subsequent financing choice between equity and debt within three years following the SEO. The multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. *P_FUNDING* concerns the probability that the firm has no additional funding, conducts a follow-on equity or debt issue, or issues both within three years after the current SEO. The nominal variable FUNDING gets a value of 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The base outcome is 2, "issue debt only". Models (1) using 1st independent set with pre-to-post SEO change of stock price informativeness and liquidity, *FSRV_CHA* and *LNAMI_CHA*, controlling for their initial levels $FSRV_{t-1}$, $LNAMI_{t-1}$ and other *CONTROL* variables. Models (2) using independent set 2 with the post-SEO levels of stock price informativeness and liquidity, $FSRV_{t+1}$ and $LNAMI_{t+1}$, , controlling for *CONTROL* variables. The CONTROL variables include SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, other firm's characteristics before the current SEO, the book-to-market ratio (*B/M*), firm size (*size*), extending for leverage (*Leverage)*, operating income (*OI*), tangibility (*Tang*), and capital expenditure ratio (*capex*). *G7* is a dummy variable controlling for industry development levels, *I1*, *I2*, are dummy variables controlling for Industry. *L1*, *L2*, and *L3* are dummy variables controlling for the period. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	With FSRV_CHA, $FSRV_{t-1}$, LNAMI_CHA, $LNAMI_{t-1}$ (1)			With both $FSRV_{t+1}$, $LNAMI_{t+1}$ (2)			With FSRV_CHA, $FSRV_{t-1}$, LNAMI_CHA, $LNAMI_{t-1}$ (1)			With both $FSRV_{t+1}$, $LNAMI_{t+1}$ (2)		
VARIABLES	FUNDING=1	FUNDING=2 (base outcome)	FUNDING=3	FUNDING=1	FUNDING=2 (base outcome)	FUNDING=3	FUNDING=1	FUNDING=2 (base outcome)	FUNDING=3	FUNDING=1	FUNDING=2 (base outcome)	FUNDING=3
FSRV_CHA	0.354***		0.0522				0.388***		-0.00949			
	-0.112		-0.125				-0.142		-0.151			
LNAMI_CHA	0.247***		-0.182*				0.244**		-0.186			
	-0.0846		-0.0977				-0.106		-0.119			
$FSRV_{t+1}$				0.354***		0.0522				0.388***		-0.00949
				-0.112		-0.125				-0.142		-0.151
$LNAMI_{t+1}$				0.247***		-0.182*				0.244**		-0.186
				-0.0846		-0.0977				-0.106		-0.119
$FSRV_{t-1}$	2.518***		0.659**	2.163***		0.606**	2.437***		0.739*	2.049***		0.748**
	-0.281		-0.314	-0.27		-0.304	-0.362		-0.39	-0.348		-0.378
SizeX $FSRV_{t-1}$	-0.322***		-0.0936**	-0.322***		-0.0936**	-0.314***		-0.133***	-0.314***		-0.133***
	-0.0382		-0.0406	-0.0382		-0.0406	-0.0488		-0.0497	-0.0488		-0.0497
$LNAMI_{t-1}$	0.0595		0.0331	-0.187**		0.215**	-0.0399		0.041	-0.284***		0.227*
	-0.0621		-0.0691	-0.0858		-0.0961	-0.0801		-0.0844	-0.109		-0.118
UND	0.105***		0.0936***	0.105***		0.0936***	0.105***		0.0925**	0.105***		0.0925**
	-0.0322		-0.0361	-0.0322		-0.0361	-0.0396		-0.0413	-0.0396		-0.0413
AAR1	0.0224		0.0474	0.0224		0.0474	-0.0115		-0.054	-0.0115		-0.054
	-0.0636		-0.0735	-0.0636		-0.0735	-0.0847		-0.0949	-0.0847		-0.0949
AAR2	0.0056		0.0144	0.0056		0.0144	0.0111		0.0229	0.0111		0.0229
	-0.0642		-0.0749	-0.0642		-0.0749	-0.0794		-0.0903	-0.0794		-0.0903
B/M	3.88E-05		-9.13E-05	3.88E-05		-9.13E-05	-0.0519**		0.00919	-0.0519**		0.00919
	-0.00079		-0.00103	-0.00079		-0.00103	-0.0216		-0.0217	-0.0216		-0.0217
Size	-0.238***		0.066	-0.238***		0.066	-0.250***		0.104	-0.250***		0.104
	-0.0553		-0.0587	-0.0553		-0.0587	-0.0688		-0.0691	-0.0688		-0.0691
SEOSize	-0.334***		0.0388	-0.334***		0.0388	-0.119		0.128	-0.119		0.128
	-0.0947		-0.0989	-0.0947		-0.0989	-0.124		-0.122	-0.124		-0.122
G7	-0.462***		-0.182*	-0.462***		-0.182*	-0.629***		-0.261**	-0.629***		-0.261**

	-0.0922		-0.0989	-0.0922		-0.0989	-0.114		-0.115	-0.114		-0.115
I1	1.743***		0.739***	1.743***		0.739***	1.783***		0.611***	1.783***		0.611***
	-0.123		-0.133	-0.123		-0.133	-0.177		-0.191	-0.177		-0.191
I2	-0.191		0.416**	-0.191		0.416**	-0.0194		0.283	-0.0194		0.283
	-0.191		-0.169	-0.191		-0.169	-0.23		-0.19	-0.23		-0.19
L1	0.0138		-0.146	0.0138		-0.146	0.671***		0.370*	0.671***		0.370*
	-0.144		-0.158	-0.144		-0.158	-0.195		-0.2	-0.195		-0.2
L2	-0.0638		-0.141	-0.0638		-0.141	0.575***		0.228	0.575***		0.228
	-0.137		-0.153	-0.137		-0.153	-0.188		-0.196	-0.188		-0.196
L3	-0.388***		-0.0285	-0.388***		-0.0285	0.0456		0.327*	0.0456		0.327*
	-0.128		-0.141	-0.128		-0.141	-0.184		-0.188	-0.184		-0.188
Leverage							-0.886***		0.226	-0.886***		0.226
							-0.199		-0.177	-0.199		-0.177
OI							-2.982***		-0.0846	-2.982***		-0.0846
							-0.356		-0.166	-0.356		-0.166
Tang							-0.270**		-0.0813	-0.270**		-0.0813
							-0.131		-0.135	-0.131		-0.135
Capex							-1.187**		-0.945	-1.187**		-0.945
							-0.583		-0.617	-0.583		-0.617
Constant	2.805***		-0.0382	2.805***		-0.0382	1.974***		-0.58	1.974***		-0.58
	-0.518		-0.575	-0.518		-0.575	-0.676		-0.716	-0.676		-0.716
Observations	7,652	7,652	7,652	7,652	7,652	7,652	4,204	4,204	4,204	4,204	4,204	4,204

Table 10

Comparing the impact of pre-to-post SEO stock price informativeness and liquidity's levels on the probability of debt and equity issues within three years following the preceding SEO.

This table presents AIC and BIC criteria among models, and the extent of AIC and BIC decreases when adding variables concerning pre-to-post SEO stock price informativeness and liquidity for explaining the subsequent financing choice. The general multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. The nominal variable FUNDING gets a value of 0 if, after the SEO, the firm does not have additional funding, 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The base outcome is 1, "issue equity only". The base model (1) is the multinomial logit model between the *FUNDING* and all control variables, including SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, book-to-market ratio (*B/M*), firm size (*size*), dummy variables controlling for country development, industry and period, *G7*, *I1*, *I2*, *L1*, *L2*, and *L3*. Models (2) to (4) add variables of preSEO levels and pre-to-post SEO change of stock price informativeness, $FSRV_{t-1}$ and *FSRV_CHA (2)* separately with variables of preSEO levels and pre-to-post SEO change liquidity $LNAMI_{t-1}$ and *LNAMI_CHA(3)* and adding all four variables (4) to the base model. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Model	**BASE model (1)**				**With FSRV_CHA, $FSRV_{t-1}$ (2)**				**With LNAMI_CHA, $LNAMI_{t-1}$ (3)**				**With FSRV_CHA, $FSRV_{t-1}$, LNAMI_CHA, $LNAMI_{t-1}$ (4)**			
VARIABLES	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUND-ING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUND-ING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUND-ING=1 (base out-come)	FUNDING=2	FUNDING=3
FSRV_CHA					-0.077		-0.381***	-0.315***					-0.237***		-0.319***	-0.252***
					(0.052)		(0.103)	(0.091)					(0.054)		(0.106)	(0.094)
$FSRV_{t-1}$					-0.066		-0.541***	-0.489***					-0.310***		-0.507***	-0.494***
					(0.062)		(0.115)	(0.102)					(0.066)		(0.122)	(0.110)
LNAMI_CHA									0.290***		-0.303***	-0.455***	0.311***		-0.271***	-0.424***
									(0.033)		(0.077)	(0.065)	(0.033)		(0.078)	(0.066)
$LNAMI_{t-1}$									0.305***		-0.115**	-0.070	0.349***		-0.037	0.007
									(0.028)		(0.057)	(0.049)	(0.029)		(0.060)	(0.052)
UP	-0.132***		-0.131***	-0.038	-0.129***		-0.133***	-0.041	-0.114***		-0.118***	-0.025	-0.112***		-0.119***	-0.026
	(0.020)		(0.031)	(0.033)	(0.020)		(0.031)	(0.033)	(0.020)		(0.031)	(0.033)	(0.020)		(0.031)	(0.033)
SEOSize	0.288***		0.386***	0.439***	0.279***		0.351***	0.412***	0.346***		0.374***	0.415***	0.325***		0.340***	0.387***
	(0.042)		(0.086)	(0.071)	(0.042)		(0.087)	(0.071)	(0.043)		(0.088)	(0.072)	(0.043)		(0.089)	(0.073)
AAR1	-0.0674***		-0.009	0.037	-0.0696***		-0.025	0.038	-0.0611***		-0.022	0.016	-0.0643***		-0.040	0.014
	(0.023)		(0.057)	(0.049)	(0.023)		(0.058)	(0.050)	(0.024)		(0.057)	(0.049)	(0.024)		(0.058)	(0.050)
AAR2	-0.0647**		0.007	0.009	-0.0647**		-0.010	0.014	-0.0578**		-0.005	-0.006	-0.0588**		-0.025	-0.006
	(0.026)		(0.060)	(0.053)	(0.026)		(0.061)	(0.054)	(0.026)		(0.061)	(0.054)	(0.026)		(0.062)	(0.055)
B/M	-0.002		0.000	0.000	-0.002		0.000	0.000	-0.001		0.000	0.000	-0.001		0.000	0.000
	(0.002)		(0.001)	(0.001)	(0.002)		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)
Size	0.0996***		0.663***	0.612***	0.0893***		0.570***	0.529***	0.284***		0.594***	0.578***	0.263***		0.556***	0.543***
	(0.011)		(0.020)	(0.018)	(0.014)		(0.028)	(0.025)	(0.020)		(0.040)	(0.035)	(0.020)		(0.041)	(0.036)
G7	-0.136***		0.290***	0.143*	-0.136***		0.304***	0.156**	-0.075		0.304***	0.162**	-0.058		0.324***	0.183**
	(0.052)		(0.087)	(0.079)	(0.052)		(0.088)	(0.079)	(0.053)		(0.088)	(0.079)	(0.053)		(0.088)	(0.079)
I1	0.125**		-1.693***	-0.946***	0.120**		-1.728***	-0.967***	0.0959*		-1.690***	-0.949***	0.075		-1.726***	-0.976***

	(0.053)	(0.121)	(0.093)	(0.053)	(0.122)	(0.094)	(0.053)	(0.121)	(0.094)	(0.054)	(0.122)	(0.094)
I2	0.222*	0.090	0.540***	0.220	0.172	0.604***	0.146	0.128	0.583***	0.156	0.176	0.618***
	(0.135)	(0.179)	(0.160)	(0.135)	(0.180)	(0.160)	(0.137)	(0.180)	(0.160)	(0.137)	(0.180)	(0.160)
L1	0.758***	0.191	0.019	0.759***	0.213	0.049	0.821***	0.201	0.039	0.840***	0.243*	0.098
	(0.075)	(0.135)	(0.123)	(0.076)	(0.137)	(0.124)	(0.076)	(0.135)	(0.123)	(0.077)	(0.138)	(0.125)
L2	0.365***	0.216*	0.028	0.349***	0.066	-0.092	0.328***	0.244*	0.088	0.266***	0.122	-0.006
	(0.067)	(0.125)	(0.111)	(0.069)	(0.130)	(0.116)	(0.068)	(0.126)	(0.112)	(0.070)	(0.132)	(0.117)
L3	0.060	0.379***	0.333***	0.051	0.307**	0.281***	0.011	0.412***	0.393***	-0.013	0.362***	0.367***
	(0.065)	(0.118)	(0.102)	(0.066)	(0.122)	(0.106)	(0.066)	(0.119)	(0.103)	(0.067)	(0.123)	(0.107)
Constant	-1.258***	-5.679***	-5.062***	-1.118***	-4.507***	-4.015***	-0.198	-6.195***	-5.533***	0.594***	-4.841***	-4.230***
	(0.086)	(0.182)	(0.157)	(0.153)	(0.300)	(0.264)	(0.127)	(0.277)	(0.241)	(0.208)	(0.425)	(0.377)
Observations	11041	11041	11041	11031	11031	11031	10997	10997	10997	10991	10991	10991
Pseudo R2	0.124	0.124	0.124	0.126	0.126	0.126	0.135	0.135	0.135	0.137	0.137	0.137
Log Lik	-11049	-11049	-11049	-11018	-11018	-11018	-10871	-10871	-10871	-10841	-10841	-10841
AIC	22176.0			22125.1			21832.5			21784.7		
Decreased AIC				50.9			343.5			391.3		
BIC	22461.1			22454.0			22161.2			22157.3		
Decreased BIC				7.1			299.8			303.8		

Table 11

Comparing the impact of pre-to-post-SEO stock price informativeness and liquidity's levels on the probability of debt and equity issues within three years following the preceding SEO (extending control variable set)

This table presents AIC and BIC criteria among models, and the extent of AIC and BIC decreases when adding variables concerning pre-to-post SEO stock price informativeness and liquidity for explaining the subsequent financing choice. The general multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. The nominal variable FUNDING gets a value of 0 if, after the SEO, the firm does not have additional funding, 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The base outcome is 1, "issue equity only". The base model (1) is the multinomial logit model between the *FUNDING* and all control variables, including SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, book-to-market ratio (*B/M*), firm size (*size*), dummy variables controlling for country development, industry and period, *G7*, *I1*, *I2*, *L1*, *L2*, and *L3*, Leverage (*Leverage)*, operating income (*OI*), tangibility (*Tang*), R&D expense (*R&D*), and capital expenditure ratio (*capex*). Models (2) to (4) add variables of preSEO levels and pre-to-post SEO change of stock price informativeness, $FSRV_{t-1,}$ and *FSRV_CHA (2)* separately with variables of preSEO levels and pre-to-post SEO change liquidity $LNAMI_{t-1}$ and *LNAMI_CHA(3)* and adding all four variables (4) to the base model. The detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Model	**BASE model (1)**				**With FSRV_CHA, $FSRV_{t-1}$ (2)**				**With LNAMI_CHA, $LNAMI_{t-1}$ (3)**				**With FSRV_CHA, $FSRV_{t-1}$, LNAMI_CHA, $LNAMI_{t-1}$ (4)**			
VARIABLES	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3
FSRV_CHA					0.062	-0.320**	-0.337***						-0.098	-0.242*	-0.256*	
					(0.080)	(0.132)	(0.128)						(0.084)	(0.136)	(0.133)	
$FSRV_{t-1}$					-0.031	-0.322**	-0.504***						-0.263***	-0.274*	-0.498***	
					(0.094)	(0.144)	(0.139)						(0.101)	(0.155)	(0.150)	
LNAMI_CHA									0.277***	-0.366***	-0.568***		0.289***	-0.332***	-0.532***	
									(0.052)	(0.101)	(0.095)		(0.053)	(0.103)	(0.096)	
$LNAMI_{t-1}$									0.268***	-0.084	-0.080		0.308***	-0.037	0.006	
									(0.044)	(0.072)	(0.068)		(0.046)	(0.077)	(0.073)	
UP	-0.117***		-0.0884**	0.019	-0.117***		-0.0935**	0.010	-0.102***		-0.0775**	0.031	-0.105***		-0.0811**	0.024
	(0.029)		(0.040)	(0.043)	(0.029)		(0.040)	(0.043)	(0.029)		(0.040)	(0.043)	(0.030)		(0.040)	(0.043)
SEOSize	0.180***		0.149	0.335***	0.179***		0.120	0.310***	0.257***		0.131	0.306***	0.244***		0.113	0.286***
	(0.069)		(0.120)	(0.099)	(0.070)		(0.120)	(0.099)	(0.071)		(0.123)	(0.102)	(0.071)		(0.124)	(0.102)
AAR1	-0.0707*		-0.019	-0.037	-0.0731*		-0.018	-0.043	-0.0688*		-0.036	-0.061	-0.0744*		-0.036	-0.069
	(0.040)		(0.081)	(0.076)	(0.040)		(0.082)	(0.076)	(0.040)		(0.082)	(0.076)	(0.041)		(0.082)	(0.077)
AAR2	-0.046		-0.027	0.009	-0.048		-0.023	0.011	-0.042		-0.050	-0.025	-0.043		-0.047	-0.025
	(0.042)		(0.080)	(0.075)	(0.042)		(0.080)	(0.075)	(0.042)		(0.081)	(0.077)	(0.042)		(0.081)	(0.078)
B/M	0.005		0.0517***	0.0600***	0.004		0.0491**	0.0554***	0.010		0.0466**	0.0530***	0.008		0.0450**	0.0493***
	(0.015)		(0.019)	(0.018)	(0.015)		(0.019)	(0.018)	(0.015)		(0.020)	(0.018)	(0.015)		(0.020)	(0.018)
Size	0.0520***		0.630***	0.626***	0.0475**		0.573***	0.538***	0.217***		0.583***	0.594***	0.199***		0.566***	0.563***
	(0.019)		(0.028)	(0.028)	(0.024)		(0.038)	(0.036)	(0.033)		(0.053)	(0.051)	(0.034)		(0.054)	(0.052)
Leverage	0.264**		0.866***	0.906***	0.264**		0.865***	0.913***	0.230*		0.870***	0.928***	0.224		0.867***	0.931***
	(0.132)		(0.162)	(0.149)	(0.132)		(0.161)	(0.148)	(0.136)		(0.161)	(0.148)	(0.137)		(0.160)	(0.148)
OI	1.639***		2.643***	2.260***	1.637***		2.606***	2.253***	1.664***		2.514***	2.109***	1.643***		2.473***	2.103***

	(0.162)	(0.415)	(0.388)	(0.163)	(0.414)	(0.390)	(0.164)	(0.418)	(0.394)	(0.163)	(0.416)	(0.395)
Tang	0.050	0.089	0.032	0.049	0.096	0.042	0.048	0.073	0.017	0.054	0.079	0.024
	(0.078)	(0.118)	(0.113)	(0.078)	(0.118)	(0.113)	(0.079)	(0.118)	(0.115)	(0.079)	(0.118)	(0.115)
R&D	0.0029***	-5.394***	-3.922***	0.00290***	-5.442***	-3.920***	0.00289***	-5.734***	-4.246***	0.00288***	-5.733***	-4.168***
	(0.001)	(1.220)	(0.958)	(0.001)	(1.224)	(0.961)	(0.001)	(1.238)	(0.979)	(0.001)	(1.239)	(0.977)
Capex	0.072	1.285**	0.081	0.067	1.256**	0.058	0.074	1.252**	0.274	0.064	1.227**	0.258
	(0.116)	(0.571)	(0.251)	(0.116)	(0.571)	(0.248)	(0.117)	(0.579)	(0.407)	(0.116)	(0.578)	(0.409)
G7	-0.122	0.347***	0.078	-0.118	0.367***	0.108	-0.086	0.354***	0.082	-0.054	0.381***	0.124
	(0.080)	(0.112)	(0.106)	(0.080)	(0.112)	(0.107)	(0.081)	(0.112)	(0.107)	(0.082)	(0.113)	(0.108)
I1	0.033	-1.239***	-0.443***	0.035	-1.247***	-0.454***	-0.012	-1.273***	-0.490***	-0.015	-1.280***	-0.503***
	(0.102)	(0.196)	(0.155)	(0.102)	(0.196)	(0.156)	(0.103)	(0.196)	(0.156)	(0.103)	(0.196)	(0.157)
I2	0.083	-0.261	0.002	0.072	-0.196	0.088	0.024	-0.228	0.044	0.034	-0.197	0.097
	(0.179)	(0.218)	(0.206)	(0.180)	(0.219)	(0.207)	(0.181)	(0.219)	(0.207)	(0.181)	(0.219)	(0.208)
L1	0.569***	-0.266	0.052	0.586***	-0.280	0.087	0.618***	-0.257	0.064	0.649***	-0.261	0.126
	(0.138)	(0.189)	(0.190)	(0.139)	(0.192)	(0.193)	(0.139)	(0.189)	(0.191)	(0.140)	(0.193)	(0.195)
L2	0.165	-0.196	0.005	0.179	-0.315*	-0.131	0.123	-0.166	0.052	0.093	-0.252	-0.047
	(0.134)	(0.180)	(0.183)	(0.136)	(0.186)	(0.188)	(0.135)	(0.181)	(0.184)	(0.137)	(0.187)	(0.190)
L3	0.015	0.121	0.441**	0.036	0.054	0.381**	-0.027	0.169	0.514***	-0.021	0.126	0.481***
	(0.137)	(0.180)	(0.181)	(0.138)	(0.183)	(0.184)	(0.139)	(0.180)	(0.182)	(0.140)	(0.184)	(0.186)
Constant	-0.749***	-5.000***	-5.128***	-0.702***	-4.283***	-4.061***	0.201	-5.418***	-5.669***	0.852**	-4.661***	-4.350***
	(0.180)	(0.278)	(0.272)	(0.262)	(0.408)	(0.392)	(0.231)	(0.379)	(0.370)	(0.344)	(0.561)	(0.541)
Observations	5431.0	5431.0	5431.0	5430.0	5430.0	5430.0	5416.0	5416.0	5416.0	5415.0	5415.0	5415.0
Pseudo R2	0.165	0.165	0.165	0.166	0.166	0.166	0.174	0.174	0.174	0.175	0.175	0.175
Log Lik	-5764	-5764	-5764	-5753	-5753	-5753	-5683	-5683	-5683	-5675	-5675	-5675
AIC	11635.8			11625.9			11485.8			11482.0		
Decreased AIC				9.9			150.0			153.8		
BIC	11992.2			11990.8			11881.7			118800.6		
Decreased BIC				2.4			110.5			111.6		

Table 12

Comparing the impact of post-SEO stock price informativeness and liquidity's levels on the probability of debt and equity issues within three years following the preceding SEO

This table presents AIC and BIC criteria among models, and the extent of AIC and BIC decreases when adding variables concerning post-SEO stock price informativeness and liquidity for explaining the subsequent financing choice. The general multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. The nominal variable FUNDING gets a value of 0 if, after the SEO, the firm does not have additional funding, 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The base outcome is 1, "issue equity only". The base model (1) is the multinomial logit model between the *FUNDING* and all control variables, including SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, book-to-market ratio (*B/M*), firm size (*size*), dummy variables controlling for country development, industry and period, *G7*, *I1*, *I2*, *L1*, *L2*, and *L3*, Leverage (*Leverage)*, operating income (*OI*), tangibility (*Tang*), R&D expense (*R&D*), and capital expenditure ratio (*capex*). Models (5) to (7) add post-SEO stock price informativeness, $FSRV_{t+1}$ *(5)* separately with post-SEO liquidity ($LNAMI_{t+1}$), (6), and add these two variables (7) into the base model. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Model	**BASE model (1)**				**With $FSRV_{t+1}$ (5)**				**With $LNAMI_{t+1}$ (6)**				**With $FSRV_{t+1}$, $LNAMI_{t+1}$ (7)**			
VARIABLES	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base out-come)	FUNDING=2	FUNDING=3
$FSRV_{t+1}$					-0.073		-0.439***	-0.379***					-0.252***		-0.360***	-0.290***
					(0.050)		(0.097)	(0.086)					(0.053)		(0.101)	(0.090)
$LNAMI_{t+1}$									0.297***		-0.169***	-0.181***	0.328***		-0.120**	-0.139***
									(0.024)		(0.052)	(0.046)	(0.025)		(0.054)	(0.048)
UP	-0.132***		-0.131***	-0.038	-0.129***		-0.131***	-0.039	-0.115***		-0.122***	-0.032	-0.114***		-0.122***	-0.032
	(0.020)		(0.031)	(0.033)	(0.020)		(0.031)	(0.033)	(0.020)		(0.031)	(0.033)	(0.020)		(0.031)	(0.033)
SEOSize	0.288***		0.386***	0.439***	0.279***		0.354***	0.415***	0.347***		0.391***	0.451***	0.330***		0.366***	0.433***
	(0.042)		(0.086)	(0.071)	(0.042)		(0.087)	(0.071)	(0.043)		(0.088)	(0.071)	(0.043)		(0.088)	(0.071)
AAR1	-0.0674***		-0.009	0.037	-0.0698***		-0.022	0.042	-0.0590**		-0.013	0.033	-0.0605**		-0.027	0.036
	(0.023)		(0.057)	(0.049)	(0.023)		(0.058)	(0.050)	(0.024)		(0.057)	(0.049)	(0.024)		(0.058)	(0.050)
AAR2	-0.0647**		0.007	0.009	-0.0649**		-0.005	0.018	-0.0569**		0.001	0.007	-0.0561**		-0.013	0.014
	(0.026)		(0.060)	(0.053)	(0.026)		(0.061)	(0.054)	(0.026)		(0.061)	(0.053)	(0.026)		(0.061)	(0.054)
B/M	-0.002		0.000	0.000	-0.002		0.000	0.000	-0.001		0.000	0.000	-0.001		0.000	0.000
	(0.002)		(0.001)	(0.001)	(0.002)		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)
Size	0.0996***		0.663***	0.612***	0.0884***		0.587***	0.548***	0.279***		0.559***	0.502***	0.259***		0.527***	0.479***
	(0.011)		(0.020)	(0.018)	(0.013)		(0.026)	(0.023)	(0.018)		(0.037)	(0.033)	(0.019)		(0.038)	(0.033)
G7	-0.136***		0.290***	0.143*	-0.136***		0.299***	0.152*	-0.079		0.300***	0.150*	-0.066		0.313***	0.162**
	(0.052)		(0.087)	(0.079)	(0.052)		(0.088)	(0.079)	(0.052)		(0.088)	(0.079)	(0.053)		(0.088)	(0.079)
I1	0.125**		-1.693***	-0.946***	0.120**		-1.719***	-0.959***	0.0965*		-1.690***	-0.942***	0.081		-1.714***	-0.953***
	(0.053)		(0.121)	(0.093)	(0.053)		(0.122)	(0.094)	(0.053)		(0.121)	(0.094)	(0.054)		(0.122)	(0.094)
I2	0.222*		0.090	0.540***	0.221		0.170	0.602***	0.149		0.128	0.580***	0.161		0.173	0.608***
	(0.135)		(0.179)	(0.160)	(0.135)		(0.180)	(0.160)	(0.137)		(0.180)	(0.161)	(0.137)		(0.180)	(0.161)
L1	0.758***		0.191	0.019	0.761***		0.174	0.005	0.819***		0.191	0.021	0.824***		0.184	0.016
	(0.075)		(0.135)	(0.123)	(0.075)		(0.135)	(0.123)	(0.076)		(0.135)	(0.123)	(0.076)		(0.135)	(0.123)

L2	0.365***	0.216*	0.028	0.349***	0.056	-0.104	0.327***	0.217*	0.031	0.263***	0.088	-0.067
	(0.067)	(0.125)	(0.111)	(0.069)	(0.130)	(0.115)	(0.068)	(0.125)	(0.111)	(0.070)	(0.131)	(0.116)
L3	0.060	0.379***	0.333***	0.052	0.278**	0.249**	0.014	0.396***	0.348***	-0.023	0.313***	0.286***
	(0.065)	(0.118)	(0.102)	(0.065)	(0.120)	(0.104)	(0.066)	(0.118)	(0.103)	(0.067)	(0.121)	(0.105)
Constant	-1.258***	-5.679***	-5.062***	-1.105***	-4.700***	-4.224***	-0.224*	-6.327***	-5.762***	0.416**	-5.347***	-4.968***
	(0.086)	(0.182)	(0.157)	(0.136)	(0.276)	(0.243)	(0.119)	(0.272)	(0.239)	(0.179)	(0.387)	(0.343)
Observations	11041	11041	11041	11031	11031	11031	11010	11010	11010	11004	11004	11004
Pseudo R2	0.124	0.124	0.124	0.125	0.125	0.125	0.134	0.134	0.134	0.135	0.135	0.135
Log Lik	-11049	-11049	-11049	-11021	-11021	-11021	-10901	-10901	-10901	-10877	-10877	-10877
AIC	22176.0			22125.3			21886.6			21843.9		
Decreased AIC				50.7			289.4			332.1		
BIC	22461.1			22432.3			22193.5			22172.7		
Decreased BIC				28.8			267.6			288.4		

Table 13

Comparing the impact of post-SEO stock price informativeness and liquidity's levels on the probability of debt and equity issues within three years following the preceding SEO (extending control variable set)

This table presents AIC and BIC criteria among models, and the extent of AIC and BIC decreases when adding variables concerning post-SEO stock price informativeness and liquidity for explaining the subsequent financing choice. The general multinomial logit model is as follows: $P\_FUNDING=e^{\alpha+x'_i\beta+u_i}$. The nominal variable FUNDING gets a value of 0 if, after the SEO, the firm does not have additional funding, 1 if the firm reissues equity, 2 if the firm issues debt, and 3 if the firm issues equity and debt within three years. The base outcome is 1, "issue equity only". The base model (1) is the multinomial logit model between the *FUNDING* and all control variables, including SEO underpricing *UP*, after-SEO return *AAR1*, *AAR2*, SEO size *SEOsize*, book-to-market ratio (*B/M*), firm size (*size*), dummy variables controlling for country development, industry and period, *G7*, *I1*, *I2*, *L1*, *L2*, and *L3*, Leverage (*Leverage)*, operating income (*OI*), tangibility (*Tang*), R&D expense (*R&D*), and capital expenditure ratio (*capex*). Models (5) to (7) add post-SEO stock price informativeness, $FSRV_{t+1}$ *(5)* separately with post-SEO liquidity ($LNAMI_{t+1}$), (6), and add these two variables (7) into the base model. A detailed definition of variables is presented in Appendix A. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.

Model	**BASE model (1)**				**With $FSRV_{t+1}$ (5)**				**With $LNAMI_{t+1}$ (6)**				**With $FSRV_{t+1}$, $LNAMI_{t+1}$ (7)**			
VARIABLES	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3	FUNDING=0	FUNDING=1 (base outcome)	FUNDING=2	FUNDING=3
$FSRVt_{+1}$					0.034	-0.314**	-0.402***						-0.142*	-0.221*	-0.292**	
					(0.077)	(0.122)	(0.118)						(0.081)	(0.128)	(0.124)	
$LNAMI_{t+1}$									0.266***	-0.169**	-0.212***		0.286***	-0.133*	-0.165**	
									(0.037)	(0.067)	(0.063)		(0.039)	(0.070)	(0.066)	
UP	-0.117***		-0.0884**	0.019	-0.115***		-0.092**	0.013	-0.104***		-0.084**	0.020	-0.105***		-0.087**	0.017
	(0.029)		(0.040)	(0.043)	(0.029)		(0.040)	(0.043)	(0.029)		(0.039)	(0.043)	(0.029)		(0.040)	(0.043)
SEOSize	0.180***		0.149	0.335***	0.182***		0.122	0.311***	0.256***		0.149	0.344***	0.246***		0.135	0.329***
	(0.069)		(0.120)	(0.099)	(0.070)		(0.121)	(0.099)	(0.071)		(0.122)	(0.100)	(0.071)		(0.123)	(0.100)
AAR1	-0.0707*		-0.019	-0.037	-0.0707*		-0.019	-0.037	-0.065		-0.023	-0.042	-0.065		-0.024	-0.042
	(0.040)		(0.081)	(0.076)	(0.040)		(0.081)	(0.076)	(0.040)		(0.081)	(0.076)	(0.040)		(0.081)	(0.076)
AAR2	-0.046		-0.027	0.009	-0.047		-0.023	0.015	-0.040		-0.037	-0.004	-0.038		-0.034	0.002
	(0.042)		(0.080)	(0.075)	(0.042)		(0.080)	(0.075)	(0.042)		(0.080)	(0.076)	(0.042)		(0.080)	(0.076)
B/M	0.005		0.0517***	0.0600***	0.006		0.0495**	0.0572***	0.010		0.0476**	0.0548***	0.009		0.0470**	0.0539***
	(0.015)		(0.019)	(0.018)	(0.015)		(0.019)	(0.018)	(0.015)		(0.020)	(0.018)	(0.015)		(0.020)	(0.018)
Size	0.0520***		0.630***	0.626***	0.0572**		0.573***	0.555***	0.215***		0.522***	0.494***	0.203***		0.506***	0.472***
	(0.019)		(0.028)	(0.028)	(0.023)		(0.035)	(0.034)	(0.030)		(0.049)	(0.047)	(0.030)		(0.050)	(0.048)
Leverage	0.264**		0.866***	0.906***	0.266**		0.866***	0.911***	0.240*		0.863***	0.914***	0.239*		0.861***	0.914***
	(0.132)		(0.162)	(0.149)	(0.132)		(0.161)	(0.148)	(0.135)		(0.161)	(0.148)	(0.135)		(0.161)	(0.147)
OI	1.639***		2.643***	2.260***	1.642***		2.626***	2.243***	1.662***		2.570***	2.199***	1.654***		2.561***	2.193***
	(0.162)		(0.415)	(0.388)	(0.163)		(0.415)	(0.388)	(0.163)		(0.417)	(0.391)	(0.163)		(0.416)	(0.391)
Tang	0.050		0.089	0.032	0.048		0.096	0.042	0.049		0.077	0.022	0.053		0.083	0.029
	(0.078)		(0.118)	(0.113)	(0.078)		(0.118)	(0.113)	(0.079)		(0.118)	(0.114)	(0.079)		(0.118)	(0.114)
R&D	0.00293***		-5.394***	-3.922***	0.00292***		-5.429***	-3.937***	0.00290***		-5.777***	-4.284***	0.00292***		-5.757***	-4.247***
	(0.001)		(1.220)	(0.958)	(0.001)		(1.223)	(0.961)	(0.001)		(1.240)	(0.982)	(0.001)		(1.240)	(0.981)
Capex	0.072		1.285**	0.081	0.072		1.261**	0.063	0.074		1.238**	0.247	0.071		1.225**	0.237

	(0.116)	(0.571)	(0.251)	(0.116)	(0.571)	(0.245)	(0.116)	(0.578)	(0.402)	(0.116)	(0.578)	(0.402)
G7	-0.122	0.347***	0.078	-0.125	0.364***	0.100	-0.089	0.348***	0.075	-0.072	0.368***	0.098
	(0.080)	(0.112)	(0.106)	(0.080)	(0.112)	(0.106)	(0.081)	(0.112)	(0.106)	(0.081)	(0.113)	(0.107)
I1	0.033	-1.239***	-0.443***	0.032	-1.249***	-0.456***	-0.010	-1.254***	-0.464***	-0.015	-1.262***	-0.474***
	(0.102)	(0.196)	(0.155)	(0.102)	(0.196)	(0.156)	(0.103)	(0.196)	(0.156)	(0.103)	(0.196)	(0.156)
I2	0.083	-0.261	0.002	0.068	-0.196	0.082	0.026	-0.222	0.052	0.032	-0.193	0.092
	(0.179)	(0.218)	(0.206)	(0.180)	(0.219)	(0.207)	(0.181)	(0.219)	(0.207)	(0.181)	(0.219)	(0.207)
L1	0.569***	-0.266	0.052	0.571***	-0.272	0.044	0.613***	-0.264	0.066	0.612***	-0.266	0.063
	(0.138)	(0.189)	(0.190)	(0.138)	(0.188)	(0.190)	(0.139)	(0.189)	(0.191)	(0.139)	(0.189)	(0.191)
L2	0.165	-0.196	0.005	0.176	-0.311*	-0.145	0.126	-0.196	0.006	0.089	-0.272	-0.098
	(0.134)	(0.180)	(0.183)	(0.136)	(0.185)	(0.188)	(0.135)	(0.181)	(0.183)	(0.137)	(0.187)	(0.189)
L3	0.015	0.121	0.441**	0.022	0.054	0.352*	-0.025	0.144	0.470***	-0.044	0.099	0.406**
	(0.137)	(0.180)	(0.181)	(0.138)	(0.181)	(0.183)	(0.138)	(0.180)	(0.182)	(0.139)	(0.183)	(0.184)
Constant	-0.749***	-5.000***	-5.128***	-0.820***	-4.298***	-4.245***	0.193	-5.604***	-5.904***	0.561*	-4.987***	-5.095***
	(0.180)	(0.278)	(0.272)	(0.242)	(0.383)	(0.370)	(0.222)	(0.373)	(0.364)	(0.305)	(0.516)	(0.499)
Observations	5431.0	5431.0	5431.0	5430.0	5430.0	5430.0	5420.0	5420.0	5420.0	5419.0	5419.0	5419.0
Pseudo R2	0.165	0.165	0.165	0.166	0.166	0.166	0.172	0.172	0.172	0.172	0.172	0.172
Log Lik	-5764	-5764	-5764	-5754	-5754	-5754	-5702	-5702	-5702	-5698	-5698	-5698
AIC	11635.8			11622.9			11518.4			11516.8		
Decreased AIC				12.9			117.4			119.0		
BIC	11992.2			11984.9			11894.5			11769.9		
Decreased BIC				7.3			97.7			99.5		

REFERENCES

Acharya, V. V., and Pedersen, L. H. (2005). Asset pricing with liquidity risk. *Journal of Financial Economics*, *77*(2), 375–410. https://doi.org/10.1016/j.jfineco.2004.06.007

Admati, A. R., and Pfleiderer, P. (1988). A Theory of Intraday Patterns: Volume and Price Variability. *The Review of Financial Studies*, *1*(1), 3–40. https://doi.org/10.1093/rfs/1.1.3

Admati, A. R., and Pfleiderer, P. (2009). The "Wall Street Walk" and Shareholder Activism: Exit as a Form of Voice. *The Review of Financial Studies*, *22*(7), 2645–2685. https://doi.org/10.1093/rfs/hhp037

Akaike, H. (1998). A New Look at the Statistical Model Identification. In E. Parzen, K. Tanabe, and G. Kitagawa (Eds.), *Selected Papers of Hirotugu Akaike* (pp. 215–222). Springer. https://doi.org/10.1007/978-1-4612-1694-0_16

Allen, F., and Faulhaber, G. R. (1989). Signalling by underpricing in the IPO market. *Journal of Financial Economics*, *23*(2), 303–323. https://doi.org/10.1016/0304-405X(89)90060-3

Amihud, Y. (2002). Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets*, *5*(1), 31–56. https://doi.org/10.1016/S1386-4181(01)00024-6

Baker, M., Stein, J. C., and Wurgler, J. (2003). When Does the Market Matter? Stock Prices and the Investment of Equity-Dependent Firms*. *The Quarterly Journal of Economics*, *118*(3), 969–1005. https://doi.org/10.1162/00335530360698478

Baker, M., and Wurgler, J. (2002). Market Timing and Capital Structure. *The Journal of Finance*, *57*(1), 1–32.

Barclay, M. J., and Hendershott, T. (2003). Price Discovery and Trading After Hours. *The Review of Financial Studies*, *16*(4), 1041–1073. https://doi.org/10.1093/rfs/hhg030

Baruch, S., Karolyi, G. A., and Lemmon, M. L. (2007). Multimarket Trading and Liquidity: Theory and Evidence. *The Journal of Finance*, *62*(5), 2169–2200.

Baruch, S., and Saar, G. (2009). Asset Returns and the Listing Choice of Firms. *The Review of Financial Studies*, *22*(6), 2239–2274.

Bhide, A. (1993). The hidden costs of stock market liquidity. *Journal of Financial Economics*, *34*(1), 31–51. https://doi.org/10.1016/0304-405X(93)90039-E

Bilinski, P., Liu, W., and Strong, N. (2012). Does liquidity risk explain low firm performance following seasoned equity offerings? *Journal of Banking and Finance*, *36*(10), 2770–2785. https://doi.org/10.1016/j.jbankfin.2012.07.009

Brennan, M. J., and Subrahmanyam, A. (1996). Market microstructure and asset pricing: On the compensation for illiquidity in stock returns. *Journal of Financial Economics*, *41*(3), 441–464. https://doi.org/10.1016/0304-405X(95)00870-K

Brogaard, J., Li, D., and Xia, Y. (2017). Stock liquidity and default risk. *Journal of Financial Economics*, *124*(3), 486–502. https://doi.org/10.1016/j.jfineco.2017.03.003

Butler, A. W., Grullon, G., and Weston, J. P. (2005). Stock Market Liquidity and the Cost of Issuing Equity. *The Journal of Financial and Quantitative Analysis*, *40*(2), 331–348.

Chan, K., Hameed, A., and Kang, W. (2013). Stock price synchronicity and liquidity. *Journal of Financial Markets*, *16*(3), 414–438. https://doi.org/10.1016/j.finmar.2012.09.007

Chemmanur, T. J., and Jiao, Y. (2011). Institutional Trading, Information Production, and the SEO Discount: A Model of Seasoned Equity Offerings. *Journal of Economics and Management Strategy*, *20*(1), 299–338. https://doi.org/10.1111/j.1530-9134.2010.00290.x

Chen, Q., Goldstein, I., and Jiang, W. (2007). Price Informativeness and Investment Sensitivity to Stock Price. *The Review of Financial Studies*, *20*(3), 619–650.

Cheung, W., Fung, S., and Tam, L. (2016). Does market microstructure matter for corporate finance? Theory and evidence on seasoned equity offering decisions. *The Quarterly Review of Economics and Finance*, *60*, 149–161. https://doi.org/10.1016/j.qref.2015.06.003

Copeland, T. E., and Galai, D. (1983). Information Effects on the Bid-Ask Spread. *The Journal of Finance*, *38*(5), 1457–1469. https://doi.org/10.1111/j.1540-6261.1983.tb03834.x

Dasgupta, S., Gan, J., and Gao, N. (2010). Transparency, Price Informativeness, and Stock Return Synchronicity: Theory and Evidence. *The Journal of Financial and Quantitative Analysis*, *45*(5), 1189–1220.

Durnev, A., Morck, R., and Yeung, B. (2004). Value-Enhancing Capital Budgeting and Firm-specific Stock Return Variation. *The Journal of Finance*, *59*(1), 65–105. https://doi.org/10.1111/j.1540-6261.2004.00627.x

Easley, D., Hvidkjaer, S., and O'Hara, M. (2002). Is Information Risk a Determinant of Asset Returns? *The Journal of Finance*, *57*(5), 2185–2221.

Easley, D., and O'Hara, M. (1987). Price, trade size, and information in securities markets. *Journal of Financial Economics*, *19*(1), 69–90. https://doi.org/10.1016/0304-405X(87)90029-8

Easley, D., and O'hara, M. (2004). Information and the Cost of Capital. *The Journal of Finance*, *59*(4), 1553–1583. https://doi.org/10.1111/j.1540-6261.2004.00672.x

Eckbo, B. E., Masulis, R. W., and Norli, Ø. (2000). Seasoned public offerings: Resolution of the 'new issues puzzle.' *Journal of Financial Economics*, *56*(2), 251–291. https://doi.org/10.1016/S0304-405X(00)00041-6

Edmans, A. (2009). Blockholder Trading, Market Efficiency, and Managerial Myopia. *The Journal of Finance*, *64*(6), 2481–2513. https://doi.org/10.1111/j.1540-6261.2009.01508.x

Elyasiani, E., Hauser, S., and Lauterbach, B. (2000). Market Response to Liquidity Improvements: Evidence from Exchange Listings. *Financial Review*, *35*(1), 1–14. https://doi.org/10.1111/j.1540-6288.2000.tb01403.x

Fang, V. W., Noe, T. H., and Tice, S. (2009). Stock market liquidity and firm value. *Journal of Financial Economics*, *94*(1), 150–169. https://doi.org/10.1016/j.jfineco.2008.08.007
Fernandes, N., and Ferreira, M. A. (2009). Insider Trading Laws and Stock Price Informativeness. *The Review of Financial Studies*, *22*(5), 1845–1887.
Frank, M. Z., and Goyal, V. K. (2009). Capital Structure Decisions: Which Factors Are Reliably Important? *Financial Management*, *38*(1), 1–37. https://doi.org/10.1111/j.1755-053X.2009.01026.x
Fulghieri, P., and Lukin, D. (2001). Information production, dilution costs, and optimal security design. *Journal of Financial Economics*, *61*(1), 3–42. https://doi.org/10.1016/S0304-405X(01)00054-X
Gajewski, J.-F., and Ginglinger, E. (2002). Seasoned Equity Issues in a Closely Held Market: Evidence from France. *Review of Finance*, *6*(3), 291–319. https://doi.org/10.1023/A:1022024925877
Garfinkel, J. A. (1993). IPO Underpricing, Insider Selling and Subsequent Equity Offerings: Is Underpricing a Signal of Quality? *Financial Management*, *22*(1), 74–83. https://doi.org/10.2307/3665967
Glosten, L. R., and Harris, L. E. (1988). Estimating the components of the bid/ask spread. *Journal of Financial Economics*, *21*(1), 123–142. https://doi.org/10.1016/0304-405X(88)90034-7
Glosten, L. R., and Milgrom, P. (1985). Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics*, *14*(1), 71–100.
Goldstein, I., and Guembel, A. (2008). Manipulation and the Allocational Role of Prices. *The Review of Economic Studies*, *75*(1), 133–164.
Gopalan, R., Kadan, O., and Pevzner, M. (2012). Asset Liquidity and Stock Liquidity. *Journal of Financial and Quantitative Analysis*, *47*(2), 333–364. https://doi.org/10.1017/S0022109012000130
Goyenko, R. Y., Holden, C. W., and Trzcinka, C. A. (2009). Do liquidity measures measure liquidity? *Journal of Financial Economics*, *92*(2), 153–181. https://doi.org/10.1016/j.jfineco.2008.06.002
Grossman, S. J., and Stiglitz, J. E. (1980). On the Impossibility of Informationally Efficient Markets. *The American Economic Review*, *70*(3), 393–408.
Hasbrouck, J. (1991a). Measuring the Information Content of Stock Trades. *The Journal of Finance*, *46*(1), 179–207. https://doi.org/10.2307/2328693
Hasbrouck, J. (1991b). The Summary Informativeness of Stock Trades: An Econometric Analysis. *The Review of Financial Studies*, *4*(3), 571–595.
Hasbrouck, J. (1993). Assessing the Quality of a Security Market: A New Approach to Transaction- Cost Measurement. *The Review of Financial Studies*, *6*(1), 191–212.
Hayek, F. A. (1945). The Use of Knowledge in Society. *The American Economic Review*, *35*(4), 519–530.
He, Y., Wang, J., and John Wei, K. C. (2014). A comprehensive study of liquidity before and after SEOs and SEO underpricing. *Journal of Financial Markets*, *20*, 61–78. https://doi.org/10.1016/j.finmar.2014.03.004
Hennessy, C. A., and Whited, T. M. (2005). Debt Dynamics. *The Journal of Finance*, *60*(3), 1129–1165. https://doi.org/10.1111/j.1540-6261.2005.00758.x
Holmström, B., and Tirole, J. (1993). Market Liquidity and Performance Monitoring. *Journal of Political Economy*, *101*(4), 678–709.
Hovakimian, A., and Hutton, I. (2010). Market Feedback and Equity Issuance: Evidence from Repeat Equity Issues. *The Journal of Financial and Quantitative Analysis*, *45*(3), 739–762.
Jayaraman, S., and Shuang Wu, J. (2020). Should I Stay or Should I Grow? Using Voluntary Disclosure to Elicit Market Feedback. *The Review of Financial Studies*, *33*(8), 3854–3888. https://doi.org/10.1093/rfs/hhz132
Jegadeesh, N., Weinstein, M., and Welch, I. (1993). An empirical investigation of IPO returns and subsequent equity offerings. *Journal of Financial Economics*, *34*(2), 153–175. https://doi.org/10.1016/0304-405X(93)90016-5
Jiang, Y., Stohs, M., and Xie, X. (2015). The Early Bird Gets the Worm? The Stock Returns and Operating Performance of Quick SEOs. *International Journal of Business*, *20*(1), 1–31.
Jin, L., and Myers, S. C. (2006). R2 around the world: New theory and new tests. *Journal of Financial Economics*, *79*(2), 257–292. https://doi.org/10.1016/j.jfineco.2004.11.003
Khanna, N., and Sonti, R. (2004). Value creating stock manipulation: Feedback effect of stock prices on firm value. *Journal of Financial Markets*, *7*(3), 237–270. https://doi.org/10.1016/j.finmar.2003.11.004
Kim, K., Ryu, D., and Yang, H. (2021). Information uncertainty, investor sentiment, and analyst reports. *International Review of Financial Analysis*, *77*, 101835. https://doi.org/10.1016/j.irfa.2021.101835
Kyle, A. S. (1985). Continuous Auctions and Insider Trading. *Econometrica*, *53*(6), 1315–1335. https://doi.org/10.2307/1913210
Lin, J.-C., and Wu, Y. (2013). SEO timing and liquidity risk. *Journal of Corporate Finance*, *19*, 95–118. https://doi.org/10.1016/j.jcorpfin.2012.09.005
Lipson, M. L., and Mortal, S. (2009). Liquidity and capital structure. *Journal of Financial Markets*, *12*(4), 611–644. https://doi.org/10.1016/j.finmar.2009.04.002
Luo, Y. (2005). Do Insiders Learn from Outsiders? Evidence from Mergers and Acquisitions. *The Journal of Finance*, *60*(4), 1951–1982.
Morck, R., Yeung, B., and Yu, W. (2000). The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics*, *58*(1), 215–260. https://doi.org/10.1016/S0304-405X(00)00071-4

Myers, S. C., and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221. https://doi.org/10.1016/0304-405X(84)90023-0

Ozdenoren, E., and Yuan, K. (2008). Feedback Effects and Asset Prices. *The Journal of Finance*, *63*(4), 1939–1975. https://doi.org/10.1111/j.1540-6261.2008.01378.x

Polk, C., and Sapienza, P. (2009). The Stock Market and Corporate Investment: A Test of Catering Theory. *The Review of Financial Studies*, *22*(1), 187–217. https://doi.org/10.1093/rfs/hhn030

Raftery, A. E. (1995). Bayesian Model Selection in Social Research. *Sociological Methodology*, *25*, 111–163. https://doi.org/10.2307/271063

Roll, R. (1988). R2. *The Journal of Finance*, *43*(3), 541–566. https://doi.org/10.1111/j.1540-6261.1988.tb04591.x

Sadka, R., and Scherbina, A. (2007). Analyst Disagreement, Mispricing, and Liquidity. *The Journal of Finance*, *62*(5), 2367–2403.

Schwarz, G. (1978). Estimating the Dimension of a Model. *The Annals of Statistics*, *6*(2), 461–464.

Sony, B., and Bhaduri, S. (2021). Information asymmetry and financing choice between debt, equity and dual issues by Indian firms. *International Review of Economics and Finance*, *72*, 90–101. https://doi.org/10.1016/j.iref.2020.11.001

Subrahmanyam, A., and Titman, S. (2001). Feedback from Stock Prices to Cash Flows. *The Journal of Finance*, *56*(6), 2389–2413.

Tabachnick, B. G., and Fidell, L. S. (2012). *Using Multivariate Statistics* (6th ed.). Pearson. https://books.google.fr/books/about/Using_Multivariate_Statistics.html?id=ucj1ygAACAAJ&redir_esc=y

Welch, I. (1989). Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings. *The Journal of Finance*, *44*(2), 421–449. https://doi.org/10.1111/j.1540-6261.1989.tb05064.x

Yulianto, A., Witiastuti, R. S., and Widiyanto. (2021). Debt versus Equity—Open Innovation to Reduce Asymmetric Information. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3), 181. https://doi.org/10.3390/joitmc7030181