Journal of Financial Economics 94 (2009) 384–411

Contents lists available at ScienceDirect

Journal of Financial Economics

journal homepage: www.elsevier.com/locate/jfec

The role of institutional investors in seasoned equity offerings ☆

Thomas J. Chemmanur [a,*], Shan He [b], Gang Hu [c]

[a] Carroll School of Management, Boston College, Chestnut Hill, MA 02467, USA
[b] E. J. Ourso College of Business, Louisiana State University, Baton Rouge, LA 70803, USA
[c] Babson College, Babson Park, MA 02457, USA

ARTICLE INFO

Article history:
Received 11 December 2007
Received in revised form
5 November 2008
Accepted 3 December 2008
Available online 13 August 2009

JEL classification:
G14
G24
G32

Keywords:
Institutional investors
Seasoned equity offerings
Manipulative trading
Information production
SEO allocations

ABSTRACT

Do institutional investors possess private information about seasoned equity offerings (SEOs)? If so, do they use this private information to trade in a direction opposite to this information (a manipulative trading role) or in the same direction (an information production role)? We use a large sample of transaction-level institutional trading data to distinguish between these two roles of institutional investors. We explicitly identify institutional SEO allocations for the first time in the literature. We analyze the consequences of the private information possessed by institutional investors for SEO share allocation, institutional trading before and after the SEO and realized trading profitability, and the SEO discount. We find that institutions are able to identify and obtain more allocations in SEOs with better long-run stock returns, they trade in the same direction as their private information, and their post-SEO trading significantly outperforms a naive buy-and-hold trading strategy. Further, more pre-offer institutional net buying and larger institutional SEO allocations are associated with a smaller SEO discount. Overall, our results are consistent with institutions possessing private information about SEOs and with an information production instead of a manipulative trading role for institutional investors in SEOs.

1. Introduction

The importance of institutional investors in financial markets and in equity offerings in particular has increased dramatically in recent years. For example, institutional investors in 2003 controlled 59.2% of the equity outstanding in the US ($7.97 trillion), compared with only 28.4% or $376 billion in 1980.[1] Further, investment banks often allocate equity in initial public offerings (IPOs) predominantly to institutional investors (Aggarwal, Prabhala, and Puri, 2002). Reflecting the importance of institutional investors, considerable research has been done on the role of institutional investors in IPOs. In particular, starting with Rock (1986) and Benveniste and

☆ We thank an anonymous referee and Bill Schwert (the editor) for many helpful suggestions. For comments and discussions, we thank Naveen Daniel, Irv DeGraw, Daniel Dorn, Alex Edmans, Wayne Ferson, Eliezer Fich, Jacqueline Garner, Bruno Gerard, Ron Giammarino, Itay Goldstein, Rob Hansen, Burton Hollifield, Yawen Jiao, Ed Kane, Rabih Moussawi, Edward Nelling, Andy Puckett, Michael Roberts, Karen Simonyan, Phil Strahan, Ralph Walkling, Xueping Wu, and seminar participants at Boston College, Drexel University, 2006 American Finance Association Meetings in Boston, 2007 National Bureau of Economic Research Market Microstructure Meeting in Boston, 2007 European Finance Association Meetings in Ljubljana, Slovenia, 2007 Eastern Finance Association Meetings in New Orleans, 2005 Financial Management Association Meetings in Chicago, and 2005 Southern Finance Association Meetings in Key West. We thank the Abel/Noser Corporation for providing us with their institutional trading data, and Judy Maiorca for answering many data-related questions. We are solely responsible for all remaining errors and omissions.

* Corresponding author.
E-mail address: chemmanu@bc.edu (T.J. Chemmanur).

0304-405X/$ - see front matter © 2009 Elsevier B.V. All rights reserved.
doi:10.1016/j.jfineco.2008.12.011

[1] See Gompers and Metrick (2001) and the 2005 Institutional Investment Report: US and International Trends—Report 1376, The Conference Board.

Spindt (1989), a number of papers in the theoretical IPO literature analyze the role of informed institutional investors in IPOs. More recently, significant empirical research also has focused on the role of institutional investors in IPOs (see, e.g., Aggarwal, Prabhala, and Puri, 2002, on institutional share allocation in IPOs; Chemmanur and Hu, 2006, on institutional trading around IPOs; and Ritter and Welch, 2002, for a review of the IPO literature). Surprisingly, however, considerably less research, especially empirical, has been done on the role of institutional investors in seasoned equity offerings (SEOs).[2] The objective of this paper is to fill this gap in the literature by analyzing empirically, for the first time, the role of institutional investors in SEOs, making use of a large sample of transaction-level institutional trading data.[3]

SEOs differ from IPOs in two important ways. First, SEOs are made by firms that have matured beyond the IPO, having a significant track record of financial and operating performance at the time of the SEO. Second, the issuing firm's shares already trade in the equity market prior to the SEO, unlike in the case of an IPO, where no such trading takes place in most countries. These two differences have several important consequences for an economic analysis of SEOs relative to IPOs. First, given that more information is available to all outside investors about firms making SEOs, the extent of information asymmetry facing uninformed (retail) investors about the prospect of SEO firms is likely to be smaller compared with that about firms making IPOs. This means that any informational advantage of institutional investors over retail investors could be lower in the context of SEOs compared with IPOs. Second, assuming that institutional investors possess private information about firms making SEOs as well as IPOs, significant differences arise in the manner in which they could exploit this private information for profit. In particular, informed investors can trade on their private information in the pre-offer market in the case of SEOs but cannot do so in the case of IPOs (given that such pre-offer equity market trading is absent in IPOs). In other words, while institutional investors can exploit their private information in both the pre-offer market and the equity offering itself in the case of SEOs, they can do so only in the equity offering in the case of IPOs.

Third, given the above likelihood that at least some of the information possessed by institutional investors is reflected in pre-offer market prices (and trading volume) due to institutional investors exploiting their information through pre-offer trading in SEOs, issuers can use these variables to infer this information and potentially use it to set their firm's SEO offer price. This contrasts with the IPO situation, in which (as modeled by Benveniste and Spindt, 1989, and others) issuers need to rely solely on various information revelation mechanisms to extract institutional investors' private information. Fourth, the possibility of issuers inferring institutional investors' private information from pre-offer equity market prices and trading volume in the context of SEOs brings up the possibility of attempts at SEO price manipulation by institutional investors by trading in the pre-offer market against their private information (for example, by selling shares in SEO firms about which they have favorable private information).[4] Clearly, given the absence of a pre-offer equity market in IPOs, such price manipulation is not a concern in IPOs. Fifth, given that, unlike in IPOs, institutional investors can acquire shares in the firm making an SEO in the pre-offer market, the relation between institutional share allocation across various categories of SEOs, SEO pricing, and institutional trading in the SEO firm's equity after the offering are likely to be different from the corresponding relations in IPOs. Finally, the existence of pre-offer equity market trading in the context of SEOs gives rise to an important SEO phenomenon, namely, the SEO discount; i.e., the fact that the offer price in SEOs is set, on average, below the closing price on the previous day (a phenomenon that clearly does not exist in the case of IPOs, given the absence of pre-offer trading).

The important economic differences between SEOs and IPOs and the role played by institutional investors in these equity offerings give rise to three sets of interesting empirical research questions. The first set of research questions pertains to whether institutional investors have private information about SEOs and the consequences of this private information on share allocation.[5] In other words, are institutional investors able to identify and obtain more allocations in better SEOs? The second set of research questions pertains to how institutions make use of their private information, if any, to trade in the equity of SEO firms before and after the SEO, and the profitability of such trading. In particular, what is the relation between pre-offer institutional trading, institutional SEO share allocations, and post-offer institutional trading? What is

[2] An extensive literature exists on seasoned equity offerings in general. There are several strands in this literature. The first strand is the literature on the announcement effect of SEOs. See, e.g., Myers and Majluf (1984) and Giammarino and Lewis (1989) for theoretical models and Asquith and Mullins (1986) for an empirical analysis. The second strand is the literature on the SEO discount and the SEO offering process. The third strand on the long-term post-issue underperformance of SEOs. See, e.g., Carlson, Fisher, and Giammarino (2006) for a theoretical analysis and Loughran and Ritter (1995) and Brav, Geczy, and Gompers (2000) for empirical analyses.

[3] There is a growing literature on the role of institutional investors around other corporate events. See, e.g., Parrino, Sias, and Starks (2003), who study the role of institutional investors around forced CEO turnovers.

[4] In an attempt to minimize such market manipulation, the Securities and Exchange Commission (SEC) recently approved a rule change barring the purchase of shares in an offering by anyone who sold the shares short during a restricted period (Wall Street Journal, 2007).

[5] The incentives of outsiders to produce information are considerably greater in the context of an SEO compared with that in a general market trading situation. In general market trading, the tendency of the market price to reveal the private information held by market participants depresses the incentives of investors to produce information, as discussed by Grossman and Stiglitz (1980). This problem is considerably mitigated in the context of SEOs, given that the SEO offer price is not fully adjusted according to the demand for shares in the offering, so that the offer price is not invertible to reveal outsiders' private information.

the pattern of institutional selling of their SEO share allocations over time? Finally, are they able to realize superior profits from trading in these SEOs, either from selling their SEO share allocations or from post-SEO trading in the equity of these firms (i.e., buying and selling shares in the stock market post-SEO), or both?[6] The third set of research questions relates to the effect of institutional private information on the SEO discount. In particular, what is the relation between pre-offer institutional trading, institutional SEO share allocations, and the SEO discount?

In this paper, we make use of a large sample of transaction-level institutional trading data to answer many of these questions. Our data include transactions from January 1999 to December 2005, originated from 786 different institutions with more than $5.5 trillion annualized trading in US equity market. For sample SEOs, these institutions collectively account for 11.9% of total trading as reported by the Center for Research in Security Prices (CRSP). With this data set, we are able to track institutional trading in SEOs before and after the offer during the 1999–2005 period and gauge their realized trading profits. We are able to incorporate the impact of trading commissions and taxes and fees on realized institutional trading profitability.[7] We are also able to identify and study institutional SEO share allocations. Our sample institutions were allocated 10.7% of SEO offering proceeds. While recent literature studies issues such as institutional IPO share allocation, institutional post-IPO trading, and the relation of the above to long-term post-IPO returns, these matters have not been explored in the context of SEOs. Given this and the significant economic differences between IPOs and SEOs, our paper makes an important contribution by studying these and related issues in the context of SEOs for the first time in the literature.

We base many of the hypotheses we test in this paper on two important roles for informed institutional investors that have been postulated by the theoretical literature on SEOs: a manipulative trading role, suggested by Gerard and Nanda (1993), and an information production role, suggested by Chemmanur and Jiao (2005). Gerard and Nanda (1993) develop a model of informed trading around SEOs in a Kyle (1985)-type setting. In the manipulative equilibrium in their model, informed investors sell shares of the SEO firm prior to the equity offering, thus driving down the SEO offer price and subsequently profiting by obtaining SEO share allocations at this reduced offer price. Thus, in this manipulation equilibrium, informed investors with favorable private information trade in a direction opposite to their private information. Chemmanur and Jiao (2005) argue that institutional investors engage in costly information production about firms making SEOs, request allocations in those SEOs about which they obtain favorable information, and buy shares in these firms before and after the offering. In contrast to Gerard and Nanda (1993), in Chemmanur and Jiao (2005), informed investors trade in the same direction as their private information both before and after the SEO.[8] In Section 3, we develop in detail the testable hypotheses arising from the manipulative trading and the information production roles of institutional investors in SEOs.

Our paper provides a number of new results on SEOs and especially the role of institutional investors in SEOs. We organize our empirical tests and results into three parts, corresponding to the three sets of research questions outlined above. First, we show, for the first time in the literature, the characteristics of institutional SEO share allocation and the relation between institutional SEO share allocation and long-term post-SEO stock returns. We find that institutions get more allocations in larger SEOs and those SEOs underwritten by more reputable investment banks. More interesting, we find that institutional investors are able to obtain more allocations in those SEOs with better long-term post-SEO performance. This holds true both in our univariate results and in our multivariate results after controlling for publicly available information. Our results are consistent with the notion that institutional investors possess private information about SEOs and are able to identify and obtain more allocations in better SEOs.

Second, we study, for the first time in the literature, how institutions make use of their private information to trade in SEO firms before and after the SEO, and the profitability of such trading. The manipulative trading hypothesis predicts that more pre-offer net selling should be associated with more SEO allocations. To the contrary, we find that more pre-offer net buying (total buying minus selling of shares in SEO firms) by institutional investors is associated with more institutional SEO share allocations. We also find that more institutional pre-offer net buying and more institutional SEO share allocations are associated with more post-offer net buying by institutional investors. Our results are robust to controlling for various SEO and institutional characteristics. Our findings paint a very different picture of the role of informed institutional investors in SEOs from that under the manipulative trading hypothesis, in which informed traders engage in short-term price manipulation by selling shares prior to an SEO and subsequently obtaining allocations in the SEO and then selling these allocations at a profit. However, they are consistent with the information production hypothesis, in which institutional investors produce information about SEO firms, identify and obtain more allocations in SEOs about which they

[6] The realized profitability of institutional trading in SEOs has not been studied before in the literature and is particularly important to study in the context of the well-documented long-term underperformance of SEOs (see, e.g., Loughran and Ritter, 1995).

[7] In addition to trading commissions and taxes and fees (which explicitly reduce realized profits), implicit trading costs such as implementation shortfall (Perold, 1988) could further reduce investors' realized profits. Our results account for both explicit and implicit trading costs, because we use actual transaction prices to calculate institutional investors' realized profits.

[8] Parsons and Raviv (1985) also develop a model that sheds light on the relation between the SEO offering price and the secondary market price prior to the SEO (and therefore on the SEO discount). However, the implications of their model do not directly deal with the role of institutional investors in SEOs.

receive favorable private information, and buy additional shares in these firms both before and after the offering.

We find very little flipping (selling of allocations immediately post-offer) in SEOs by institutional investors. Institutions sell only 3.2% of their SEO share allocations during the first two days post-SEO. This is in sharp contrast to institutional flipping activities shown by IPO studies. Aggarwal (2003) shows that institutions sell about 25.8% of the shares allocated to them within the first two days post-IPO. This lack of flipping in SEOs does not seem to be due to institutional constraints (e.g., underwriter discouragement), because institutional SEO share allocation sales seem to be reasonably smooth over time up to one year post-SEO. We find that this lack of flipping is not costly to institutional investors, i.e., no significant difference exists between underpricing (paper profitability) and institutional realized profitability on SEO allocation sales, which could explain the lack of flipping by institutional investors in the first place.

SEOs underperform on average after the offering, as shown by previous studies (see, e.g., Loughran and Ritter, 1995). However, we find that institutional investors' trading post-SEO in those SEOs where they obtained share allocations significantly outperforms a naive buy-and-hold trading strategy in SEOs. Further, SEO-institution pairs with institutional share allocations significantly outperform SEO-institution pairs without allocations in post-SEO trading. In fact, SEO-institution pairs with allocations even outperform the corresponding size and book-to-market benchmark portfolios in post-SEO trading. However, SEO-institution pairs without allocations underperform the corresponding size and book-to-market benchmark portfolios, even though they neither significantly outperform nor underperform a naive buy-and-hold trading strategy in SEOs. Our results are consistent with institutional investors having private information about SEOs in which they obtained share allocations. In particular, they are consistent with the information production hypothesis, in which institutional investors who produce information about SEOs during the SEO allocation process continue to have an informational advantage in post-SEO trading (i.e., their private information about SEOs is long-lived, not short-lived).

Finally, we study the relation between pre-offer institutional trading, institutional SEO share allocations, and the SEO discount, also for the first time in the literature. We find that more pre-offer institutional net buying is associated with a lower SEO discount (offer price relative to the closing price on the previous day). We also find that larger institutional SEO share allocations are associated with a smaller SEO discount. Our results are robust to controlling for various SEO characteristics. Under the manipulative trading hypothesis, informed traders sell more shares in SEOs about which they have more favorable private information and then profit by obtaining more allocations in these SEOs at lower offer prices. These SEOs also are offered with a larger discount in equilibrium, because of a more severe Rock (1986)-type winner's curse problem faced by uninformed investors. Therefore, this hypothesis predicts a positive correlation between pre-offer institutional net selling and the SEO discount and a positive correlation between institutional SEO share allocations and the SEO discount. Our empirical findings are thus consistent with the first prediction but inconsistent with the second prediction of the manipulative trading hypothesis. Both of our findings are, however, consistent with the predictions of the information production hypothesis, in which both greater pre-offer institutional net buying and greater institutional SEO share allocations are associated with a smaller SEO discount.

The remainder of this paper is organized as follows. Section 2 discusses the relation of our paper to the existing literature. Section 3 discusses the manipulative trading and information production roles of institutional investors in more detail and develops testable hypotheses. Section 4 describes the data and sample selection procedures. Section 5 presents our empirical tests and results. Section 6 concludes with a discussion of our results.

2. Related literature

Our paper is related to several strands in the empirical literature on SEOs. Safieddine and Wilhelm (1996) examine manipulative trading around SEOs by testing for a relation between the SEO discount and pre-offer short selling. Consistent with the manipulative trading hypothesis, prior to the adoption of Rule 10b-21, Safieddine and Wilhelm (1996) show unusually high levels of short interest in the pre-offer period and a positive relation between short interest and SEO discount. They find no such relation after the adoption of Rule 10b-21, supporting the notion that Rule 10b-21 was successful in curbing short selling and reducing the discount. However, due to data limitations, Safieddine and Wilhelm (1996) study only short-selling activities. In contrast to Safieddine and Wilhelm (1996), Kim and Shin (2004) conclude that Rule 10b-21 has resulted in less informative pre-offer prices and that the adoption of the rule has increased the SEO discount (see also Singal and Xu, 2005, for similar findings). Ours is the first paper to comprehensively study both institutional buying and selling activities surrounding SEOs.[9] Altinkilic and Hansen (2003) decompose the SEO discount into expected and unexpected components and examine the relation between these components and SEO stock returns. Corwin (2003) conducts a comprehensive analysis of the determinants of the SEO discount. He finds that the SEO discount increases substantially over time, especially after the adoption of Rule 10b-21, and that the SEO discount is positively related to offer size, price uncertainty, and the magnitude of pre-offer returns.

[9] Rule 10b-21 was adopted by the SEC in August 1988, and it was replaced by Rule 105 in April 1997. Our sample period is after the adoption of these rules. However, these rules restrict short-selling activities only prior to SEOs. These rules do not restrict institutional selling activities in general. Most institutional investors in our sample cannot or do not engage in short-selling activities. Therefore, we do not expect the trading behavior of our sample institutions to be significantly affected by these rules.

Using quarterly institutional holdings data, Gibson, Safieddine, and Sonti (2004) show that SEO firms experiencing the greatest increase in institutional investment around the offer date significantly outperform those experiencing the greatest decrease. They interpret their results as evidence that institutions are able to identify above-average SEO firms and increase holdings in these potential outperformers. While our long-term post-SEO stock return results are broadly consistent with that of Gibson, Safieddine, and Sonti (2004), ours is the first paper to separately study institutional SEO share allocations, pre-offer institutional trading, and post-offer institutional trading. We are in a unique position to study these aspects of SEOs, given that we use institutional trading data instead of quarterly holdings data. For example, using quarterly holdings data one cannot distinguish whether changes in institutional holdings arise from pre-offer trading, SEO share allocation, or post-offer trading, which is crucial in identifying the precise role of institutional investors in SEOs. This is also the first paper to study the realized profitability of institutional trading in SEO firms, which also cannot be studied in the absence of the actual transaction prices at which institutions traded and the trading commissions and taxes and fees paid on each transaction. Finally, ours is also the first paper to study how pre-offer institutional net buying and institutional SEO share allocations are related to the SEO discount, highlighting the important role played by institutional investors in the SEO process.

3. Theory and hypotheses

In this section, we summarize the theoretical literature relating to the role of institutional investors with private information in SEOs, discuss in detail the manipulative trading and information production roles of institutional investors, and develop testable hypotheses for our empirical analysis. Gerard and Nanda (1993) develop a model of trading around SEOs in which informed investors, acting strategically, attempt to manipulate stock prices prior to SEOs. In a setting broadly similar to Kyle (1985), they conjecture that these informed investors could sell shares in the SEO firm prior to the equity offering, even when they have favorable private information, thus driving down the SEO offer price. They then profit by obtaining SEO share allocations at this reduced offer price and selling these allocations subsequent to the offering. In other words, in the Gerard and Nanda (1993) manipulation equilibrium, informed institutional investors with favorable private information trade in a direction opposite to their private information: they sell shares in the pre-SEO market even when they have favorable private information about the firm, to conceal this private information.[10] Such a trading strategy is profitable if institutional investors can recoup their pre-SEO trading losses by obtaining (and subsequently selling) share allocations in these SEOs at a reduced offer price. In the above setting, the SEO discount is a way of compensating uninformed (retail) investors for the adverse selection (winner's curse) they face in the SEO allocation process [similar to the winner's curse faced by uninformed investors in the Rock (1986) IPO model]. From now onward, we refer to institutional investor behavior in SEOs along the lines conjectured in the manipulation equilibrium as the manipulative trading hypothesis.

In contrast to the manipulative trading hypothesis, Chemmanur and Jiao (2005) argue that institutional investors engage in costly information production about firms making SEOs, request allocations in SEOs about which they obtain favorable private information, and buy shares in these firms before and after the offering. Thus, informed investors in Chemmanur and Jiao (2005) trade in the same direction as their long-lived private information both before and after the SEO. Because the private information held by institutional investors is reflected only partially in the pre-SEO secondary market price in this setting, issuing firms are able to make only a noisy inference about the realization of institutional investors' private information. Issuers choose the SEO discount in equilibrium, balancing the desire to maximize SEO proceeds against the need to minimize the risk of SEO failure and at the same time ensuring that institutional investors have an adequate incentive to produce information about the firm. From now onward, we refer to institutional investor behavior in SEOs along the lines conjectured by Chemmanur and Jiao (2005) as the information production hypothesis.

We now develop specific testable hypotheses for our empirical analysis. While some of our hypotheses are related to the above theories, it is not our objective in this paper to directly test these theories. Our first hypothesis relates to whether or not institutions have private information as conjectured by the theoretical literature and the consequences of this private information on their SEO share allocation. If institutions have private information, they are able to identify and obtain allocations in SEOs with better long-term performance (H1).

Our second set of hypotheses deals with how institutions make use of their private information, if any, to trade in the equity of SEO firms. The manipulative trading hypothesis predicts that those institutions selling more of the equity in an SEO firm prior to the offering demand and obtain larger share allocations in that SEO (H2A). In contrast, the information production hypothesis predicts that institutions buying more of the equity of an SEO firm prior to the offering demand larger share allocations in that SEO (H2B). The information production hypothesis also has predictions for the relation between institutional pre-offer trading, share allocations, and institutional post-offer trading. This hypothesis predicts that institutions not only demand larger share allocations in those SEOs about which they have favorable private information, but also use this private information to buy more shares in these firms both before and after the SEO. This implies that, post-SEO, institutions buy more shares in those SEOs in

[10] While Gerard and Nanda (1993) focus on this manipulative trading equilibrium and develop empirical implications related to it, they also explore other equilibria in which institutional investors do not necessarily engage in manipulative trading. However, the hypotheses we test in this paper relate only to the manipulation equilibrium in their paper.

which they obtained larger share allocations and bought more shares pre-SEO (H3B). In contrast, the manipulative trading hypothesis predicts a negative or no relation between the SEO share allocation obtained by an institution and its post-offer net buying in that SEO (H3A).

Our third set of hypotheses deals with the pattern and profitability of post-SEO selling of institutions' share allocations. If institutions' demand for share allocations in SEOs is driven by a desire for short-term profits (in the spirit of the manipulative trading hypothesis), then one would expect a significant amount of flipping by institutional investors, especially in light of the well-documented long-term underperformance of SEOs (H4A). However, if institutions are longer-term investors, or face costs associated with flipping their share allocations imposed by underwriters, one would expect institutions to sell their allocations only over a longer period of time (H4B). Further, if institutions were to flip their entire SEO allocations at the close of the first day of post-SEO trading, the return they would realize would be equal to the extent of underpricing (initial return) of SEOs. Therefore, a comparison of the realized profitability of institutional SEO share allocation sales with SEO underpricing would reveal the magnitude of the opportunity cost incurred by institutions, if any, by not flipping immediately after the SEO (H5).

Our fourth set of hypotheses deals with the profitability of post-SEO trading by institutions (i.e., purely from buying and selling shares in the secondary market post-SEO). If institutions have long-lived private information about SEOs, they are able to outperform a naive buy-and-hold strategy across SEOs (H6). Further, the information production hypothesis postulates that it is more efficient for institutions to produce information around the SEO and continue to exploit this information in post-SEO trading. This implies that the profitability of post-SEO trading by institutions in SEOs in which they obtained allocations would be higher than in SEOs in which they did not obtain allocations (H7).

Our final set of hypotheses deals with the effect of institutional investors' private information on the SEO discount. Both the manipulative trading and the information production hypotheses predict a negative relation between institutional pre-offer trading and the SEO discount (H8), though for different reasons. Under the manipulative trading hypothesis, this negative relation arises from the fact that SEOs in which informed institutional investors engage in a larger amount of manipulative selling pre-SEO are characterized by greater adverse selection faced by uninformed investors, who need to be compensated through a greater SEO discount. Under the information production hypothesis, this negative relation arises from the fact that a larger amount of pre-offer buying in an SEO by institutional investors indicates to the issuing firm that they have more favorable private information about that SEO, thereby reducing the risk of SEO failure, so that the issuing firm needs to offer only a smaller SEO discount. Under the manipulative trading hypothesis, when institutions engage in a larger amount of manipulative pre-offer selling of shares in an SEO, they need to obtain larger share allocations in that SEO to cover any losses incurred in the pre-offer trading. This further implies that, the greater the institutional share allocation in an SEO, the larger the SEO discount (H9A), because uninformed investors need to be compensated for the greater adverse selection in this case. In contrast, under the information production hypothesis, the more favorable the private information of institutional investors about an SEO, the larger the allocations they request and obtain in that SEO. Because more favorable institutional private information also reduces the risk of SEO failure, SEOs with larger institutional share allocations would be characterized by smaller SEO discounts under the information production hypothesis (H9B).

Many of the hypotheses are clearly driven by institutional investors having the ability to produce information about firms making SEOs and therefore potentially having an informational advantage over retail investors. The type of private information that institutional investors could possess might deal with the future prospects of the firm conducting the SEO; e.g., regarding the efficacy of the firm's products or the competitive position of the firm in the marketplace. There are two categories of institutional investors in our sample, namely, mutual funds and plan sponsors, and the ability to produce information could differ across these two categories of institutions. For example, mutual funds are more likely to employ in-house analysts compared with plan sponsors and could therefore enjoy some advantages in information production over plan sponsors. If this is the case, we would expect to see somewhat stronger results for mutual funds relative to plan sponsors under the information production hypothesis. However, mutual funds could be more active traders compared with plan sponsors, which could result in a higher propensity to engage in manipulative trading. Further, by being more active traders (turning over their portfolios significantly more than plan sponsors), mutual funds could generate more commission revenue for brokerage houses and underwriting firms, creating an incentive for them to provide larger allocations and better information to mutual funds, instead of plan sponsors. For all of the above reasons, we present our empirical tests of various hypotheses not only for our aggregate institutional trading sample, but also for trading by mutual funds and plan sponsors separately.

Our sample period (1999–2005) covers both the time period before and after the Regulation Fair Disclosure (Reg-FD), which requires that all material information be communicated to all investors at the same time. The regulation came into effect on October 23, 2000. The Securities and Exchange Commission's stated objective in issuing the rule was to eliminate the practice of selective disclosure of information to analysts and institutional investors. Reg-FD therefore has two implications for our analysis. First, if institutional investors' informational advantage over retail investors arises even partially from privileged access to information provided by firm managers (either directly or indirectly through analysts), we would expect this information advantage to be lower in the post-Reg-FD period. Second, if mutual funds are more likely to employ in-house analysts compared with plan sponsors, the relative information advantage of mutual

Table 1
Summary statistics of institution sample.

This table presents summary statistics of the 786 sample institutions from January 1999 to December 2005. Sample mean, median, and total are presented. Annualized shares and principal traded are computed based on all US domestic equity traded from January 1999 to December 2005. Annualized commission expense and annualized taxes and fees expense are the trading commission, and taxes and fees paid associated with the equity traded, respectively. Percentage of trading in seasoned equity offerings (SEOs) equals the trading principal by sample institutions in each SEO firm divided by the total dollar trading volume of that firm reported in the Center for Research in Security Prices during the period from three months before SEO to one year post-SEO. *P*-values for the Mann-Whitney test with the null hypothesis that the two groups of mutual funds and plan sponsors are independently and identically distributed are reported in the last column. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	Total	Mutual funds	Plan sponsors	Mann-Whitney test (*P*-value)
Number of institutions	786	183	603	
Annualized shares traded (millions)				
Mean	239.449	738.343	88.043	
Median	21.739	192.829	13.111	(0.000)***
Total	188,207	135,117	53,090	
Annualized principal traded (millions of dollars)				
Mean	7,107.501	22,196.891	2,528.134	
Median	629.090	4,966.994	394.201	(0.000)***
Total	5,586,496	4,062,031	1,524,465	
Annualized commission expense (millions of dollars)				
Mean	8.326	26.640	2.768	
Median	0.711	6.385	0.441	(0.000)***
Total	6,544	4,875	1,669	
Annualized taxes and fees expense (millions of dollars)				
Mean	0.937	0.601	1.039	
Median	0.000	0.000	0.001	(0.000)***
Total	736.339	109.896	626.443	
Percentage of trading in SEOs				
Mean	11.921	9.425	2.496	
Median	10.175	7.901	2.130	(0.001)***

funds over plan sponsors would also be lower in the post-Reg-FD period.[11] Given this, we include dummy variables in our empirical analysis that allow us to study the impact of Reg-FD on the informational advantage enjoyed by institutional investors.[12]

4. Data and summary statistics

In this section, we describe our data and sample selection procedures, and we present summary statistics of our data. Section 4.1 describes our institutional trading data and presents summary statistics. Section 4.2 describes our SEO sample and presents summary statistics. Section 4.3 explains how we identify institutional SEO share allocations in our institutional trading data and describes our algorithm for identifying institutional SEO allocation sales in post-SEO institutional trading.

4.1. Institutional trading data

We obtain transaction-level institutional trading data from the Abel/Noser Corporation, a leading execution quality measurement service provider for institutional investors. The data are similar to those used by several microstructure studies on institutional trading costs, for example, Conrad, Johnson, and Wahal (2001), Goldstein, Irvine, Kandel, and Wiener (2008), Jones and Lipson (2001), and Keim and Madhavan (1995). This is the first paper to use institutional trading data to study institutional investors' trading behavior in SEOs.

The data cover equity trading transactions by a large sample of institutions from January 1999 to December 2005. For each transaction, the data include gathered are the date of the transaction, the stock traded (identified by both symbols and CUSIPs), the number of shares traded, the dollar principal traded, commissions and taxes and fees paid by the institution, and whether the transaction is a buy or a sell by the institution. The data are provided to us under the condition that the names of all institutions are removed. However, identification codes are provided enabling us to separately identify all institutions. Sample institutions are either investment managers or plan sponsors. Investment managers are mutual fund families such as Fidelity Investments, Putnam Investments, and Lazard Asset Management. Examples of plan sponsors include the California Public Employees' Retirement System (CalPERS), the Commonwealth of Virginia, and United Airlines. Going forward, we call these two classes of institutions, respectively, "mutual funds" and "plan sponsors".

Summary statistics of institutional trading sample are presented in Table 1. The total annualized shares traded

[11] The Securities Industry Association (SIA) comment letter to the SEC states its belief "that these communications help get information into the marketplace, whereas the proposal will discourage issuers from exchanging ideas or information with analysts, as well as deter analysts from vigorously competing to glean useful information for their clients and the markets". See http://www.sia.com/.

[12] We thank the referee for bringing this important point to our attention. The post-Reg-FD period (from October 23, 2000 onward) mostly overlaps with the post-Internet-bubble period (from 2001 onward). In other words, there is only a two-month difference between the two periods. Because on an annual basis the post-Reg-FD and post-Internet-bubble periods coincide, in our empirical analysis we use a single dummy variable for both periods and refer to it, for expositional simplicity, as the post-bubble dummy. Separately, we have redone our analysis using the precise post-Reg-FD period, and the results are similar.

are 188 billion and the total annualized principal traded is $5.6 trillion. Table 1 also reports the commission and taxes and fees expenses associated with the institutional trading. Together, trading commission and taxes and fees expenses account for 13 basis points of institutional trading principal. For sample SEO firms, our sample institutions collectively account for 11.9% of CRSP-reported total dollar trading volume during the period starting three months before the offer and ending one year following the offer.

The 786 sample institutions are further partitioned into mutual funds and plan sponsors. There are 183 mutual funds (families) and 603 plan sponsors. In our sample, mutual funds tend to be much larger and trade more than plan sponsors. The annualized dollar trading volume by the 183 mutual funds is $4.1 trillion, while the annualized dollar trading volume by the 603 plan sponsors is only $1.5 trillion. We separately examine these two classes of institutions for most of our empirical results to see whether systematic differences exist. In our multivariate analysis, institution size [*Ln*(*instsize*)] is the natural logarithm of the institution's estimated asset size, assuming an annual turnover rate of 100%.

4.2. SEO sample

The initial sample of SEOs between January 1999 and December 2004 is obtained from the Securities Data Company (SDC) new issues database. The sample focuses on firm-commitment underwritten SEOs of common shares to be listed on the NYSE, AMEX, and NASDAQ. Close-end funds, Real Estate Investment Trusts, unit offerings, rights offers, American Depository Receipts, depositary shares, beneficial interests, limited partnerships, spin-offs, and shelf offerings are excluded. Offerings without an underwriter, offerings using private placement, auctions, block trades, and accelerated bookbuilding methods are also excluded. Offers with an offer price under $5 are also excluded. Our SEO sample ends in December 2004 because our institutional trading data ends in December 2005 and we track institutional trading for up to one year after the offer.

As described in the SEO literature (see, e.g., Safieddine and Wilhelm, 1996; Altinkilic and Hansen, 2003), the offer dates reported in SDC often do not accurately reflect the actual trading dates on which the securities are offered to the market. For the initial SEO sample from SDC, we further search for each issue in Factiva, a comprehensive business news archive service. For 98% of the SEO sample from SDC we found news regarding the offer date from Factiva, out of which about 70% Factiva offer dates differ from SDC offer dates.[13] To accurately measure SEO discount and underpricing, we use the Factiva offer date whenever it differs from the SDC offer date.

In our business press news search from Factiva, besides the offer date, we search for the following issue-related information: the issue announcement date, offer price, and whether the issue is a shelf offer, a rights offer, a unit offer, or a spin-off. We primarily rely on the issue pricing news in Factiva for the offer price information, because SDC occasionally rounds the offer price to the second or third digit. We need a precise offer price to identify the allocation transactions as well as to calculate the exact SEO discount and underpricing. The news search from Factiva helped us to identify and exclude more shelf offerings, rights offerings, and unit offerings, which SDC failed to identify. We also exclude one SEO that had a merger rumor on the day of offering according to the Factiva news search. We match the sample of SEOs to the CRSP and Compustat databases and require that the stock be covered by CRSP database for at least one month before and after the offer date. This yields a sample of 1,109 SEOs by 969 firms, of which sample institutions engaged in the trading of all but one of the SEO firms' stocks during the trading period that we study.[14] Therefore, most of our empirical tests are based on the 1,108 SEOs by 968 firms, of which nine firms made three offerings during the six year period, 122 firms made two offerings, and 837 firms had only one seasoned offerings.

To summarize, the SEO data needed for our empirical analysis are constructed as follows. From SDC, we obtain information on the total shares offered, percentage of shares offered that are primary shares (*% Primary Shares*), total proceeds of the offer in the US market (*Proceeds*), whether the issuer is in a high-tech industry, and the lead underwriter. We construct a high-tech dummy (*Hitek*), which equals one if SDC identifies the issuer as being in a high-tech industry and zero otherwise. We construct an underwriter reputation dummy (*Repuhi*) based on the highest lead underwriters' reputation rank from Jay Ritter's website (Loughran and Ritter, 2004).[15] *Repuhi* equals one if the highest lead underwriters' or the bookrunner's reputation rank is 9.1 (the highest possible ranking score) and zero otherwise. From Factiva, we obtain information on the announcement date, the offer date, and the offer price. From CRSP and Compustat, we obtain daily stock prices and returns, shares outstanding, the primary exchange on which the stock is listed, the issuer's standard industrial classification (SIC) code, and the book value of equity and the book value of assets at the end of the fiscal year before the offering. SEO discount (*Discount*) is the natural logarithm of the ratio of the pre-offer day closing price to the offer price. SEO underpricing (*Underpricing*) is the natural logarithm of the ratio of the offer day closing price to the offer price. Market capitalization before the offering is calculated as the

[13] When the earliest press news story on the pricing of SEOs has a time stamp after the close of the market, the actual offer date is the next trading date. Hence, in such cases we assign the next trading date as the Factiva offer date. In most cases when the Factiva offer date differs from the SDC offer date, the Factiva offer date lags the SDC offer date by one trading day.

[14] The only stock that had an SEO but was not traded by sample institutions around the issue is an offer on February 20, 2003 by Resource Bankshares Corp, VA.

[15] The reputation rankings in Loughran and Ritter (2004) are loosely based on the Carter and Manaster (1990) and Carter, Dark, and Singh (1998) rankings, with an update for 1992–2004. Because our SEO sample period is from 1999 to 2004, we use the Loughran and Ritter (2004) reputation ranking score for the period 1992–2004.

closing price five trading days (one week) before the offering times the number of shares outstanding. Market capitalization after the offering is the market capitalization before the offering plus the offer proceeds from the primary shares sold. *Relative Offer Size* is the ratio of the offer proceeds to the market capitalization before the offering. In our multivariate analysis, the size variable (*Lnsize*) is the natural logarithm of the market capitalization after the offering. Market to book (*Mkbk*) is the ratio of the market value of assets to the book value of assets of the SEO firm at the immediate fiscal year-end before offering.

Panel A of Table 2 provides summary statistics of the 1,108 SEOs traded by sample institutions. The average market capitalization of issuers before the offering is \$1.636 billion, with the average offering proceeds equal to \$0.168 billion. High-tech industries account for 56.5% (626 out of 1,108) of the offerings, and 56% (620 out of 1,108) of the offerings use a high reputation lead underwriter. Sample SEOs have an average discount of 3% and an average underpricing of 3.5%. Panel A of Table 2 also provides the number of SEOs and SEO characteristics across sample years. As expected, the SEO activities are higher during the hot market years (279 SEOs in year 1999 and 258 SEOs in year 2000); for the post-bubble years between 2001 and 2004, there are about 140 SEOs per year. As for industry representation, 36 SEOs (by 30 unique firms) are from the utility industry (SIC code 4900 to 4999), 126 SEOs (by 110 unique firms) are from the financial industry (SIC code 6000 to 6999), and the remaining 946 SEOs (by 828 unique firms) are by industrial firms.

4.3. Identifying institutional SEO share allocations and allocation sales

Our institutional trading data provide detailed information about each transaction, including SEO share allocations. We identify institutional SEO share allocations in our database by requiring that transactions meet the following five criteria: (1) it is a buy side transaction; (2) the shares are bought exactly at the offer price;[16] (3) the shares are bought on the day of the offering (or the day before when that is the SDC-reported offer date);[17] (4) the commission paid on the transaction is equal to zero;[18] and (5) the transaction size is least one thousand shares or \$10,000.[19] While these criteria might not capture institutional SEO share allocations with 100% precision, it seems reasonable to identify these transactions as share allocations.[20] This is the first paper in the literature to systematically study institutional SEO share allocations. Panel A of Table 2 also reports the percentage of the total shares allocated to sample institutions. Overall, our sample institutions were allocated 10.7% of SEO offering proceeds. This is comparable to the trading activity in SEOs by sample institutions as reported in Table 1 (mean 11.9% and median 10.2%).

Having identified institutional SEO share allocations, we further identify allocation sales from institutional post-SEO trading. For sample institutions with continuous trading data for at least one year following the offer, we track those institutions' post-SEO trading and identify their SEO share allocation sales. This allows us to analyze the pattern and profitability of institutional share allocation sales and separately examine "pure" post-SEO institutional trading excluding allocation sales. Simply put, our algorithm to capture flipping is basically a LIFO (last in first out) process. At any point of time, when shares sold exceed shares bought post-SEO until that time, these shares sold are classified as SEO allocation sales. Fig. 1 shows two simple numerical examples of our algorithm. Our algorithm is conservative in nature in that shares bought in the secondary market post-SEO are used to offset shares sold post-SEO first, so that only shares sold in excess of shares bought until that time post-SEO are considered SEO allocation sales. This is consistent with the rules used by the Depository Trust Company (DTC) to identify IPO allocation sales in its IPO Tracking System (see, e.g., Aggarwal, 2003).

5. Empirical tests and results

In this section we discuss the empirical methodology used to test our hypotheses and report our results. Section 5.1 presents the results of our empirical tests regarding

[16] A concern that could arise is that price stabilization transactions, which usually take the form of short covering, may confound our identification of SEO allocations to institutional investors here. Such a concern can be laid to rest by noting the following. First and most important, price stabilization transactions are conducted by sell-side underwriters, whereas our trading data include only transactions done by buy-side institutional investors. Second, though many price stabilization short covering transactions are done at prices close to the offer price, only 16% of such trades are done at exactly the offer price (see Boehmer and Fishe, 2002). Finally, while we identify SEO allocations from transactions made on the SEO offering day (which could be one day before or on the first trading day), price stabilization by underwriters is done on or after the first trading day post-SEO.

[17] When the Factiva offer date is the trading day immediately after the SDC-reported offer date (because the earliest pricing news of the issue was time stamped after the market close on the SDC-reported offer date), the SEO share allocations identified are often on the SDC-reported offer date instead of the Factiva offer date. It seems to be the case that, (*footnote continued*) when the SEO pricing and offer news is released after the market close, the SEO share allocation transactions often take place on the same calendar day, not one day later. For these SEOs, we still see a sharp increase in the CRSP-reported trading volume on the Factiva offer date, a pattern shown as an empirical regularity after the offer (see, e.g., Safieddine and Wilhelm, 1996, and Altinkilic and Hansen, 2003).

[18] Unlike regular institutional brokerage transactions, institutional SEO allocation transactions typically incur zero brokerage commission.

[19] Discussions with practitioners led us to believe that SEO allocation transactions to institutional investors tend to be large. Criterion (5) filters out $<1\%$ of potential allocation transactions [those transactions identified by criteria (1)–(4)] and only $<0.01\%$ of potential allocations in terms of share volume.

[20] An examination of institutional trading patterns in sample SEO firms shows that, on days when institutional SEO share allocations are identified, 93% of the total transactions are on the buy side and 73% of these buy side transactions are identified as allocations. On regular trading days, buy side transactions account for 60% of the total number of daily transactions. The average transaction size of share allocations is about 3.6 times that of regular secondary market transactions.

Table 2
Summary statistics of institutional share allocation and offer characteristics.

This table presents summary statistics of sample seasoned equity offerings (SEOs) on an annual basis in Panel A and tests the differences in offer characteristics across SEOs with above and below median institutional share allocations in Panel B. The sample includes 1,108 firm-commitment underwritten seasoned equity offerings issued from January 1999 to December 2004 that are traded by sample institutions and present in the Center for Research in Security Prices at the time of offering. Close-end funds, Real Estate Investment Trusts, unit offerings, rights offers, American Depository Receipts, depositary shares, beneficial interests, limited partnerships, spin-offs, shelf offerings, and offers with an offer price under $5 are excluded. Offers without using an underwriter, offerings using block trade, private placement, auction, and accelerated building techniques are also excluded. Market cap before offer is the market capitalization of the issuing firm's equity, calculated as the closing price one week before the offering times the number of shares outstanding on that day. Offer proceeds equals offer price times total shares offered. Relative offer size equals the offer proceeds divided by the market cap before offer. Percentage of primary shares offered equals the total number of primary shares offered divided by the total number of shares offered. Fraction of offers by hitech firms equals the number of SEOs offered by Hitech firms divided by the total number of SEOs. Hitech firms are identified by the Securities Data Company hitech industry classification. High reputation underwriters are those with the highest lead underwriters' (or bookrunner's) reputation score equal to 9.1 (the highest possible rank score). The underwriters' rank score is from Jay Ritter's website (Loughran and Ritter, 2004), which is loosely based on Carter and Manaster (1990) and Carter, Dark, and Singh (1998) rankings. Discount is the natural logarithm of the ratio of the pre-offer day closing price to the offer price. Underpricing is the natural logarithm of the ratio of the offer day closing price to the offer price. Raw buy-and-hold return one year post-offer is the post-offer market capitalization weighted one year raw buy-and-hold return. Abnormal return one year post-offer equals the raw buy-and-hold return one year post-offer minus the return on the Fama and French 5×5 size and book-to-market matched portfolio. Percentage of allocation to all institutions equals the total dollar value of shares allocated to all sample institutions divided by the total dollar value of shares offered in the US market. In Panel B, *t*-tests for equality of means assuming unequal variances are conducted for the two groups of SEOs split by the median percentage of the offering allocated to the sample institutions, in which the institutional share allocation to the entire sample institutions, as well as to the mutual fund and plan sponsor subsamples, are examined. *P*-values for *t*-tests are reported in parentheses. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level. Because 30 SEO firms cannot be assigned to a Fama and French 5×5 size and book-to-market matched portfolio, we have abnormal returns for only 1,078 sample SEOs. The last row in Panel B reports the number of abnormal returns in each of the SEO group for the *t*-test.

	Total	1999	2000	2001	2002	2003	2004
Panel A. Summary statistics across sample years							
Number of SEOs	1108	279	258	144	146	138	143
Market cap before offer (millions of dollars)	1636.4	1795.2	2647.6	1215.2	1299.4	1152.4	737.0
Offer proceeds (millions of dollars)	168.9	179.2	225.1	147.0	134.0	141.2	131.4
Relative offer size	0.195	0.192	0.145	0.194	0.191	0.206	0.284
Percentage of primary shares offered	0.680	0.692	0.749	0.688	0.687	0.647	0.546
Fraction of offers by hitech firms	0.565	0.677	0.818	0.493	0.342	0.377	0.371
Fraction of offer by high reputation underwriters	0.560	0.563	0.562	0.604	0.596	0.529	0.497
Discount	2.97%	2.81%	3.31%	3.07%	2.71%	2.93%	2.87%
Underpricing	3.50%	3.15%	3.57%	4.90%	3.36%	3.53%	2.77%
Percentage of allocation to sample institutions	10.678	14.226	10.169	7.301	10.989	7.779	9.302

	Whole sample			Mutual funds			Plan sponsors		
	Above median	Below median	Test of difference (*P*-value)	Above median	Below median	Test of difference (*P*-value)	Above median	Below median	Test of difference (*P*-value)
Panel B. Offering characteristics comparison of SEO samples split by median institutional share allocation									
Number of SEOs	554	554		538	570		554	554	
Percentage of allocation to sample institutions	18.86	0.29		16.57	0.21		2.29	0.08	
Market cap before offer (millions of dollars)	1922.8	1349.9	(0.013)**	2080.1	1217.5	(0.000)**	1885.7	1387.0	(0.031)**
Offer proceeds (millions of dollars)	188.9	148.8	(0.012)**	204.0	135.7	(0.000)***	187.8	149.9	(0.017)**
Relative offer size	0.185	0.205	(0.148)	0.188	0.202	(0.292)	0.186	0.204	(0.174)
Percentage of primary shares offered	0.655	0.704	(0.033)**	0.642	0.715	(0.001)***	0.656	0.704	(0.036)**
Fraction of offers by hitech firms	0.561	0.569	(0.809)	0.545	0.584	(0.184)	0.594	0.536	(0.053)
Fraction of offer by high reputation underwriters	0.662	0.457	(0.000)***	0.693	0.433	(0.000)***	0.650	0.469	(0.000)***
Discount	2.00%	4.00%	(0.000)***	2.00%	3.90%	(0.000)***	2.00%	4.00%	(0.000)***
Underpricing	2.40%	4.60%	(0.000)***	2.40%	4.50%	(0.000)***	2.40%	4.60%	(0.000)***
Raw buy-and-hold return one year post-offer	1.89%	−20.51%	(0.001)***	2.58%	−23.24%	(0.001)***	0.63%	−18.24%	(0.002)***
Abnormal return one year post-offer	3.88%	−17.66%	(0.001)***	5.65%	−22.05%	(0.001)***	3.12%	−16.01%	(0.001)***
Number of abnormal return one year post-offer	537	541		522	556		535	543	

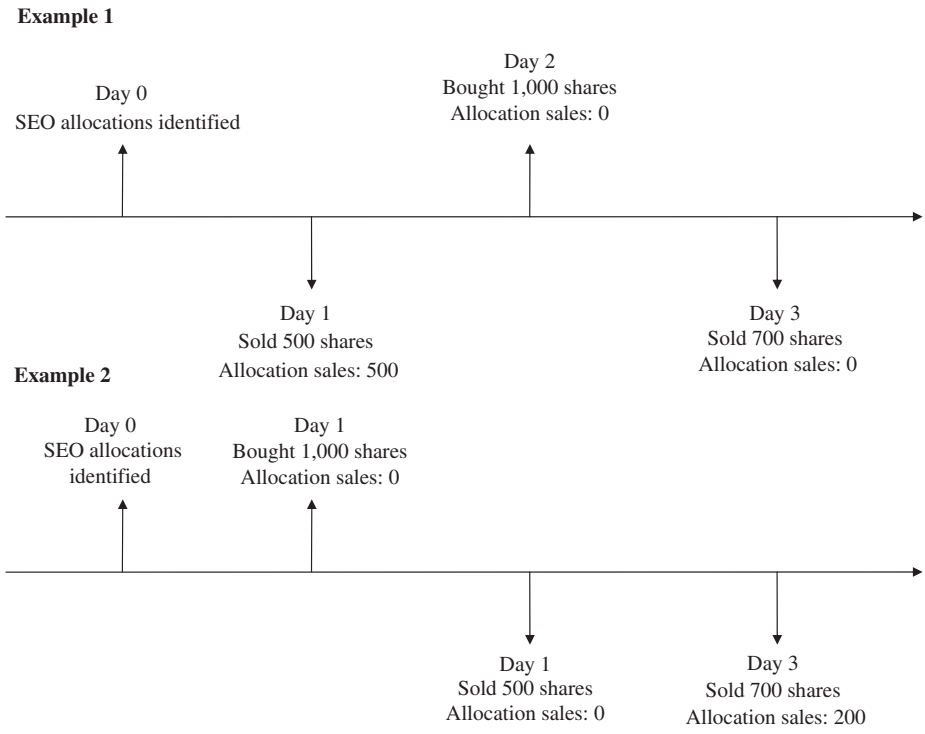

Fig. 1. Numerical examples of algorithm for identifying institutional seasoned equity offering (SEO) allocation sales.

the relation between institutional SEO share allocation and SEO long-term performance. In Section 5.2, we study how institutions trade before and after the SEO and the profitability of such trading. In Section 5.3, we study the relation between pre-offer institutional trading, institutional SEO share allocations, and the SEO discount.

5.1. Institutional SEO share allocation and post-SEO long-term performance

In this subsection, we empirically examine the characteristics of institutional SEO share allocations. In particular, we attempt to study whether institutional investors possess private information about SEOs and whether they are able to identify and obtain more allocations in better SEOs.

Panel B of Table 2 presents the relation between institutional SEO share allocation and SEO offer characteristics. For the 1,108 SEOs traded by sample institutions, we split the sample into two groups by the median percentage of the offer allocated to sample institutions. Our univariate results suggest that SEOs with higher institutional share allocations tend to be larger, in terms of both pre-SEO market capitalization ($1.9 billion versus $1.3 billion) and offer proceeds ($189 million versus $149 million). SEOs with higher institutional share allocations are also more likely to be underwritten by high reputation underwriters. Previous studies show that institutional investors tend to get more allocations in more underpriced IPOs (see, e.g., Aggarwal, Prabhala, and Puri, 2002). In contrast, our results in Table 2 indicate that SEOs with higher institutional share allocations tend to have lower discount and underpricing.

SEOs with above median institutional share allocations on average exhibit positive one-year post-SEO raw buy-and-hold returns and positive abnormal returns, while SEOs with below median institutional share allocations on average exhibit negative one-year post-SEO raw buy-and-hold returns and negative abnormal returns. The abnormal return is the one-year post-SEO buy-and-hold return minus the return on the 25 Fama and French size and book-to-market benchmark portfolio.[21] The long-term post-SEO return differences between the SEOs with above median and below median institutional share allocations are highly significant, both statistically and economically. For instance, for the whole sample, SEOs with above median institutional share allocations outperform SEOs with below median institutional share allocations by 22.1% in terms of one-year post-SEO raw buy-and-hold return. When we split our sample into mutual funds and plan sponsors, the results are qualitatively similar to the results for the whole sample.

To further investigate whether institutional investors have private information about SEOs and thus are able to identify and obtain more allocations in better SEOs, we conduct the following multivariate ordinary least squares (OLS) regression on the relation between post-SEO

[21] Because a few firms that had an SEO do not have a non-missing and positive book value of equity around the time of the offer, they are not assigned with a matched portfolio, thus their abnormal return is missing. Therefore, the number of observations for the abnormal returns is slightly different from the sample observations.

long-term performance and institutional share allocations, controlling for various variables capturing publicly available information about the SEO:

$$\begin{aligned}\textit{Post-SEO Return} &= \alpha + \beta_1 Ln(Pctallo) + \beta_2 Repuhi + \beta_3 Hitek \\ &\quad + \beta_4 Lnsize + \beta_5 Mkbk + \beta_6(\%Primary\ Shares) \\ &\quad + \beta_7 Relative\ Offer\ Size + \beta_8 Utility + \beta_9 Financial \\ &\quad + \beta_{10} Discount + \beta_{11} Underpricing + \beta_{12} Ln(Pctallo) \\ &\quad * Postbubble + Year\ Fixed\ Effects + \varepsilon, \end{aligned} \quad (1)$$

where *Post-SEO Return* is the one-year raw buy-and-hold return or abnormal return. *Ln*(*pctallo*) is the natural logarithm of the percentage of shares allocated to sample institutions. *Repuhi*, *Hitek*, *Lnsize*, *Mkbk*, *% Primary Shares*, *Relative Offer Size*, *Underpricing*, *and Discount* are defined as in the data section. *Utility* and *Financial* are two industry dummies that are equal to one if the SEO firm is a utility (SIC code 4900–4999) or a financial (SIC code 6000–6999) firm, respectively, and are equal to zero otherwise. We also include year dummies to account for the overall market condition that could affect the security offering market and stock return performance. We further include an interaction variable *Ln*(*pctallo*)∗*Postbubble* to examine whether the relation we study between institutional share allocation and post-SEO long-term stock returns is robust in both the bubble and post-bubble period. *Postbubble* is a dummy variable that equals to one for SEOs made in years 2001–2004 and zero otherwise.

Table 3 presents the regression results in three specifications, for both the raw buy-and-hold return and the abnormal return. The first specification can be thought of as a base model that illustrates the relation between institutional share allocation [*Ln*(*pctallo*)] in the offering and the post-SEO long-term stock return performance of the firm making an SEO, controlling for the underwriter reputation, whether the firm is in the hitech sector, and firm size. The second specification includes additional control variables that could have an influence on the SEO firm's long-term stock performance, such as the market-to-book ratio, percentage of primary share offered, relative offer size, and whether the firm belongs to the utility or the financial industry. These are all publicly available information at the time of offering. None of those control variables turns out to be a significant factor that relates to an SEO firm's long-term stock return, as shown in the second regression specification in Table 3. Also included as control variables are the SEO discount and underpricing. These two variables can be thought of as the new information released during the offer from the issuer (via the setting of the SEO discount) and from the market participants (via the magnitude of the SEO underpricing). The coefficients on both the *Discount* and *Underpricing* are negative, meaning the higher the SEO discount or the higher the SEO underpricing, the lower the SEO long-term stock return performance. However, neither coefficient is statistically significant. Because 15 SEO firms did not have the information regarding their book value of assets from Compustat at the time of the offering, their market-to-book ratio is thus missing. Hence, we have only 1,093 SEOs for the second regression specification. Even though none of the control variables is shown to be significantly related to the long-term stock return performance of SEO firms, the coefficients on the institutional share allocation variable [*Ln*(*pctallo*)] are positive and statistically significant across the three specifications for both raw and abnormal returns. This means the higher the institutional share allocations in an SEO, the better the post-SEO stock return performance, both in raw and abnormal terms. The results are both economically and statistically significant. For example, in the second regression specification in Panel A, a one standard deviation increase in the institutional share allocation variable [*Ln*(*pctallo*)] translates into a 7.2% (7.6%) increase in the one-year post-SEO raw buy-and-hold return (abnormal return). In the third specification, we further add the interaction variable *Ln*(*pctallo*)∗*Postbubble* to examine whether the positive relation between institutional share allocation and post-SEO long-term stock returns is robust in both the bubble and post-bubble period. The coefficient for this interaction variable is negative, but not statistically significant for both the raw return and the abnormal return for the whole sample (Panel A), suggesting that the positive relation between institutional share allocation and post-SEO long-term stock returns in general holds throughout the sample period in both the bubble years and the post-bubble years. The relation is weaker in post-bubble years. The post-bubble years mostly overlap with the post-Reg-FD period, which could explain the weakened informational advantage of institutional investors.

Both our univariate and multivariate results lend support to the hypothesis that institutional investors possess private information about SEOs and that they are able to identify and obtain more allocations in SEOs with better long-term performance (H1).[22] Boehmer, Boehmer, and Fishe (2006) find similar results in the IPO context. They find that institutional investors obtain more allocations in IPOs with better long-term performance. Gibson, Safieddine, and Sonti (2004) show that SEOs experiencing the greatest increase in institutional investment between the quarter before the offering and the quarter after the offering outperformed their benchmark portfolios in the year following the issue by a significant margin relative to those experiencing the greatest decrease in institutional investment. However, their study is not able to distinguish between institutional secondary market trading and institutional share allocations. To the best of our knowledge, this is the first paper to study the informativeness of institutional share allocations in SEOs.

[22] A more direct test for this hypothesis is to use the institutional SEO share request information instead of their actual share allocations. We do not have the institutional SEO share request information. However, their actual share allocation should be highly correlated with their allocation request. We believe their actual share allocation is a good proxy for their allocation request. In the multivariate regression analysis, controlling for SEO discount and underpricing also helps to control for the possible discrepancy between institutional SEO share request and actual share allocation across SEOs.

Table 3
Institutional share allocation and seasoned equity offering (SEO) long-term performance, multivariate analysis.

This table presents an ordinary least squares regression analysis of the relation between SEO long-term performance and institutional share allocations. The unit of observation is an SEO. The dependent variables are post-SEO one year raw buy-and-hold return (Columns 1, 2, and 3) and post-SEO one year abnormal returns benchmarked by Fama and French 5×5 size and book-to-market matched portfolios (Columns 4, 5, and 6). *Ln*(*pctallo*) is the natural logarithm of the percentage of shares offered allocated to sample institutions. *Repuhi* is a dummy variable for underwriter reputation. *Repuhi* equals one for high reputation underwriters (highest lead underwriters' or bookrunner's rank is 9.1) and zero otherwise. The underwriters' rank is from Jay Ritter's website (Loughran and Ritter, 2004), which is loosely based on Carter and Manaster (1990) and Carter, Dark, and Singh (1998) rankings. *Hitek* is a dummy variable that equals one for issuers in a hitech industry and zero otherwise, as identified by Securities Data Company. *Lnsize* is the natural logarithm of the SEO firms' market capitalization of equity after the offering (as measured by the market capitalization of the SEO firm one week before the offer plus the offering proceeds). *Mkbk* is the SEO firms' market-to-book ratio of assets at the fiscal year-end immediately before the offering. *% Primary Shares Offered* equals the total number of primary shares offered divided by the total number of shares offered. *Relative Offer Size* equals the *Offer Proceeds* divided by the *Market Cap before Offer*. *Utility* is a dummy variable that equals one for utility firms [standard industrial classification (SIC) code 4900–4999] and zero otherwise. *Financial* is a dummy variable that equals one for financial firms (SIC code 6000–6999) and zero otherwise. *Discount* is the natural logarithm of the ratio of the pre-offer day closing price to the offer price. *Underpricing* is the natural logarithm of the ratio of the offer day closing price to the offer price. For the interaction variable *Ln*(*pctallo*)$*$*Postbubble*, *Postbubble* is a dummy variable that equals one for the SEOs issued during the post-bubble years of 2001–2004 and zero for years 1999 and 2000. All the regressions include year fixed effects. Panel A reports the results for the full sample of institutional share allocations. Panel B and Panel C report the results for the allocations of mutual funds and plan sponsors, respectively. *P*-values are in parentheses. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	Raw buy-and-hold return			Abnormal return		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Whole sample						
Ln(*pctallo*)	0.024**	0.021*	0.038**	0.024**	0.022**	0.039**
	[0.021]	[0.064]	[0.014]	[0.023]	[0.050]	[0.012]
Repuhi	−0.065	−0.089	−0.086	−0.057	−0.079	−0.077
	[0.444]	[0.314]	[0.326]	[0.505]	[0.371]	[0.380]
Hitek	−0.067	−0.023	−0.028	−0.014	0.004	0.001
	[0.382]	[0.791]	[0.741]	[0.855]	[0.960]	[0.999]
Lnsize	−0.057	−0.056	−0.059	−0.029	−0.025	−0.028
	[0.124]	[0.174]	[0.152]	[0.432]	[0.541]	[0.503]
Mkbk		0.001	0.001		0.004	0.005
		[0.909]	[0.835]		[0.594]	[0.560]
% Primary Share Offered		0.031	0.029		0.061	0.06
		[0.760]	[0.777]		[0.549]	[0.560]
Relative Offer Size		0.151	0.148		0.153	0.149
		[0.375]	[0.385]		[0.364]	[0.374]
Utility		0.206	0.209		0.156	0.159
		[0.327]	[0.321]		[0.452]	[0.445]
Financial		0.032	0.028		−0.007	−0.010
		[0.795]	[0.820]		[0.955]	[0.935]
Discount		−1.328	−1.359		−0.822	−0.874
		[0.251]	[0.240]		[0.485]	[0.458]
Underpricing		−0.616	−0.628		−0.459	−0.472
		[0.283]	[0.273]		[0.423]	[0.409]
Ln(*pctallo*)$*$*Postbubble*			−0.033			−0.032
			[0.106]			[0.115]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.173***	1.152***	1.263***	0.623**	0.551*	0.655**
	[0.000]	[0.000]	[0.000]	[0.011]	[0.069]	[0.034]
Number of observations	1,108	1,093	1,093	1,078	1,064	1,064
Adjusted R^2	0.093	0.094	0.096	0.02	0.019	0.02
Panel B. Mutual funds						
Ln(*pctallo*)	0.030***	0.028**	0.049***	0.029***	0.029***	0.048***
	[0.004]	[0.011]	[0.001]	[0.005]	[0.009]	[0.002]
Repuhi	−0.076	−0.100	−0.101	−0.068	−0.090	−0.092
	[0.373]	[0.257]	[0.253]	[0.429]	[0.308]	[0.298]
Hitek	−0.062	−0.016	−0.02	−0.009	0.011	0.008
	[0.423]	[0.857]	[0.813]	[0.910]	[0.895]	[0.923]
Lnsize	−0.062*	−0.062	−0.066	−0.034	−0.031	−0.034
	[0.094]	[0.135]	[0.110]	[0.359]	[0.455]	[0.410]
Mkbk		0.001	0.002		0.005	0.005
		[0.866]	[0.782]		[0.556]	[0.515]
% Primary Share Offered		0.030	0.026		0.06	0.057
		[0.768]	[0.797]		[0.560]	[0.578]
Relative Offer Size		0.153	0.143		0.154	0.146
		[0.369]	[0.399]		[0.359]	[0.385]
Utility		0.209	0.206		0.158	0.156
		[0.321]	[0.326]		[0.446]	[0.452]
Financial		0.043	0.036		0.003	−0.002
		[0.727]	[0.766]		[0.978]	[0.989]

Table 3 (*continued*)

	Raw buy-and-hold return			Abnormal return		
	(1)	(2)	(3)	(4)	(5)	(6)
Discount		−1.232	−1.324		−0.754	−0.863
		[0.281]	[0.247]		[0.517]	[0.458]
Underpricing		−0.653	−0.713		−0.506	−0.564
		[0.249]	[0.209]		[0.372]	[0.319]
Ln(pctallo) * *Postbubble*			−0.040**			−0.038*
			[0.049]			[0.064]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.267***	1.251***	1.411***	0.713***	0.648**	0.792**
	[0.000]	[0.000]	[0.000]	[0.004]	[0.035]	[0.012]
Number of observations	1,108	1,093	1,093	1,078	1,064	1,064
Adjusted R^2	0.095	0.097	0.099	0.022	0.021	0.024
Panel C. Plan sponsors						
Ln(pctallo)	0.028**	0.022	0.045**	0.028**	0.024*	0.047**
	[0.037]	[0.119]	[0.024]	[0.038]	[0.094]	[0.017]
Repuhi	−0.058	−0.082	−0.078	−0.05	−0.072	−0.068
	[0.497]	[0.349]	[0.371]	[0.560]	[0.412]	[0.436]
Hitek	−0.071	−0.027	−0.032	−0.018	0.001	−0.004
	[0.358]	[0.758]	[0.711]	[0.817]	[0.998]	[0.961]
Lnsize	−0.053	−0.053	−0.054	−0.025	−0.021	−0.023
	[0.153]	[0.204]	[0.192]	[0.496]	[0.606]	[0.585]
Mkbk		0.001	0.001		0.004	0.004
		[0.940]	[0.876]		[0.618]	[0.590]
% Primary Share Offered		0.033	0.031		0.063	0.063
		[0.749]	[0.759]		[0.537]	[0.540]
Relative Offer Size		0.146	0.146		0.147	0.147
		[0.391]	[0.392]		[0.380]	[0.383]
Utility		0.206	0.21		0.156	0.160
		[0.328]	[0.319]		[0.452]	[0.441]
Financial		0.022	0.021		−0.017	−0.018
		[0.855]	[0.866]		[0.889]	[0.883]
Discount		−1.357	−1.38		−0.838	−0.885
		[0.245]	[0.237]		[0.480]	[0.456]
Underpricing		−0.663	−0.653		−0.505	−0.495
		[0.246]	[0.253]		[0.376]	[0.386]
Ln(pctallo) * *Postbubble*			−0.043			−0.045*
			[0.103]			[0.086]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.191***	1.160***	1.302***	0.643**	0.561*	0.708**
	[0.000]	[0.000]	[0.000]	[0.010]	[0.067]	[0.026]
Number of observations	1,108	1,093	1,093	1,078	1,064	1,064
Adjusted R^2	0.092	0.094	0.095	0.019	0.018	0.019

5.2. Institutional trading around SEOs and institutional trading profitability

In this subsection, we empirically examine the institutional trading pattern before and after SEOs and the corresponding trading profitability. In terms of empirical design, the unit of observation is an SEO-institution pair. For each SEO-institution pair, we aggregate the pre-offer net buy and post-offer net buy in different trading windows, and we examine whether institutions trade in the same direction as their private information in SEOs as predicted by the information production role of institutional investors or in the opposite direction as predicted by the manipulative trading role (Section 5.2.1). For the institutions that obtained allocations in SEOs, we further track their allocation sales over the one-year period following the SEO and examine whether they flip their allocations in the short period immediately after the offering. We also consider the cost or benefit of holding allocations for longer periods (Section 5.2.2). Finally, for each SEO-institution pair, we examine the trading profitability in the year post-SEO to study whether institutions are able to make use of their private information to profitably trade after the offering (Section 5.2.3).

5.2.1. Institutional pre-offer trading, institutional SEO share allocation, and institutional post-offer trading

Under the manipulative trading hypothesis, strategic institutional investors who demand and (expect to) obtain a larger share allocation in an SEO sell more of the equity in the SEO firm prior to the offering (H2A). In contrast, the information production hypothesis predicts that institutional investors who obtain favorable information about an SEO ask for more allocations in that firm and also buy more of the equity in that firm prior to the offering (H2B).

We examine institutional pre-offer net buying in each SEO during the five trading days (one week) immediately

Table 4
Institutional pre-offer trading and institutional share allocation, univariate analysis.

This table presents the summary statistics and univariate test results of institutional pre-offer trading and institutional share allocation. The unit of observation is a seasoned equity offering (SEO)-institution pair. The SEOs include all sample seasoned equity offerings issued from February 1999 to December 2004. Offerings by firms that had at least one other equity issuance within half year before or after are excluded. Institutional pre-offer trading is aggregated over a five trading-day window and a 21 trading-day window before the offering, with both trading windows ending one day before the offering. Institutional pre-offer trading is grouped into net buy, zero net buy, and net sell subgroups. *Alloshroff* is the institutional share allocation in shares scaled by total shares offered, in percentage unit. The difference in *Alloshroff* between the net buy and net sell subgroups is tested. Panel A reports the results for the full sample of SEO-institution pairs. Panel B and Panel C report the results for the subsamples of mutual funds and plan sponsors, respectively. *P*-values are based on two tailed t-tests for the difference in means, assuming unequal variances. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	Five trading days pre-offer		Twenty-one trading days pre-offer	
	Number of observations	*Alloshroff* (mean)	Number of observations	*Alloshroff* (mean)
Panel A. Full sample				
Net buy	3,683	0.624	7,627	0.421
Zero net buy	28,589	0.168	21,535	0.158
Net sell	2,240	0.327	5,350	0.228
Difference (buy–sell)		0.297***		0.193***
P-value		(0.000)		(0.000)
Panel B. Mutual funds				
Net buy	1,474	1.489	2,534	1.198
Zero net buy	5,537	0.682	3,679	0.676
Net sell	853	0.836	1,651	0.703
Difference (buy–sell)		0.653***		0.494***
P-value		(0.000)		(0.000)
Panel C. Plan sponsors				
Net buy	2,209	0.047	5,093	0.035
Zero net buy	23,052	0.044	17,856	0.051
Net sell	1,387	0.013	3,699	0.015
Difference (buy–sell)		0.033***		0.019***
P-value		(0.000)		(0.000)

before the offer and 21 trading days (one month) immediately before the offer. Normally, it takes about one month from the announcement of the SEO to the pricing of the offer and share allocation. Therefore, the 21 trading-day period approximately corresponds to the pre-SEO period when institutional investors learn about the upcoming SEO and have opportunities to get more information about the firm making the SEO through road shows, more news coverage in the media, conference calls with analysts and firm management, etc. We also present results of institutional pre-offer trading within the five trading days immediately before the offer, because if the purpose of manipulative trading is to depress the offer price and increase the issue discount as suggested by the manipulative trading hypothesis, the short period immediately before the offering would be more suitable for the manipulative trading window.

Table 4 presents univariate results on institutional pre-offer trading and institutional SEO share allocations. The univariate results show that SEO-institution pairs with positive pre-offer net buy positions are allocated significantly more shares than SEO-institution pairs with pre-offer net sell positions.[23] These results are inconsistent with H2A (manipulative trading) but consistent with H2B (information production). It is interesting that pre-offer net sellers do receive some SEO allocations, even though the quantity allocated is far less than the allocation received by net buyers. Underwriters could allocate some SEO shares even to net selling institutions because this is a multi-period game and they have long-term relations with these institutional clients. Perhaps more important, underwriters might not be able to (fully) observe the buying and selling behavior of institutional investors in the pre-offer secondary market.

Table 5 presents multivariate results on institutional pre-offer trading and institutional SEO share allocation, controlling for institution and SEO characteristics. We run different specifications of the following censored (Tobit) regression (SEO i and institution j):

$$\begin{aligned} Alloshroff_{i,j} = {} & \alpha + \beta_1 Pre-offer\ Net\ Buy_{i,j} + \beta_2 Mf_j \\ & + \beta_3 Ln(instsize)_j + \beta_4 Ln(offer\ size)_i + \beta_5 Repuhi_i \\ & + \beta_6 Hitek_i + \beta_7 Discount_i + \beta_8 Underpricing_i \\ & + \beta_9 Pre\text{-}offer\ Net\ Buy_{i,j} * Postbubble_i \\ & + Year\ Fixed\ Effects + \varepsilon_{i,j}, \end{aligned} \quad (2)$$

where $Alloshroff_{i,j}$ is the number of shares in the ith offering allocated to institution j normalized by the total number of shares offered in the ith SEO. *Pre-offer Net Buy*$_{i,j}$

[23] The pre-offer net selling here represents selling of shares previously owned by institutions, not short selling. Almost all institutions in our sample (mutual funds and plan sponsors) either cannot or do not engage in short selling. These transactions thus are not restricted by the SEC Rule 105 adopted in April 1997 to replace Rule 10b-21. In addition, Henry and Koski (2008) find that Rule 105 is not very restrictive.

(*footnote continued*)

is institution *j*'s total net buy in shares of the *i*th issuing firm during the pre-offer period scaled by the firm's shares outstanding, in percentages. *Mf*, *Ln*(*instsize*), *Repuhi*, *Hitek*, *Discount*, and *Underpricing* are as described in the data section. *Ln*(*offer size*) is the natural logarithm of the size of the offer (measured as the offering proceeds). We use White robust standard errors with clustering on SEOs.

The coefficients on *Pre-offer Net Buy* are consistently positive and statistically significant at the 1% level across different specifications in Table 5, both for the five pre-offer trading days window and for the 21 pre-offer trading days window. That is, the more shares an institutional investor buys before the offer, the more share allocations the institutional investor obtains. This result is inconsistent with the predictions of the manipulative trading hypothesis (H2A), but consistent with the predictions of the information production hypothesis (H2B).

For offer characteristics, the multivariate analysis shows that sample institutions obtain more allocations in SEOs underwritten by high reputation underwriters (first specification). In the second specification, we further control for SEO discount and underpricing, and the coefficients on *Pre-offer Net Buy* remain positive and statistically significant. The coefficients on both SEO discount and SEO underpricing are negative, reflecting the negative relation between institutional share allocation in SEOs and SEO discount and underpricing. In the third specification, when we add the interaction variable *Pre-offer Net Buy*∗*Postbubble*, the coefficient for this interaction variable is negative, statistically significant for the five pre-offer trading days window, but not significant for the 21 pre-offer trading days window. Overall, the sign and magnitude of the coefficient suggests that the positive relation between institutional pre-offer net buy and institutional share allocation is strong both in the bubble years and in the post-bubble years.

Next, we study institutional post-offer trading from the first five trading days post-offer up to the first three months post-offer.[24] Table 6 presents univariate results on the relation between institutional SEO share allocation and institutional post-offer trading. Comparing SEO-institution pairs with and without allocations, those pairs with allocations continue to buy more shares than do those without allocations during the first three months post-SEO.[25] For SEO-institution pairs with SEO allocations, we also show a monotonic relation between institutional post-offer net buy and institutional share allocations.

Table 7 presents multivariate results on institutional post-offer trading, institutional share allocation, and institutional pre-offer trading, controlling for institution and offer characteristics. The multivariate analysis is based on the following OLS regression framework (SEO *i* and institution *j*):

$$\begin{aligned}\textit{Post-offer Net Buy}_{i,j} &= \alpha + \beta_1 \textit{Alloshroff}_{i,j} + \beta_2\, \textit{Pre-offer Net Buy}_{i,j} + \beta_3 \textit{Mf}_j \\ &\quad + \beta_4 \textit{Ln(instsize)}_j + \beta_5 \textit{Lnsize}_i + \beta_6 \textit{Repuhi}_i + \beta_7 \textit{Hitek}_i \\ &\quad + \beta_8 \textit{Discount}_i + \beta_9 \textit{Underpricing}_i + \beta_{10} \textit{Alloshroff}_{i,j} \\ &\quad * \textit{Postbubble}_i + \beta_{11} \textit{Pre-offer Net Buy}_{i,j} * \textit{Postbubble}_i \\ &\quad + \textit{Year Fixed Effects} + \varepsilon_{i,j}, \end{aligned} \tag{3}$$

where *Post-offer Net Buy*$_{i,j}$ is institution *j*'s net buy in shares of the *i*th issuing firm scaled by the firm's shares outstanding (in percentages) during the first five days and first one month post-offer, respectively.[26] All explanatory variables are as defined before. For each trading window, we report regression results in four specifications. In the first two specifications, we separately examine the relation between institutional post-offer net buy (*Post-offer Net Buy*) with institutional share allocation (*Alloshroff*) and institutional pre-offer trading (*Pre-offer Net Buy*), respectively. In the third specification, we include both *Alloshroff* and *Pre-offer Net Buy* in one regression. In the fourth specification, we further add interaction variables *Alloshroff*∗*Postbubble* and *Pre-offer Netbuy*∗*Postbubble* to see whether the relation between institutional post-offer net buy and institutional pre-offer net buy and share allocation is robust during both the bubble and post-bubble years. We use White robust standard errors with clustering on SEOs.

Our regression results on the whole sample (Panel A) show that, for the first five days and first month post-SEO, institutions continue to buy more shares in the SEO firm if they obtained more SEO share allocations (first regression specification) or bought more pre-offer (second regression specification). In the third specification, when we include both the institutional share allocation variable and the institutional pre-offer trading variable in the regression, the coefficients of *Alloshroff* and *Pre-offer Net Buy* both remain positive and statistically significant. When we examine such relations in mutual funds and plan sponsors separately, similar results are found in the mutual funds subsample. For the plan sponsors subsample, the positive and statistically significant relation between pre-offer trading and post-offer trading continue to prevail. However, their allocations do not seem to play a role in their post-offer trading. In the fourth specification, when we add the interaction variables, the coefficients on *Alloshroff* and *Pre-offer Net Buy* and on the interaction variables suggest that, throughout bubble and post-bubble periods, a positive relation exists between institutional post-offer net buy and institutional pre-offer net buy and share allocation.

The pattern of institutional post-offer trading seems to suggest that, overall, institutional investors do not reverse their positions immediately post-SEO, and, if anything, they tend to buy more shares post-offer if they obtained larger share allocations or bought more shares pre-offer.

[24] For institutional post-offer trading, we further decompose the trading into institutional pure post-SEO secondary market trading and SEO share allocation sales. The results based on the institutional pure post-SEO secondary market trading are qualitatively similar. We only report only the total post-SEO trading to save space.

[25] This difference is more significant when we examine pure post-SEO secondary market trading excluding allocation sales.

[26] We also ran regressions for the *Post-offer Net Buy* measured during the first three months post-SEO trading period. The results are similar to that with the *Post-offer Net Buy* measured during only the first one month post-SEO trading period. We report only the regression results based on the first five days and first one month for brevity.

Table 5
Institutional pre-offer trading and institutional share allocation, multivariate analysis.

This table presents a Tobit regression analysis of the relation between institutional pre-offer trading and institutional share allocation in seasoned equity offerings (SEOs). The unit of observation is an SEO-institution pair. The SEOs include all sample seasoned equity offerings issued from February 1999 to December 2004. Offerings by firms that had at least one other equity issuance within half year before or after are excluded. The dependent variable is the institutional share allocation scaled by total shares offered, in percentage units (*Alloshroff*). *Pre-offer Net Buy* is the institutional total net buy in shares scaled by the issuing firm's shares outstanding, in percentage unit, aggregated over a five trading-day window (Columns 1, 2, and 3) and a 21 trading-day window (Columns 4, 5, and 6) before the offering, with both trading windows ending one day before the offering. *Mf* is the mutual funds dummy, which equals one for mutual funds and zero for plan sponsors. *Ln*(*instsize*) is the natural logarithm of institution size. *Ln*(*offer size*) is the natural logarithm of the issue proceeds. *Repuhi* is a dummy variable for underwriter reputation. *Repuhi* equals one for high reputation underwriters (highest lead underwriters' or bookrunner's rank is 9.1) and zero otherwise. The underwriters' rank is from Jay Ritter's website (Loughran and Ritter, 2004), which is loosely based on Carter and Manaster (1990) and Carter, Dark, and Singh (1998) rankings. *Hitek* is a dummy variable that equals one for issuers in a hitech industry and zero otherwise, as identified by Securities Data Company. *Discount* is the natural logarithm of the ratio of the pre-offer day closing price to the offer price. *Underpricing* is the natural logarithm of the ratio of the offer day closing price to the offer price. For the interaction variable *Pre-offer Net Buy* * *Postbubble*, *Postbubble* is a dummy variable that equals one for the SEOs issued during the post-bubble years of 2001–2004 and zero for years 1999 and 2000. All the regressions include year fixed effects. Panel A reports the results for the full sample of SEO-institution pairs. Panel B and Panel C report the results for the subsamples of mutual funds and plan sponsors, respectively. *P*-values are in parentheses. The *P*-values are based on White robust standard errors with clustering on SEOs. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	Five trading days pre-offer			Twenty-one trading days pre-offer		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Full sample						
Pre-offer Net Buy	2.482***	2.494***	4.264***	1.648***	1.667***	2.007***
	[0.004]	[0.002]	[0.000]	[0.000]	[0.000]	[0.000]
Mf	1.392***	1.421***	1.424***	1.394***	1.423***	1.425***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln(*instsize*)	0.209***	0.217***	0.210***	0.202***	0.210***	0.209***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln(*offer size*)	−0.16	−0.284*	−0.288*	−0.161	−0.285*	−0.287*
	[0.327]	[0.092]	[0.088]	[0.323]	[0.090]	[0.088]
Repuhi	0.781***	0.392	0.396	0.778***	0.389	0.390
	[0.005]	[0.151]	[0.146]	[0.005]	[0.153]	[0.153]
Hitek	−0.396	−0.229	−0.230	−0.404	−0.237	−0.237
	[0.114]	[0.353]	[0.349]	[0.107]	[0.335]	[0.335]
Discount		−32.484***	−32.287***		−32.519***	−32.458***
		[0.000]	[0.000]		[0.000]	[0.000]
Underpricing		−3.855*	−3.854*		−3.785*	−3.784*
		[0.063]	[0.063]		[0.068]	[0.069]
Pre-offer Net Buy			−3.256**			−0.786
* *Postbubble*			[0.012]			[0.298]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−6.180***	−4.726***	−4.669***	−6.115***	−4.662***	−4.649***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Number of observations	34,512	34,512	34,512	34,512	34,512	34,512
Panel B. Mutual funds						
Pre-offer Net Buy	3.180***	3.232***	4.804***	1.986***	2.026***	2.147***
	[0.004]	[0.002]	[0.001]	[0.000]	[0.000]	[0.005]
Ln(*instsize*)	1.259***	1.284***	1.270***	1.237***	1.262***	1.261***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln(*offer size*)	0.26	−0.133	−0.152	0.247	−0.146	−0.149
	[0.453]	[0.699]	[0.659]	[0.475]	[0.670]	[0.664]
Repuhi	2.803***	1.786***	1.798***	2.800***	1.782***	1.784***
	[0.000]	[0.009]	[0.008]	[0.000]	[0.009]	[0.009]
Hitek	−1.152*	−0.673	−0.674	−1.177*	−0.703	−0.702
	[0.057]	[0.245]	[0.242]	[0.052]	[0.224]	[0.224]
Discount		−78.530***	−77.979***		−78.769***	−78.695***
		[0.000]	[0.000]		[0.000]	[0.000]
Underpricing		−12.996***	−13.040***		−12.637**	−12.644**
		[0.009]	[0.009]		[0.012]	[0.012]
Pre-offer Net Buy			−3.017*			−0.289
* *Postbubble*			[0.096]			[0.785]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−24.044***	−19.821***	−19.645***	−23.727***	−19.504***	−19.492***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Number of observations	7,864	7,864	7,864	7,864	7,864	7,864
Panel C. Plan sponsors						
Pre-offer Net Buy	2.320***	2.256***	3.217***	1.012***	0.980***	1.442***
	[0.009]	[0.010]	[0.001]	[0.007]	[0.009]	[0.008]
Ln(*instsize*)	0.012*	0.013*	0.013*	0.012	0.013*	0.013*
	[0.098]	[0.077]	[0.078]	[0.101]	[0.079]	[0.080]

Table 5 (*continued*)

	Five trading days pre-offer			Twenty-one trading days pre-offer		
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(offer size)	−0.099*	−0.123**	−0.122**	−0.098*	−0.122**	−0.122**
	[0.067]	[0.039]	[0.039]	[0.068]	[0.039]	[0.039]
Repuhi	0.134	0.052	0.052	0.133	0.05	0.05
	[0.127]	[0.492]	[0.487]	[0.130]	[0.503]	[0.503]
Hitek	−0.06	−0.025	−0.025	−0.06	−0.026	−0.025
	[0.314]	[0.671]	[0.676]	[0.313]	[0.668]	[0.671]
Discount		−6.786***	−6.795***		−6.782***	−6.782***
		[0.001]	[0.001]		[0.001]	[0.001]
Underpricing		−0.921*	−0.914*		−0.921*	−0.916*
		[0.097]	[0.099]		[0.097]	[0.099]
Pre-offer Net Buy			−2.503*			−0.874
∗Postbubble			[0.099]			[0.176]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.752***	−0.450**	−0.453**	−0.752***	−0.450**	−0.453**
	[0.002]	[0.031]	[0.030]	[0.002]	[0.031]	[0.030]
Number of observations	26,648	26,648	26,648	26,648	26,648	26,648

These results are consistent with the information production hypothesis (H3B), but inconsistent with the manipulative trading hypothesis (H3A).

5.2.2. Pattern and profitability of institutional share allocation sales

In this subsection, we track institutional share allocation sales for up to one year post-offer and examine the pattern and profitability of institutional share allocation sales during this period. Because in this and the next subsection, we track institutional trading in SEOs for up to one year post-offer, for these two subsections, we further restrict the SEO sample to only firms that did not make another seasoned equity offering within one year before and after the offer.[27] The procedures used to identify SEO allocations and allocation sales are described in the data section. Table 8 presents the pattern of institutional share allocation sales in terms of percentage of allocations sold in each month and the cumulative allocations sold at the end of each month for the 12 months post-SEO. For the first month immediately post-SEO, we take a closer look by studying allocation sales (or flipping) during day 1, day 2, and each of the first four weeks separately. The results in Table 8 show that, overall, institutions tend to hold on to their SEO share allocations for a significant period of time. Institutions flip only a very small fraction of their SEO allocations—3.2% during the first two days post-SEO. In contrast, Aggarwal (2003) shows that institutions sell about 25.8% of their IPO allocations within the first two days post-IPO. During the first year post-SEO, about 60% of institutional SEO share allocations are sold. This lack of flipping in SEOs does not seem to be due to institutional constraints (e.g., underwriter discouragement), because allocation sales seem to be reasonably smooth over time up to one year post-SEO. Mutual funds hold their allocations for longer periods than do plan sponsors. The pattern of allocation sales does not support the notion that institutions' demand for SEO share allocations is driven by a desire for short-term profits (H4A), but rather suggests that institutions obtain SEO share allocations for longer-term investment (H4B).

Table 9 presents realized returns from institutional share allocation sales and compares them with underpricing of allocations (the opportunity cost of not flipping the entire allocation immediately post-offer). At the end of one year post-SEO, we mark unsold allocations to market using the closing price at the end of the year post-SEO. The raw return from allocation sales (and unsold allocations) is about 7.5% for the whole sample, which exceeds underpricing by 4.6%, meaning that share allocations sold overtime are on average executed at higher prices than the closing price on first day of offer. After we discount cash flows from allocation sales using the Fama and French size and book-to-market benchmark portfolio return, the return in current dollars is lower (only 1.8%) but positive (not statistically significant). This means that institutional investments in SEO primary markets and their subsequent selling and holding strategies fare as well as investments in Fama and French size and book-to-market benchmark portfolios. Table 9 presents that, even in current dollar terms, institutional investors do not lose by not flipping their share allocations immediately after the offer. Therefore, the lack of flipping we show above does not appear to impose significant costs on institutional investors (H5).

5.2.3. Profitability of institutional post-offer trading

We track institutional trading in SEOs during the one year period post-offer and examine the profitability of pure secondary market trading (excluding allocation sales) and total trading including allocations and allocation sales. We calculate two return measures for post-SEO institutional trading, namely, return on buy principal and return on maximum investment. Return on buy principal

[27] When a firm makes sequential equity offers within relatively short time frame, it is hard to disentangle allocations and allocation sales from different offers.

Table 6
Institutional share allocation and institutional post-offer trading, univariate analysis.

This table presents the summary statistics and univariate test results of institutional share allocation and institutional post-offer trading in the seasoned equity offering (SEO) firms' shares during the periods of the first five trading days since the offering, the first month (21 trading days) since the offering, and the first three months (63 trading days) since the offering, respectively. The unit of observation is an SEO-institution pair. The SEOs include all sample seasoned equity offerings issued from January 1999 to September 2004. Offerings by firms that had at least one other equity issuance within half year before or after are excluded. *Total Post-offer Net Buy* is institutional total post-offer net buy in the SEO firms' shares scaled by the SEO firms' shares outstanding, in percentage unit. *Allocation* is the institutional share allocation scaled by total shares offered, in percentage units (*Alloshroff*). Panel A reports the results for the full sample of SEO-institution pairs. Panel B and Panel C report the results for the subsamples of mutual funds and plan sponsors, respectively. Sample means for *Total Post-offer Net Buy* are reported. *P*-values are based on the two tailed *t*-test for the difference in means, assuming unequal variances. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	Number of observations	Total Post-offer Net Buy		
		First five days	First one month	First three months
Panel A. Full sample				
By Institutions in SEOs with and without allocation				
Institutions in SEOs with allocation	5,185	0.040	0.072	0.078
Institutions in SEOs without allocation	28,982	0.011	0.018	0.030
Difference in post-offer net buy		0.029	0.053	0.047
P-value		(0.000)***	(0.000)***	(0.000)***
Sample of institutions in SEOs with allocation, by allocation above and below median				
Allocation above median	2,592	0.077	0.137	0.152
Allocation below median	2,593	0.004	0.006	0.004
Difference in post-offer net buy		0.073	0.131	0.148
P-value		(0.000)***	(0.000)***	(0.000)***
Sample of institutions in SEOs with allocation, split into five quintiles				
Highest quintile	1,037	0.160	0.295	0.323
Quintile 4	1,037	0.025	0.040	0.047
Quintile 3	1,037	0.010	0.016	0.014
Quintile 2	1,037	0.005	0.005	0.005
Lowest quintile	1,037	0.001	0.002	0.000
Panel B. Mutual funds				
By Institutions in SEOs with and without allocation				
Institutions in SEOs with allocation	1,246	0.136	0.255	0.298
Institutions in SEOs without allocation	6,424	0.039	0.061	0.109
Difference in post-offer net buy		0.097	0.193	0.189
P-value		(0.000)***	(0.000)***	(0.000)***
Sample of institutions in SEOs with allocation, by allocation above and below median				
Allocation above median	623	0.239	0.454	0.482
Allocation below median	623	0.034	0.056	0.114
Difference in post-offer net buy		0.205	0.398	0.367
P-value		(0.000)***	(0.000)***	(0.000)***
Sample of institutions in SEOs with allocation, split into five quintiles				
Highest quintile	250	0.366	0.779	0.749
Quintile 4	253	0.178	0.260	0.328
Quintile 3	244	0.065	0.099	0.178
Quintile 2	249	0.042	0.084	0.139
Lowest quintile	250	0.029	0.048	0.092
Panel C. Plan sponsors				
By Institutions in SEOs with and without allocation				
Institutions in SEOs with allocation	3,939	0.010	0.014	0.008
Institutions in SEOs without allocation	22,558	0.003	0.006	0.008
Difference in post-offer net buy		0.007	0.008	0.000
P-value		(0.000)***	(0.000)***	(0.895)
Sample of institutions in SEOs with allocation, by allocation above and below median				
Allocation above median	1,968	0.017	0.024	0.014
Allocation below median	1,971	0.003	0.004	0.002
Difference in post-offer net buy		0.014	0.020	0.012
P-value		(0.000)***	(0.000)***	(0.001)***
Sample of institutions in SEOs with allocation, split into five quintiles				
Highest quintile	787	0.027	0.038	0.021
Quintile 4	788	0.012	0.015	0.012
Quintile 3	789	0.007	0.010	0.007
Quintile 2	788	0.003	0.004	0.002
Lowest quintile	787	0.001	0.001	−0.001

Table 7
Institutional pre-offer trading, institutional share allocation, and institutional post-offer trading, multivariate analysis.

This table presents an ordinary least squares regression analysis of the relation between institutional seasoned equity offering (SEO) share allocation, institutional pre-offer trading, and institutional post-offer trading. The unit of observation is an SEO-institution pair. The SEOs include all sample seasoned equity offerings issued from January 1999 to September 2004. Offerings by firms that had at least one other equity issuance within half year before or after are excluded. The dependent variables are institutional total post-offer net buy in the SEO firms' shares scaled by the SEO firms' shares outstanding, in percentage unit, during the first five trading days and first one month trading period since the offer, respectively. *Alloshroff* is the institutional share allocation scaled by total shares offered, in percentage units. *Pre-offer Net Buy* is the institutional total net buy in shares scaled by the issuing firm's shares outstanding, aggregated over a five trading-day window before the offering, with the trading window ending one day before the offering, in percentage unit. *Mf* is the mutual funds dummy, with one for mutual funds and zero for plan sponsors. *Ln*(*instsize*) is the natural logarithm of institution size. *Lnsize* is the natural logarithm of the SEO firms' market capitalization of equity after the offering. *Repuhi* is a dummy variable for underwriter reputation. *Repuhi* equals one for high reputation underwriters (highest lead underwriters' or bookrunner's rank is 9.1) and zero otherwise. The underwriters' rank is from Jay Ritter's website (Loughran and Ritter, 2004), which is loosely based on Carter and Manaster (1990) and Carter, Dark, and Singh (1998) rankings. *Hitek* is a dummy variable that equals one for issuers in a hitech industry and zero otherwise, as identified by Securities Data Company. *Discount* is the natural logarithm of the ratio of the pre-offer day closing price to the offer price. *Underpricing* is the natural logarithm of the ratio of the offer day closing price to the offer price. *Alloshroff* * *PostBubble* and *Pre-offer Net Buy* * *Postbubble* are two interaction variables where *Postbubble* is a dummy variable that equals one for the SEOs issued during the post-bubble years of 2001–2004 and zero for years 1999 and 2000. All the regressions include year fixed effects. Panel A reports the results for the full sample of SEO-institution pairs. Panel B and Panel C report the results for the subsamples of mutual funds and plan sponsors, respectively. *P*-values are in parentheses. The *P*-values are based on White robust standard errors with clustering on SEOs. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	First five days				First one month			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Full sample								
Alloshroff	0.015***		0.013***	0.011***	0.034***		0.032***	0.024***
	[0.000]		[0.000]	[0.010]	[0.000]		[0.000]	[0.001]
Pre-offer Net Buy		0.400***	0.384***	0.689***		0.583***	0.545***	0.919***
		[0.001]	[0.001]	[0.000]		[0.001]	[0.001]	[0.000]
Mf	0.028***	0.031***	0.025***	0.026***	0.036***	0.046***	0.032***	0.032***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln(*instsize*)	0.003**	0.003***	0.002***	0.002**	0.005***	0.008***	0.004***	0.004***
	[0.001]	[0.000]	[0.008]	[0.029]	[0.000]	[0.000]	[0.001]	[0.003]
Lnsize	−0.006***	−0.006***	−0.005***	−0.005***	−0.009***	−0.010***	−0.008***	−0.008***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Repuhi	0.003	0.003	0.002	0.002	0.001	0.003	0.001	0.001
	[0.337]	[0.332]	[0.519]	[0.456]	[0.788]	[0.621]	[0.985]	[0.909]
Hitek	−0.002	−0.004	−0.003	−0.003	−0.002	−0.004	−0.003	−0.003
	[0.366]	[0.171]	[0.209]	[0.191]	[0.645]	[0.342]	[0.442]	[0.457]
Discount	0.036	0.024	0.029	0.029	0.004	−0.018	−0.006	−0.004
	[0.125]	[0.291]	[0.205]	[0.187]	[0.906]	[0.621]	[0.875]	[0.902]
Underpricing	0.01	−0.005	0.022	0.031	0.005	−0.045	0.023	0.041
	[0.840]	[0.915]	[0.639]	[0.493]	[0.948]	[0.558]	[0.761]	[0.577]
Alloshroff * *PostBubble*				0.003				0.017
				[0.606]				[0.133]
Pre-offer Net Buy * *PostBubble*				−0.537***				−0.654***
				[0.002]				[0.009]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.032***	0.030**	0.032***	0.035***	0.044**	0.041**	0.044**	0.049***
	[0.009]	[0.009]	[0.007]	[0.002]	[0.014]	[0.019]	[0.011]	[0.005]
Number of observations	34,167	34,167	34,167	34,167	34,167	34,167	34,167	34,167
R^2	0.028	0.061	0.073	0.094	0.046	0.054	0.08	0.094

	First five days (9)	First five days (10)	First one month (11)	First one month (12)
Panel B. Mutual funds				
Alloshroff	0.013***	0.011**	0.032***	0.024***
	[0.000]	[0.013]	[0.000]	[0.001]
Pre-offer Net Buy	0.389***	0.705***	0.551***	0.938***
	[0.001]	[0.000]	[0.002]	[0.000]
Ln(*instsize*)	0.003	0.002	0.009*	0.007
	[0.265]	[0.512]	[0.070]	[0.169]
Lnsize	−0.016**	−0.017***	−0.026***	−0.027***
	[0.011]	[0.004]	[0.004]	[0.002]
Repuhi	0.012	0.013	0.004	0.006
	[0.377]	[0.322]	[0.865]	[0.773]
Hitek	−0.015	−0.015	−0.016	−0.016
	[0.147]	[0.130]	[0.333]	[0.334]
Discount	0.113	0.109	−0.055	−0.050
	[0.262]	[0.260]	[0.739]	[0.753]

Table 7. (*continued*)

Underpricing	0.071	0.114	−0.033	0.035
	[0.705]	[0.524]	[0.912]	[0.901]
*Alloshroff * PostBubble*		0.003		0.017
		[0.588]		[0.160]
*Pre-offer Net Buy * PostBubble*		−0.553***		−0.673***
		[0.002]		[0.009]
Year fixed effects	Yes	Yes	Yes	Yes
Constant	0.149**	0.169***	0.191**	0.226**
	[0.019]	[0.006]	[0.043]	[0.017]
Number of observations	7,670	7,670	7,670	7,670
R^2	0.068	0.091	0.075	0.089

	First five days (9)	First five days (10)	First one month (11)	First one month (12)
Panel C. Plan sponsors				
Alloshroff	0.001	−0.001	0.002	0.001
	[0.962]	[0.823]	[0.794]	[0.991]
Pre-offer Net Buy	0.098***	0.139***	0.208***	0.268**
	[0.002]	[0.004]	[0.008]	[0.034]
Ln(instsize)	0.002***	0.002***	0.003***	0.003***
	[0.000]	[0.000]	[0.000]	[0.000]
Lnsize	−0.003***	−0.002***	−0.004***	−0.004***
	[0.000]	[0.000]	[0.000]	[0.000]
Repuhi	0.001	0.001	0.001	0.001
	[0.686]	[0.701]	[0.845]	[0.857]
Hitek	0.001	0.001	0.001	0.001
	[0.533]	[0.514]	[0.276]	[0.268]
Discount	0.008	0.008	0.005	0.005
	[0.273]	[0.234]	[0.701]	[0.659]
Underpricing	−0.011	−0.007	0.018	0.021
	[0.306]	[0.489]	[0.306]	[0.224]
*Alloshroff * PostBubble*		0.019**		0.017
		[0.017]		[0.143]
*Pre-offer Net Buy * PostBubble*		−0.081		−0.119
		[0.190]		[0.439]
Year fixed effects	Yes	Yes	Yes	Yes
Constant	0.013***	0.013***	0.016***	0.016***
	[0.000]	[0.000]	[0.000]	[0.000]
Number of observations	26,497	26,497	26,497	26,497
R^2	0.014	0.017	0.018	0.019

is a simple and conservative measure, which is calculated by dividing total trading profits (raw or in current dollars) by total buy principal (raw or in current dollars). Return on maximum investment adjusts total investment (the denominator) by allowing the use of selling proceeds for later buying transactions instead of counting it as new investment. This measure more closely reflects the investment return from post-SEO institutional trading.

Table 10 presents results on the profitability of post-SEO institutional trading. We separately show post-SEO trading profitability for SEO-institution pairs with and without allocations. We also compare institutional trading profitability with a naive buy-and-hold trading strategy across SEOs. Institutional post-SEO trading returns in SEO in which they obtained allocations across all measures are significantly higher than returns from the naive buy-and-hold trading strategy in SEOs, both statistically and economically. This supports the hypothesis that, if institutional investors have long-lived private information, they are able to outperform a naive buy-and-hold strategy in post-SEO trading (H6). However, institutional post-SEO trading returns in SEO in which they did not obtain allocations do not outperform a naive buy-and-hold strategy. Further, SEO-institution pairs with allocations clearly trade more and realize more dollar profits than do SEO-institution pairs without allocations. The return measures for SEO-institution pairs with allocations are positive and statistically significantly different from zero, both in raw terms and in current dollars, including or excluding profits from allocations. In contrast, return measures for SEO-institution pairs without allocations are negative and statistically significantly different from zero, both in raw terms and in current dollars. Compared with return on maximum investment, return on buy principal is a more conservative measure. For pure post-SEO trading, SEO-institution pairs with allocations outperform SEO-institution pairs without allocations by 12.9% (raw return on buy principal), or 17.5% (raw return on maximum investment); the outperformance is 9.7% in terms of return using current dollars on buy principal and 12.8% in terms of return using current dollars on maximum investment. These outperformances are both

Table 8
Pattern of institutional seasoned equity offering (SEO) share allocation sales.

This table presents the pattern of institutional SEO share allocation sales. The unit of observation is an SEO-institution pair. The SEOs include all sample seasoned equity offerings issued from January 1999 to December 2004, which were present in Compustat at the time of the offering and were covered by the Center for Research in Security Prices for at least one year from issuance and have matched portfolios. The first year post-SEO is divided into 16 subperiods. Day 1 is the first trading day post-offer. Day 2 is the second trading day post-offer. Week 1 (excluding the first two days) is trading day 3 to trading day 5. Week 2 through week 4 each consists of five trading days. Month 1 through month 12 each consists of 21 trading days. Allocation sales are identified as described in Section 4.3. Period allocation sales as fraction of allocation is computed as the total shares of allocation sold during the period divided by the total shares acquired in the allocation. Cumulative allocation sales as fraction of allocation is computed as the cumulative total shares of allocation sold till the end of the period divided by the total shares acquired in the allocation.

	Period allocation sales as fraction of allocation			Cumulative allocation sales as fraction of allocation		
	All institutions	Mutual funds	Plan sponsors	All institutions	Mutual funds	Plan sponsors
Number of observations	4,354	1,060	3,294	4,354	1,060	3,294
Day 1 (percent)	2.185	2.320	1.170	2.185	2.320	1.170
Day 2 (percent)	1.010	1.040	0.791	3.195	3.360	1.962
Week 1 (excluding first two days) (percent)	1.659	1.671	1.571	4.854	5.030	3.533
Week 2 (percent)	2.935	2.880	3.341	7.788	7.911	6.874
Week 3 (percent)	1.727	1.669	2.160	9.515	9.579	9.034
Week 4 (percent)	1.630	1.462	2.888	11.145	11.041	11.922
Month 1 (percent)	11.411	11.299	12.254	11.411	11.299	12.254
Month 2 (percent)	7.458	7.114	10.032	18.870	18.413	22.286
Month 3 (percent)	6.737	6.650	7.391	25.607	25.062	29.677
Month 4 (percent)	5.156	4.853	7.420	30.762	29.915	37.097
Month 5 (percent)	8.765	9.140	5.961	39.528	39.055	43.057
Month 6 (percent)	4.952	5.032	4.354	44.479	44.087	47.412
Month 7 (percent)	3.429	3.323	4.223	47.909	47.410	51.635
Month 8 (percent)	3.221	3.147	3.772	51.078	50.502	55.381
Month 9 (percent)	2.417	2.317	3.162	53.834	53.224	58.382
Month 10 (percent)	3.054	3.082	2.846	56.837	56.318	60.742
Month 11 (percent)	2.615	2.502	3.453	58.988	58.309	64.046
Month 12 (percent)	1.320	1.074	3.136	60.417	59.497	67.206

statistically and economically significant. This finding is consistent with the information production hypothesis (H7).

In summary, the profitability of post-SEO institutional trading suggests that institutional investors have long-lived private information about SEOs. In particular, institutions that have favorable information about certain SEOs and obtain allocations in those SEOs continue to use their private information in post-offer trading to achieve superior performance.

5.3. Institutional pre-offer trading, allocation, and the SEO discount

In this subsection, we empirically study the role of institutional investors in the pricing of SEOs and, in particular, in the determination of the SEO discount.

Table 11 presents univariate results on the relation between pre-offer institutional trading and the SEO discount.[28] We present pre-offer trading in three different trading windows: three trading days, five trading days, and ten trading days. For three and five trading days pre-offer, those SEOs with above median net buy from sample institutions have a significantly smaller SEO discount than those with below median net buy. For example, for the three pre-offer trading day window, SEOs with above median institutional net buy are discounted for 0.77% less than those with below median net buy. At the sample average offer proceeds of $169 million, this translates into $1.3 million less in discount per SEO. For the ten pre-offer trading day window, the difference is also in the same direction, though not statistically significant. Our results on the relation between pre-offer institutional trading and the SEO discount are consistent with predictions from both the manipulative trading and the information production hypotheses (H8).

Table 12 presents SEO allocations partitioned by the SEO discount (Panel A) and underpricing (Panel B) quartiles. Unlike SEO underpricing, SEO discount is a choice variable directly under the control of the underwriter and the SEO firm. In Panel A, a clear pattern emerges of more institutional share allocations in less discounted SEOs. This is not consistent with the manipulative trading hypothesis (H9A) but is consistent with the information production hypothesis (H9B). In Panel B, for underpricing quartiles, no clear monotonic pattern is evident in institutional SEO share allocations. Overall, institutions tend to get more allocations in SEOs with lower underpricing (where there might be underwriter stabilization activities). This is consistent with the information production hypothesis. The finding is interesting as it contrasts with previous findings in the context of IPOs. Aggarwal, Prabhala, and Puri (2002) conclude that larger institutional share allocations in IPOs are associated

[28] Because we study the relation between pre-offer institutional trading, institutional share allocation, and SEO discount, for this subsection we restrict our SEO sample to offers starting from February 1999 (to leave one month for the pre-offer trading period). We also drop from the whole SEO sample offers that have another seasoned equity offer within half a year before or after. This leaves 1,033 SEOs.

Table 9
Profitability of institutional seasoned equity offering (SEO) share allocation sales.

This table presents the profitability of institutional share allocation sales. The unit of observation is an SEO-institution pair. The SEOs include all sample seasoned equity offerings issued from January 1999 to December 2004, which were present in Compustat at the time of the offering and were covered by the Center for Research in Security Prices for at least one year from issuance. The SEOs also need to have non-negative book value of equity at the time of offering to be included in this analysis (to be assigned to a Fama and French size and book-to-market matched portfolio). *Allocation Sales* are identified as described in Section 4.3. Panel A reports the summary statistics of institutional share allocation. *Amount Invested* is computed as the offer price multiplied by the shares allocated. *Fraction of Offer Allocated* is calculated as the total amount invested by sample institutions in share allocations divided by the total proceeds by the SEOs. *Money Left on the table* equals *Amount Invested* times the SEO underpricing. Panel B reports the profit in dollar amount and in return measured at one year post-SEO. Raw Profit is the total raw profit earned by sample institutions from selling their allocation during the one year post-SEO using actual transaction prices net of commissions and taxes and fees, with any unsold position from allocations marked to market at the end of one year. *Raw Return from Allocation Sales* is the total raw profit divided by the total dollar amount invested in allocations by sample institutions. *Allocation Underpricing* is the dollar proceeds weighted underpricing of the shares allocated to institutions. *Raw Realization Shortfall* equals *Allocation Underpricing* minus the *Raw Return from Allocation Sales. Profit in Current Dollars* is computed by discounting the raw profit back to the day before the offering using the matched Fama and French 25 size and book-to-market portfolio buy-and-hold value-weighted return. *Return using Current Dollars from Allocation Sales* is the total profit in current dollars divided by the total dollar amount allocated to sample institutions. *Realization Shortfall in Current Dollars* equals *Allocation Underpricing* minus the *Return using Current Dollars from Allocation Sales*. Difference in the last column presents the difference in means of the profits and return measures between mutual funds and plan sponsors. The *P*-value for testing whether the mean is different from zero is in parentheses. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	All institutions	Mutual funds	Plan sponsors	Difference
Panel A. Amount investment in allocation				
Number of observation	4,354	1,060	3,294	
Mean amount invested (millions of dollars)	2.602	9.428	0.406	
Total amount invested (millions of dollars)	11,329.323	9,993.248	1,336.075	
Fraction of Offer Allocated (percent)	8.639	7.620	1.019	
Mean Money Left on the Table (millions of dollars)	0.075	0.279	0.009	
Total Money Left on the Table (millions of dollars)	324.217	296.209	28.008	
Panel B. Profit from allocation sales at one year post-SEO				
Raw Profit (thousands of dollars)	194.290	693.846	33.535*	660.312
	(0.334)	(0.400)	(0.069)	(0.423)
Raw Return from Allocation Sales (percent)	7.467***	7.36**	8.268***	−0.908
	(0.001)	(0.041)	(0.001)	(0.823)
Allocation Underpricing (percent)	2.8647***	2.9673***	2.0972***	0.870***
	(0.001)	(0.001)	(0.001)	(0.001)
Raw Realization Shortfall (percent)	−4.592***	−4.380	−6.176***	1.7964
	(0.009)	(0.224)	(0.001)	(0.658)
Profit in Current Dollars (thousands of dollars)	46.803	167.613	7.926	159.686
	(0.766)	(0.795)	(0.611)	(0.805)
Return using Current Dollars from Allocation Sales (percent)	1.799	1.778	1.954	−0.176
	(0.168)	(0.507)	(0.147)	(0.953)
Realization Shortfall in Current Dollars (percent)	1.0721	1.1961	0.145	1.0511
	(0.412)	(0.656)	(0.914)	(0.726)

with a greater extent of IPO underpricing. This difference could be due to the fact that institutional profits from participating in SEOs arise from holding allocations for a longer period (recall our earlier finding that there is very little flipping in SEOs), whereas institutions' profits from participating in IPOs arise predominantly from short-term trading (flipping). We discuss the relation between our SEO findings and the results shown in the IPO literature in more detail in Section 6.

Table 13 presents multivariate results on pre-offer institutional trading, institutional SEO share allocations, and the SEO discount based on the following OLS regression framework:

$$\begin{aligned} Discount = {} & \alpha + \beta_1 Ln(pctallo) + \beta_2 Pre\text{-}offer\ Net\ Buy \\ & + \beta_3 Ln(Offer\ Size) + \beta_4 Relative\ Offer\ Size \\ & + \beta_5 (1/Offer\ Price) + \beta_6 Roundprc + \beta_7 Volatility \\ & + \beta_8 Repuhi + \beta_9 Hitek + \beta_{10} CAR\_Positive \\ & + \beta_{11} CAR\_Negative + \beta_{12} Ln(pctallo) * Postbubble \\ & + \beta_{13} Pre\text{-}offer\ Net\ Buy * Postbubble \\ & + Year\ Fixed\ Effects + \varepsilon, \end{aligned} \quad (4)$$

where *Discount*, *Ln*(*pctallo*), *Ln*(*Offer Size*), *Relative Offer Size*, *Repuhi*, and *Hitek* are defined previously. The *Pre-offer Net Buy* is aggregated across institutions to the SEO level. 1/(*Offer Price*) is one over the SEO's offer price. *Roundprc* is a dummy variable that equals one if the SEO is priced at integer offer prices. Mola and Loughran (2004) show that issues with integer offer prices are associated with a larger discount. *Volatility* is the standard deviation of the issuing firm's daily stock returns during the 126–42 trading days before the offering. *CAR* is the cumulative market-adjusted return over the five trading days prior to the offer. Following Corwin (2003), who showed that the magnitude of pre-offer returns is associated with SEO discount and that positive and negative pre-offer returns could affect the SEO discount in a asymmetric manner, we also include the positive and negative pre-offer *CARs* (*CAR_Positive* and *CAR_Negative*) in the regression.[29] Regression 1 relates only the institutional share allocation to SEO

[29] Altinkilic and Hansen (2003) also find the asymmetric effect of pre-offer price movement on the SEO discount. We also estimate the pre-offer abnormal returns by adjusting the returns using the returns on the

Table 10
Profitability of institutional post-offer trading.

This table presents the univariate results of the profitability of institutional trading over the one year period post-offer, split by seasoned equity offering (SEO)-institution pairs with and without allocations (Panel A) and by institution types (Panel B). The unit of observation is an SEO-institution pair. The SEOs include all sample seasoned equity offerings issued from January 1999 to December 2004 without any other offers during the immediate one year before and after the issuance. The SEOs also need to be present in Compustat and the Center for Research in Security Prices at the time of the offering and have non-negative book value of equity at the time of offering to be included in this analysis (to be assigned to a Fama and French size and book-to-market matched portfolio). Institutional trading profitability is reported based on post-SEO secondary market trading, excluding allocation sales and on total trading, which includes profits from allocation sales, respectively. *Allocation Sales* are identified as described in Section 4.3. *Raw Profit* is the total raw profit earned by institutions using actual transaction prices net of commissions and taxes and fees, with the net position marked to market at the end of one year post-SEO. *Profit in Current Dollars* is computed by discounting the raw profit back to the day before the offering using the matched Fama and French 25 size and book-to-market portfolio buy-and-hold value-weighted return. We use two measures to proxy the amount invested for post-SEO trading, namely, the *Buy Principal* and the *Maximum Investment. Raw Buy Principal* is the sum of the actual dollar amounts of all the buy transactions including commissions and taxes and fees spent by sample institutions during the one year post-SEO. *Raw Maximum Investment* is the maximum dollar amount committed to trading the SEO firms' shares during the one year post-SEO by sample institutions, as described in Section 5.2.3. *Buy Principal in Current Dollars* and *Maximum Investment in Current Dollars* are computed by discounting the *Raw Buy Principal* and the *Raw Maximum Investment*, respectively, back to the day before offering using the matched Fama and French 25 size and book-to-market portfolio buy-and-hold value-weighted return. *Raw Return on Buy Principal* (or on *Maximum Investment*) equals the raw profit divided by the *Raw Buy Principal* (or the *Raw Maximum Investment*). *SEO Buy and Hold Raw Return* is the post-issue market-capitalization-weighted raw one year post-SEO buy and hold return for all the sample SEOs issued during the 1999–2004 period, which are included in this analysis. *Raw Outperformance on Buy Principal* (or on *Maximum Investment*) equals institutional raw return on *Buy Principal* (or on *Maximum Investment*) from post-SEO trading minus the SEO buy-and-hold raw return. *Return using Current Dollars on Buy Principal* (or on *Maximum Investment*) equals profit in current dollars divided by the *Buy Principal* (or *Maximum Investment*) in current dollars. *SEO Buy and Hold Return using Current Dollars* is computed by discounting SEO buy-and-hold raw return back to the day before the offering using the matched Fama and French 25 size and book-to-market portfolio buy-and-hold value-weighted return. *Outperformance Using Current Dollars on Buy Principal* (or on *Maximum Investment*) equals institutional post-SEO trading return using current dollars on *Buy Principal* (or on *Maximum Investment*) minus the *SEO Buy and Hold Return using Current Dollars*. All return measures are in percentage units. The *P*-value for testing whether the mean is different from zero is in parentheses. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	Post-SEO trading, excluding allocation sales			Total trading		
	With allocation	Without allocation	Test of difference	With allocation	Without allocation	Test of difference
Number of SEO-institution pairs	4354	23037		4354	23037	
Raw Profit (millions of dollars)	0.885	−0.393		1.079	−0.393	
Raw Buy Principal (millions of dollars)	13.503	6.202		16.105	6.202	
Raw Maximum Investment (millions of dollars)	9.513	4.791		12.115	4.791	
Profit in Current Dollars (millions of dollars)	0.267	−0.465		0.314	−0.465	
Buy Principal in Current Dollars (millions of dollars)	12.812	6.112		15.414	6.112	
Maximum Investment in Current Dollars (millions of dollars)	9.227	4.68		11.829	4.68	
Raw Return on Buy Principal (percent)	6.551***	−6.340***	12.891***	6.699***	−6.340***	13.039***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SEO Buy and Hold Raw Return (percent)	−4.308	−4.308		−4.308	−4.308	
	(0.254)	(0.254)		(0.254)	(0.254)	
Raw Outperformance on Buy Principal (percent)	10.859***	−2.032		11.007***	−2.032	
	(0.005)	(0.592)		(0.005)	(0.592)	
Raw Return on Maximum Investment (percent)	9.299***	−8.207***	17.506***	8.906***	−8.207***	17.113***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SEO Buy and Hold Raw Return (percent)	−4.308	−4.308		−4.308	−4.308	
	(0.254)	(0.254)		(0.254)	(0.254)	
Raw Outperformance on Maximum Investment (percent)	13.607***	−3.899		13.214***	−3.899	
	(0.001)	(0.304)		(0.001)	(0.304)	
Return using Current Dollars on Buy Principal (percent)	2.085***	−7.603***	9.688***	2.037**	−7.603***	9.640***
	(0.006)	(0.001)	(0.001)	(0.010)	(0.001)	(0.001)
SEO Buy and Hold Return Using Current Dollars (percent)	−10.167***	−10.167***		−10.167***	−10.167***	
	(0.001)	(0.001)		(0.001)	(0.001)	
Outperformance Using Current Dollars on Buy Principal (percent)	12.252***	2.564		12.204***	2.564	
	(0.001)	(0.367)		(0.001)	(0.367)	
Return using Current Dollars on Maximum Investment (percent)	2.895***	−9.929***	12.825***	2.654**	−9.929***	12.583***
	(0.007)	(0.001)	(0.001)	(0.012)	(0.001)	(0.001)
SEO Buy and Hold Return Using Current Dollars (percent)	−10.167***	−10.167***		−10.167**	−10.167***	
	(0.001)	(0.001)		(0.001)	(0.001)	
Outperformance Using Current Dollars on Maximum Investment (percent)	13.062***	0.238		12.821***	0.238	
	(0.001)	(0.934)		(0.001)	(0.934)	

Table 11
Institutional pre-offer trading and the seasoned equity offering (SEO) discount, univariate analysis.

This table presents the summary statistics and univariate test results of institutional pre-offer trading and the SEO discount. The sample includes 1,033 SEOs issued between February 1999 and December 2004 that are traded by sample institutions and present in the Center for Research in Security Prices databases at the time of the offering. The SEO discount is the natural logarithm of the ratio of the pre-offer day closing price to the offer price, in percentage units. *Pre-offer Net Buy* is the institutional total net buy in shares aggregated at the SEO level scaled by the issuing firm's shares outstanding, in percentage unit. In Panels A, B, and C, the sample of SEOs is split by above and below the median pre-offer net buy in the three, five, and ten pre-offer trading days, respectively, ending at the day before the offering. *P*-value for difference is the *P*-value (in parentheses) for testing the difference of the SEO discount between the above-median and below-median pre-offer net buy SEO groups (*t*-test for difference in means; Mann-Whitney test for difference in medians). Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

Split by median pre-offer net buy	Number of SEOs	Pre-offer net buy (Mean)	Discount (Mean)	Discount (Median)
Panel A. Pre-offer three trading days				
Above median	516	0.339	2.62%	1.79%
Below median	517	−0.110	3.39%	2.54%
P-value for difference			(0.001)***	(0.001)***
Panel B. Pre-offer five trading days				
Above median	517	0.449	2.60%	1.89%
Below median	516	−0.149	3.41%	2.43%
P-value for difference			(0.001)***	(0.003)***
Panel C. Pre-offer ten trading days				
Above median	516	0.659	2.90%	2.02%
Below median	517	−0.260	3.11%	2.27%
P-value for difference			(0.342)	(0.225)

discount, controlling for SEO characteristics. The coefficient on the institutional share allocation is negative and statically significant, meaning the larger the institutional SEO share allocations, the smaller the SEO discount. A one standard deviation increase in institutional share allocation reduces the SEO discount by 0.76%. Regression 2 relates only the institutional pre-offer net buy to SEO discount, controlling for SEO characteristics. The coefficient on the institutional pre-offer trading variable is negative and statically significant, meaning the more institutional pre-offer net buy of the shares in a firm about to make an SEO, the lower the SEO discount. Regression 3 includes both institutional share allocation and institutional pre-offer net buy as independent variables along with other controlling variables. The coefficients on the institutional share allocation and pre-offer net buy variables both remain negative and statistically significant, and at the similar magnitude as in Regressions 1 and 2. This suggests that the issuers (and their underwriters) extract information both from institutional share allocation request and from institutional trading activity pre-offer to decide on the offering price of the SEO and, hence, the SEO discount. Regression 4 further includes the interaction variables *Ln*(*pctallo*)∗*Postbubble* and *Pre-offer Net Buy*∗*Postbubble* to examine whether the SEO discount relates to institutional share allocation and pre-offer net buy in a similar manner in both bubble and post-bubble periods. The coefficients on both interaction variables are not statistically significant, and the coefficients on both share allocation and pre-offer net buy variables remain negative and statistically significant, suggesting that the relation between SEO discount and institutional share allocation and pre-offer net buy is stable across years in bubble and post-bubble periods. In Regressions 5 and 6, the dependent variable is winsorized at the 5th and 95th percentiles. In Regressions 7 and 8, Tobit regression estimates are presented. The results remain robust in both the winsorized dependent variable specifications and the Tobit regressions, with or without the interaction variables controlling for post-bubble period.

In summary, our results on the negative relation between pre-offer institutional trading and the SEO discount support H8, consistent with both the manipulative trading and the information production hypotheses. Our results on the relation between institutional share allocations and the SEO discount are inconsistent with the predications of the manipulative trading hypothesis (H9A) but are consistent with the predictions of the information production hypothesis (H9B).

The coefficients of other control variables are generally consistent with previous studies on the SEO discount. For example, the practice of setting the offer price at round dollars increases the discount; SEOs with higher stock return volatility have larger discounts; SEOs that experienced positive price run-ups have larger discounts; and larger offers and SEOs with higher price levels tend to have smaller discounts.

6. Discussion of results and conclusion

The theoretical literature suggests two possible roles for institutional investors with private information in seasoned equity offerings: a manipulative trading role, in which institutional investors with private information sell shares prior to the SEO to lower the SEO offer price and profit subsequently by obtaining allocations at this lowered offer price; or an information production role, in which institutional investors produce information about firms making SEOs, request allocations in SEOs

(*footnote continued*)
Fama and French benchmark portfolios. The results using the benchmark portfolio adjusted returns are similar to those reported in Table 13.

Table 12
Institutional share allocation, the seasoned equity offering (SEO) discount, and SEO underpricing, univariate analysis.

This table presents the summary statistics on institutional share allocation in SEOs by quartiles of the SEO discount and SEO underpricing. *Discount* is the natural logarithm of the ratio of the pre-offer day closing price to the offer price. *Underpricing* is the natural logarithm of the ratio of the offer day closing price to the offer price. The sample contains 1,033 SEOs issued between February 1999 and December 2004 that are traded by sample institutions and present in the Center for Research in Security Pricesdatabases at the time of the offering. For discount, underpricing, proceeds, and percent of offer allocated, means and medians are reported, with medians in parentheses. The *P*-values for the Kruskal-Wallis test for equality of medians across the quartile groups are reported in the last column. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

	Disc. < 0.48% (1)	0.48% < = Disc. < 2.12% (2)	2.12% < = Disc. < 4.31% (3)	Disc. > = 4.31% (4)	Kruskal-Wallis test (*P*-value)
Panel A. Partitioned by discount quartiles (low to high)					
Number of SEOs	258	258	258	259	
Discount	0.004%	1.269%	3.045%	7.681%	
	(0.001%)	(1.277%)	(3.004%)	(6.551%)	
Proceeds offered (millions of dollars)	210.508	200.435	144.158	99.541	
	(129.950)	(112.000)	(96.650)	(66.500)	(0.001)***
Proceeds allocated to all institutions (millions of dollars)	37.196	18.685	9.515	3.856	
	(12.709)	(4.949)	(0.001)	(0.001)	(0.001)***
Proceeds allocated to mutual funds (millions of dollars)	32.852	16.383	8.224	3.145	
	(9.497)	(1.477)	(0.001)	(0.001)	(0.001)***
Proceeds allocated to plan sponsors (millions of dollars)	4.344	2.302	1.291	0.711	
	(9.497)	(1.477)	(0.001)	(0.001)	(0.001)***
Percent of offer allocated to all institutions	14.067	10.458	7.35	4.144	
	(11.540)	(4.837)	(0.001)	(0.001)	(0.001)***
Percent of offer allocated to mutual funds	11.821	8.404	6.175	3.448	
	(8.421)	(2.055)	(0.001)	(0.001)	(0.001)***
Percent of offer allocated to plan sponsors	2.247	2.054	1.175	0.697	
	(1.704)	(0.457)	(0.001)	(0.001)	(0.001)***

	Und. < 0% (1)	0% < = Und. < 2.15% (2)	2.15% < = Und. < 6.9% (3)	Und. > = 6.9% (4)	Kruskal-Wallis test (*P*-value) (5)
Panel B. partitioned by underpricing quartiles (low to high)					
Number of SEOs	222	294	258	259	
Underpricing	−3.586%	0.555%	4.489%	12.031%	
	(−2.532%)	(0.239%)	(4.355%)	(10.228%)	
Proceeds offered (millions of dollars)	155.2599	179.0119	189.2647	127.6811	
	(102.750)	(107.450)	(95.550)	(87.000)	(0.147)
Proceeds allocated to all institutions (millions of dollars)	17.069	21.231	18.56	11.781	
	(4.242)	(5.097)	(0.060)	(0.001)	(0.001)***
Proceeds allocated to mutual funds (millions of dollars)	14.18	18.823	16.603	10.323	
	(1.035)	(2.412)	(0.001)	(0.001)	(0.001)***
Proceeds allocated to plan sponsors (millions of dollars)	2.888	2.407	1.957	1.459	
	(0.813)	(0.414)	(0.001)	(0.001)	(0.001)***
Percent of offer allocated to all institutions	10.010	10.681	8.525	6.700	
	(4.632)	(5.751)	(0.059)	(0.001)	(0.001)***
Percent of offer allocated to mutual funds	7.802	9.081	7.119	5.659	
	(1.351)	(3.115)	(0.001)	(0.001)	(0.001)***
Percent of offer allocated to plan sponsors	2.208	1.600	1.406	1.042	
	(0.884)	(0.589)	(0.001)	(0.001)	(0.001)***

about which they obtain favorable private information, and also buy shares before and after the offering.

In this paper, we make use of a large sample of transaction-level institutional trading data to study several important issues surrounding the role of institutional investors in SEOs in the above theoretical context. Our data allowed us to explicitly identify institutional SEO share allocations for the first time in the literature. We study whether institutional investors have private information about SEOs and its consequences for SEO share allocation, institutional trading before and after the SEO and realized trading profitability, and the SEO discount.

Our results can be summarized as follows. First, institutions are able to identify and obtain more

Table 13
Institutional pre-offer trading, institutional share allocation, and the seasoned equity offering (SEO) discount, multivariate analysis.

This table presents an ordinary least squares regression analysis of the relation between institutional pre-offer trading, institutional share allocation, and SEO discount (Columns 7 and 8 present Tobit estimates). The sample contains 1,029 SEOs that were issued between February 1999 and December 2004, covered by the Center for Research in Security Prices (CRSP) and Compustat databases at the time of offering and have valid price and return information for at least half year before the offer (for estimating the stock volatility). The dependent variable is the SEO discount, in percentage units, which is the natural logarithm of the ratio of the pre-offer day closing price to the offer price. In Columns 5 and 6, the dependent variable is winsorized at the 5th and 95th percentiles. *Ln*(*pctallo*) is the natural logarithm of the percentage of shares offered allocated to sample institutions. *Pre-offer Net Buy* is the institutional total net buy in shares during the five trading days pre-offer (ending on the day before the offering) scaled by the issuing firm's shares outstanding, in percentages. *Ln*(*offer size*) is the natural logarithm of the issue proceeds. *Relative Offer Size* is the ratio of offer proceeds to the SEO firm's market capitalization before offer. 1/(*Offer Price*) is one over the offer price. *Roundprc* is a dummy variable that equals one if the offer price is set at a dollar integer and zero otherwise. *Volatility* is the standard deviation of the SEO firms' stock return during the previous 126 trading days ending at 42 trading days before the offering. *Repuhi* equals one for high reputation underwriters (highest lead underwriters' or bookrunner's rank is 9.1) and zero otherwise. The underwriters' rank is from Jay Ritter's website (Loughran and Ritter, 2004), which is loosely based on Carter and Manaster (1990) and Carter, Dark, and Singh (1998) rankings. *Hitek* is a dummy variable that equals one for issuers in a hitech industry and zero otherwise, as identified by Securities Data Company. *CAR* is defined as the cumulative market-adjusted return over the five days prior to the offer, where market return is defined as the return on the CRSP value-weighted index. *CAR_Positive* (*CAR_negative*) equals *CAR* if positive (negative) and zero otherwise. *Ln*(*pctallo*) * *PostBubble* and *Pre-offer Net Buy* * *Postbubble* are two interaction variables where *Postbubble* is a dummy variable that equals one for the SEOs issued during the post-bubble years of 2001–2004 and zero for years 1999 and 2000. All the regressions include year fixed effects. *P*-values are in parentheses. Statistical significance is indicated by *** for 1% level, ** for 5% level, and * for 10% level.

					Winsorized		Tobit	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(*pctallo*)	−0.221***		−0.224***	−0.184***	−0.207***	−0.170***	−0.274***	−0.233***
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Pre-offer Net Buy		−0.285**	−0.323***	−0.500***	−0.295***	−0.451***	−0.415***	−0.563***
		[0.024]	[0.008]	[0.009]	[0.003]	[0.004]	[0.003]	[0.010]
Ln(*offer size*)	−0.339***	−0.427***	−0.328**	−0.322**	−0.308***	−0.303***	−0.435***	−0.428***
	[0.009]	[0.001]	[0.011]	[0.012]	[0.003]	[0.004]	[0.003]	[0.004]
Relative Offer Size	0.360	0.605	0.431	0.440	0.545	0.553	0.581	0.587
	[0.397]	[0.167]	[0.310]	[0.300]	[0.114]	[0.109]	[0.218]	[0.213]
1/(*Offer Price*)	22.832***	22.827***	22.805***	22.931***	15.820***	15.938***	23.415***	23.569***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Roundprc	1.642***	1.863***	1.661***	1.671***	1.377***	1.386***	2.098***	2.106***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Volatility	17.121***	19.080***	17.541***	17.868***	14.939***	15.234***	21.824***	22.126***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Repuhi	−0.359	−0.557**	−0.327	−0.323	−0.370**	−0.365**	−0.382	−0.379
	[0.101]	[0.013]	[0.134]	[0.140]	[0.037]	[0.039]	[0.119]	[0.122]
Hitek	0.343	0.366*	0.355*	0.343	0.311*	0.300*	0.387	0.372
	[0.112]	[0.099]	[0.099]	[0.112]	[0.075]	[0.087]	[0.113]	[0.128]
CAR_Positive	3.298**	3.343**	3.441**	3.275**	3.402***	3.250***	3.803**	3.633**
	[0.030]	[0.032]	[0.023]	[0.031]	[0.006]	[0.008]	[0.025]	[0.032]
CAR_Negative	−0.450	0.190	−0.393	−0.279	−0.534	−0.431	0.234	0.337
	[0.739]	[0.891]	[0.771]	[0.836]	[0.626]	[0.694]	[0.878]	[0.824]
Ln(*pctallo*) * *Postbubble*				−0.073		−0.067		−0.075
				[0.179]		[0.129]		[0.222]
Pre-offer Net buy * *Postbubble*				0.281		0.248		0.238
				[0.257]		[0.217]		[0.399]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.158*	1.572**	1.085	1.095	1.405**	1.414**	0.511	0.523
	[0.097]	[0.028]	[0.119]	[0.116]	[0.013]	[0.012]	[0.517]	[0.507]
Number of observations	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029
R^2	0.265	0.225	0.27	0.273	0.292	0.295		

allocations in SEOs with better long-term returns. Second, more pre-offer net buying of the SEO firm's equity by institutional investors is associated with more institutional SEO share allocations, and also more post-offer net buying. Third, institutions flip only a very small fraction of their SEO share allocations—3.2% during the first two days post-SEO. However, this lack of flipping does not appear to be costly to institutional investors. No significant difference exists between the extent of underpricing and the realized profitability of institutional SEO share allocation sales. Fourth, institutional investors' post-SEO trading significantly outperforms a naive buy-and-hold trading strategy in SEOs. Further, the profitability of post-offer trading in SEOs in which institutions obtained allocations is higher than that of trading in SEOs in which they did not obtain allocations. Finally, more pre-offer institutional net buying and larger institutional SEO share allocations are associated with a smaller SEO discount. Overall, our results are consistent with an information production instead of a manipulative trading role for institutional investors in SEOs.

An interesting finding of our paper is that SEOs with larger institutional share allocations are characterized by smaller SEO discounts and underpricing. At the same

time, these SEOs perform better in the long run. This is consistent with the predictions of the information production hypothesis, in which firms (and their underwriters) observing greater institutional participation in their SEOs infer that institutions have more favorable information about their long-term prospects and, therefore, offer only smaller discounts in equilibrium, because they are less concerned about SEO failure. Such SEOs perform better in the long run, given that institutions' private information is proven correct on average. Thus, SEOs characterized by smaller discounts perform better in the long run. Ritter (1991) has a similar result in the context of IPOs, showing that IPOs characterized by smaller underpricing are associated with better long-run stock returns. However, our finding that larger institutional share allocations in SEOs are associated with smaller SEO discounts and underpricing contrasts with the finding of Aggarwal, Prabhala, and Puri (2002) that larger institutional share allocations in IPOs are associated with a greater extent of IPO underpricing. This contrast could be due to the fact that institutional profits from participating in SEOs arise from holding allocations for a longer period (recall our finding that there is very little flipping in SEOs), whereas institutions' profits from participating in IPOs arise predominantly from short-term trading (flipping).

References

Aggarwal, R., 2003. Allocation of initial public offerings and flipping activity. Journal of Financial Economics 68, 111–135.

Aggarwal, R., Prabhala, N., Puri, M., 2002. Institutional allocation in initial public offerings: empirical evidence. Journal of Finance 57, 1421–1442.

Altinkilic, O., Hansen, R.S., 2003. Discounting and underpricing in seasoned equity offers. Journal of Financial Economics 69, 285–323.

Asquith, P., Mullins, D.W., 1986. Equity issues and offering dilution. Journal of Financial Economics 15, 61–89.

Benveniste, L.M., Spindt, P.A., 1989. How investment bankers determine the offer price and allocation of new issues. Journal of Financial Economics 24, 343–362.

Boehmer, B., Boehmer, E., Fishe, R.P.H., 2006. Do institutions receive favorable allocations in IPOs with better long run returns? Journal of Financial and Quantitative Analysis 41, 809–828.

Boehmer, E., Fishe, R.P.H., 2002. Price support by underwriters in initial and seasoned public offerings. Unpublished working paper, Texas A&M University, College Station, TX.

Brav, A., Geczy, C., Gompers, P.A., 2000. Is the abnormal return following equity issuances anomalous? Journal of Financial Economics 56, 209–250.

Carlson, M., Fisher, A., Giammarino, R., 2006. Corporate investment and asset price dynamics: implications for SEO event studies and long-run performance. Journal of Finance 61, 1009–1034.

Carter, R.B., Dark, F.H., Singh, A.K., 1998. Underwriter reputation, initial returns, and the long-run performance of IPO stocks. Journal of Finance 53, 285–311.

Carter, R., Manaster, S., 1990. Initial public offerings and underwriter reputation. Journal of Finance 45, 1045–1067.

Chemmanur, T.J., Hu, G., 2006. The role of institutional investors in IPOs. Unpublished working paper, Boston College, Boston, MA.

Chemmanur, T.J., Jiao, Y., 2005. Institutional trading, information production, and the SEO discount: a model of seasoned equity offerings. Unpublished working paper, Boston College, Boston, MA.

Conrad, J.S., Johnson, K.M., Wahal, S., 2001. Institutional trading and soft dollars. Journal of Finance 56, 397–416.

Corwin, S.A., 2003. The determinants of underpricing for unseasoned equity offers. Journal of Finance 58, 2249–2279.

Gerard, B., Nanda, V., 1993. Trading and manipulation around seasoned equity offerings. Journal of Finance 48, 213–245.

Giammarino, R.M., Lewis, T., 1989. A theory of negotiated equity financing. Review of Financial Studies 1, 265–288.

Gibson, S., Safieddine, A., Sonti, R., 2004. Smart investments by smart money: evidence from seasoned equity offerings. Journal of Financial Economics 72, 581–604.

Goldstein, M., Irvine, R., Kandel, E., Wiener, Z., 2008. Brokerage commissions and information allocation. Review of Financial Studies, forthcoming.

Gompers, P.A., Metrick, A., 2001. Institutional investors and equity prices. Quarterly Journal of Economics 116, 229–259.

Grossman, S.J., Stiglitz, J.E., 1980. On the impossibility of informationally efficient markets. American Economic Review 70, 393–408.

Henry, T.R., Koski, J.L., 2008. Short selling around seasoned equity offerings. Unpublished working paper, University of Georgia, Athens, GA.

Jones, C.M., Lipson, M.L., 2001. Sixteenths: direct evidence on institutional execution costs. Journal of Financial Economics 59, 253–278.

Keim, D.B., Madhavan, A., 1995. Anatomy of the trading process: empirical evidence on the behavior of institutional traders. Journal of Financial Economics 37, 371–398.

Kim, K., Shin, H.-H., 2004. The puzzling increase in underpricing of seasoned equity offerings. The Financial Review 39, 343–366.

Kyle, A.S., 1985. Continuous auctions and insider trading. Econometrica 53, 1315–1336.

Loughran, T., Ritter, J.R., 1995. The new issues puzzle. Journal of Finance 50, 23–51.

Loughran, T., Ritter, J.R., 2004. Why has IPO underpricing changed over time? Financial Management 33, 5–37.

Mola, S., Loughran, T., 2004. Discounting and clustering in seasoned equity offering prices. Journal of Financial and Quantitative Analysis 39, 1–23.

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

Parrino, R., Sias, R.W., Starks, L.T., 2003. Voting with their feet: institutional ownership changes around forced CEO turnover. Journal of Financial Economics 68, 3–46.

Parsons, J., Raviv, A., 1985. Underpricing of seasoned issues. Journal of Financial Economics 14, 377–397.

Perold, A.F., 1988. The implementation shortfall: paper versus reality. Journal of Portfolio Management 14, 4–9.

Ritter, J.R., 1991. The long-run performance of initial public offerings. Journal of Finance 46, 3–27.

Ritter, J.R., Welch, I., 2002. A review of IPO activity, pricing, and allocations. Journal of Finance 57, 1795–1828.

Rock, K., 1986. Why new issues are underpriced. Journal of Financial Economics 15, 187–212.

Safieddine, A., Wilhelm, W.J., 1996. An empirical investigation of short-selling activity prior to seasoned equity offerings. Journal of Finance 51, 729–749.

Singal, V., Xu, L., 2005. Do short sellers know more? Evidence from a natural experiment. Unpublished working paper, Virginia Polytechnic Institute and State University, Blacksburg, VA.

Wall Street Journal, 2007. SEC revises rule on short selling. June 21.