

**ESSAYS ON SEASONED EQUITY OFFERINGS**

**BY**

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**ABSTRACT**

Essays on Seasoned Equity Offerings

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A seasoned equity offering (SEO) is a new equity issue by a public firm. SEOs are very important activities during the life of firms. A significant body of empirical work finds stylized facts concerning the stock price dynamics around seasoned equity offerings, which are the stock price run-up prior to the issue and the low long-run post-issue return. Chapter 1 reviews the empirical evidence and different explanations of the return patterns around SEOs.

Chapter 2 examines the trading patterns of institutional investors around SEOs and relates to the SEO market timing. Institution investors, on average, significantly increase their share ownership at the time of SEOs. There is no evidence that these increases take into account the timing patterns of SEOs. These patterns hold for both institutional shareholders with long- and short- investment horizons. Finally, results show that firms with higher institutional shareholdings are somewhat less likely to engage in the timing of their SEOs. Overall, these results imply that the SEO market timing does not benefit institutional shareholders that maintain stakes in the issuing firms.

Chapter 3 examines the impact of reference point prices on seasoned equity offerings. It documents that a firm's financing decision is affected by the past peak price, after controlling for the firm's characteristics. The ratio of the offering price to the past peak price clusters around one with the probability of issuing exactly at the past peak price much higher than that at prices

slightly below or above. And the likelihood of equity issuance increases with the ratio of the current price to the historical high price. Furthermore, the likelihood of equity issuance is significantly higher following the months in which the stock hits a high. Overall, the evidence suggests that widely available stock price information, the historical peak price, serves as a reference point in managers' financing decisions.

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## CHAPTER 1

### LITERATURE REVIEW

A seasoned equity offering (SEO) is a new equity issue by a public firm. SEOs are very important activities during the life of firms. A significant body of empirical work finds stylized facts concerning the stock price dynamics around seasoned equity offerings, which are the stock price run-up prior to the issue and low long-run post-issue returns. These findings appear to challenge the presumption of rational pricing in security markets. The post-issue long-run underperformance is commonly referred to as the “new issues puzzle.” The main objective in this chapter is to survey the empirical evidence of the return patterns around SEOs and the various models that try to interpret the timing of seasoned equity offerings.

#### **1. Empirical evidence of long-run returns around seasoned equity offerings**

Numerous studies examine the long-run performance of seasoned equity offerings<sup>1</sup>. Different methodologies and different samples have been used to examine the price paths around seasoned equity offerings. Next I will give a brief review of these studies.

Loughran and Ritter (1995) examine the performance of seasoned equity offerings during 1970 to 1990 using three different procedures. The first procedure is to calculate t-statistics using annual holding-period returns of issuers relative to non-issuers. The second procedure uses a series of cross-sectional regressions on monthly individual firm returns. The third procedure calculates the abnormal returns using a 3-factor time series regression of monthly returns for portfolios of issuers and non-issuers. They find that the average annual post-issue return of equity issuers is about 7%, while for comparable non-issuers matched on size, the average annual

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<sup>1</sup> E.g. (Loughran and Ritter (1995), Spiess and Affleck-Graves (1995), Lee (1997), Jegadeesh (2000), Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000), Kahle (2000), and Clarke, Dunbar, and Kahle (2001).

return is 15%. It implies that an investor would have had to invest 44% more money in the issuers than in the non-issuers of the same size to have the same wealth five years after the offering date. The post-issue underperformance is robust to five other market-index-based benchmarks, such as the CRSP equally weighted and value-weighted Amex-NYSE indices, CRSP equally weighted and value-weighted Nasdaq indices, and the S&P 500.

Spiess and Affleck-Graves (1995) document that a sample of primary seasoned equity issues from 1975 to 1989 substantially underperform matched non-issuers in similar industries and of similar size. Specially, the median five-year post-issue return is 10.0% compared with 42.3% for the matched non-issuers sample. Similar results are found when issuers and non-issues are matched on the basis of book-to-market ratio and size. In addition the underperformance is quite persistent across most years and is robust after controlling for trading system, offer size and firm age.

However, the results of long-run performance are still under controversy and subject to questions and doubts. Eckbo, Masulis and Norli (2000) and Brav, Geczy and Gompers (2000) raise questions about the credibility of the matched-firm method and the econometric foundation of the “New Issue Puzzle”, which represents the joint hypothesis that markets underreact to SEO announcements and that non-issuing control firms capture the true risk characteristics of SEO firms. Eckbo, Masulis and Norli (2000) test the second part by using various factor model specifications to generate risk-adjusted expected returns. Their factor model estimation uses six macroeconomic variables, such as the value-weighted CRSP market index, the return spread between Treasury bonds with 20-year and one-year maturities, the return spread between 90- and 30-day Treasury bills, the seasonally adjusted percent change in real per capita consumption of nondurable goods, the difference in the monthly yield change on BAA-rated and AAA-rated

corporate bonds, and unexpected inflation. They document that post-issue underperformance reflects lower systematic risk exposure for issuing firms relative to the matched non-issuing firms. Their explanation is that when equity issuers lower leverage, their exposure to unexpected inflation and default risks decreases, which correspondingly decreases the expected returns relative to the matched firms. In addition, equity issues also significantly increase stock liquidity, which further lowers the expected returns relative to the matched non-issuers. Therefore, they conclude that the “New Issue Puzzle” is a result of a failure of the matched-firm technique to provide a proper control for risk.

## 2. Long-run performance measurements

The existence of long-run underperformance of seasoned equity offerings is still controversial mainly because of the arguments about what is considered as a good benchmark return. Three different long-run abnormal measurements have been widely used in prior literature. This section will briefly introduce the three different approaches while attempting to interpret their relative strengths and weaknesses.

### 2.1 Cumulative abnormal return (CAR) approach

Average monthly-adjusted return (AR) for the  $t$  months after the SEOs is computed as:

$$AR_t = \left(\frac{1}{N_t}\right) \sum_{i=1}^{N_t} (R_{issuers,it} - R_{matched,it})$$

Where  $R_{issuers,it}$  is the return of a seasoned equity offering for firm  $i$  in month  $t$ , and  $R_{matched,it}$  is the total return on the matched firm over the same period.  $N_t$  is the number of issuers in month  $t$ .

Different benchmarks have been considered in earlier literature (e.g. Barber and Lyon (1997), Spiess and Affleck-Graves (1995)): (1) A size-matched sample of non-equity-issuing firms, (2) book-to-market matched sample of non-issuers (3) an industry and size matched

sample of non-equity-issuing firms, and (4) a book-to-market and size-matched sample of non-equity-issuing firms. The implicit assumption of the characteristic-based benchmark approach is that the expected return of the character-matched sample is the expected return of the issuers as well.

The cumulative adjusted return ( $CAR$ ) through event month  $T$  is the sum of the average monthly-adjusted returns for months 1 through  $T$  as shown below:

$$CAR_t = \sum_{t=1}^T AR_t$$

This method will test the null hypothesis that the mean abnormal return is equal to zero. A standard t-statics is calculated by dividing  $CAR$  by an estimated standard deviation.

## 2.2 Buy-and-hold abnormal return approach

Buy-and-hold abnormal return (BHAR) has been the most popular method of abnormal return estimation in previous studies (e.g. Ritter (1991), Jegadeesh (2000), Loughran and Ritter (1995)). Mitchell and Stafford (2000) describe buy-and-hold abnormal return as the average multiyear return from a strategy of investing in all firms that complete an event and selling at the end of a specific holding period versus a comparable strategy using otherwise similar nonevent firms.

The average buy-and-hold return for  $T$  months after SEOs can be calculated as:

$$\overline{BHR} = \left( \frac{1}{\omega_i} \right) \sum_{i=1}^N \left[ \prod_{t=t_i}^{T_i} (1 + R_{it}) - 1 \right]$$

Where  $R_{it}$  is the return of stock  $i$  in event month  $t$ ,  $N$  is the total number of stocks, and  $\omega_i$  is stock  $i$ 's weight in forming the average holding-period return. The holding period for stock

$i$  is  $T_i$ .  $\overline{BHR}$  can be calculated as the equal or value weighted average of individual firms ( $\omega_i = \frac{1}{N}$  when equal-weight, and value-weighted is captured by their market capitalization).

The five-year abnormal buy-and-hold return following equity issues is computed as the difference in buy-and-hold returns between SEO firms and matched non-issuers:

$$\overline{BHAR} = \overline{BHR}_{Issuers} - \overline{BHR}_{matched}$$

Similar to the cumulative abnormal return approach, different firm characters have been used to select the matched sample of non-issuers, such as firm size, book-to-market ratio and industry.

Inferences about the abnormal performance are on the basis of the mean buy-and-hold abnormal return and its statistical significance.

### 2.3 Jensen-alpha approach

With the Jensen-alpha approach, an asset-pricing model is estimated using monthly returns, with the intercept  $\alpha$  as the measure of the average monthly abnormal return (e.g. Jensen (1968)). This method has obtained significant support in the studies of long-term seasoned equity issue performance (e.g. Mitchell and Stafford (2000) and Brav and Gompers (1997)). Assume that the researcher seeks to estimate price performance over five years ( $T = 60$  months) following the event. For each calendar month over the entire sample period, a portfolio is constructed comprising all firms experiencing the corporate event during the previous 60 months. The portfolios are rebalanced each month and an equal or value-weighted portfolio excess return is calculated. Then the time-series monthly portfolio returns adjusted by the risk-free rate are then regressed on some factors that can be used to predict the expected return.

The most commonly used empirical asset pricing model is the three-factor model of Fama and French (1993):

$$R_{pt} - R_{ft} = \alpha_p + \beta_1(R_{mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \varepsilon_{pt}$$

Where  $R_{pt}$  is the equal or value weighted return for calendar month  $t$  for the portfolio of SEO firms.  $R_{ft}$  is the risk-free rate.  $R_{mt}$  is the return on the CRSP valued weighted market portfolio.  $SMB_t$  and  $HML_t$  are the Fama and French (1993) size and book-to-market factors.  $SMB_t$  is the difference in return between the portfolios of “small” stocks and “big” stocks.  $HML_t$  is the difference in return between the portfolios of “high” and “low” book-to-market stocks.

A momentum factor that is inspired by Carhart (1997) is also included in some literature (e.g. Brav, Geczy and Gompers (2000)). It is constructed as the difference in the return between the one-third highest and the one-third lowest CRSP performers over the past 12 months. In addition, Eckbo, Masulis and Norli (2000) control for some other specific macroeconomic variables, such as the value-weighted CRSP market index, the return spread between Treasury bonds with 20-year and one-year maturities, the return spread between 90- and 30-day Treasury bills, the seasonally adjusted percent change in real per capita consumption of nondurable goods, the difference in the monthly yield change on BAA-rated and AAA-rated corporate bonds, and unexpected inflation.

The coefficient of interest is  $\alpha_p$ . It is the average monthly abnormal return on the portfolio of issuing firms and can be used to calculate the annualized post-issue abnormal returns. Inferences about the abnormal performance are based on the estimated  $\alpha_p$  and its statistical significance.

So far, the existence of the post-issue abnormal return is still subject to challenges because the magnitude of the abnormal return is not robust to different aforementioned

methodologies. The different methods hinge on the joint-hypothesis that the measurement of “normal returns” is correct and there is market inefficiency. Even though an intensive literature focuses on the approaches to measure abnormal performance, there is still no clear winner since none of them is immune to problems.

As Barber and Lyon (1997) point out, cumulative abnormal returns are subject to different types of biases: 1) Measurement biases, which is because cumulative abnormal returns are a biased predictor of long-run buy-and-hold abnormal returns; 2) New listing biases, which arise because the bench market return will include new firms that don't have a long post-event history of returns; 3) skewness biases, which is a result of large positive returns.

The inference from the buy-and-hold abnormal return approach is on the basis of the mean buy-and-hold abnormal return and its statistical significance. An unbiased standard error assumes that BHARs are normally and independently distributed. The BHAR approach is subjective to some critiques (e.g. Barber and Lyon (1997), Brav, Geczy and Gompers (2000), Mitchell and Stafford (2000), and Jegadeesh and Karceski (2009)): 1) Abnormal returns are not normal distributed but right-skewed because returns have a lower bound of -100% but no upper bound. 2) The abnormal returns are not independent but cross-correlated because long-time horizon returns will lead to the common time period among the sample firms and seasoned equity offerings also exhibit waves. Breaking the normal distribution and independence assumption can lead to a large bias. Even though different adjusted t-statistics have been developed (e.g. Johnson (1978), Sutton (1993), Lyon, Barber and Tsai (1999)), none of them can fully address the biases.

Jensen-alpha approach could overcome the biases arising from the cross-correlation

because it uses calendar time portfolios. However, Loughran and Ritter (2000) argue that the Fama-French three-factor model using value-weighted returns has low power to identify abnormal returns for events that occur under managerial control mainly due to weighting schemes (equally weighting each period and value-weighting returns) and factor contamination. They find that methods using the value-weighted scheme will generate lower abnormal returns than methods using the equal-weighted scheme. In addition, using the Fama-French three-factor model that uses factors that are purged of new issues, they find that SEOs reliably underperform regardless of the weighting schemes.

### **3. Explanations of long-run post-issue performance**

The aforementioned return patterns around SEOs appear to challenge the presumption of rational pricing in security markets. Different explanations have been brought up to interpret the post-issue underperformance of seasoned equity offerings. There are mainly two types of explanations.<sup>2</sup> One is based on rational market pricing, and the other one is on the basis of investors' irrationality, which is taken advantage of by managers. However, none of these explanations could adequately explain the firms' seasoned equity financing decisions. This section reviews the various models separately.

#### **3.1 Timing theories with rational market pricing**

##### **1) Optimal investments and equity offerings**

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<sup>2</sup> One branch of literature focuses on the negative announcement effects and equity issue waves. (e.g. Asquith and Mullins (1986), Masulis and Korwar (1986), Jung, Kim and Stultz (1996)). A large number of papers try to explain the phenomenon (e.g. Myers and Majluf (1984), Jensen (1986), Karajczyk, Lucas and McDold(1992)). In this chapter, I am not going to review this line of literature, but mainly focus on the explanations of low post-issue returns.

Carlson, Fisher, and Giammarino (2005) develop a rational theory to interpret the pre-issuance price run-up and the post-issuance long-run underperformance. They interpret the low post-issue return as the endogenous decrease in the expected rate of return. When a project execution is flexible in time, a project becomes a real option. Exercising the real option converts the real option into assets in place. In other words, a real option is a levered claim, while exercising the real option unlevers the position. The required rate of return on a levered claim is higher than the required return on an unlevered claim on the same assets. Accordingly, when firms convert real options into assets in place through seasoned equity offerings, the model predicts lower realized post-issue returns. Therefore, they conclude that lower post-issue returns are not because managers time equity issues to periods of stock overvaluation, but rather the result of a fundamental shift in the riskiness of firms' assets. Furthermore, since managers will only exercise growth options when the options move sufficiently in the money, the model also explains the pre-issue stock price run-up.

Lyandres, Sun and Zhang (2008) also explore the investment-based explanation for the low long-run stock returns of SEOs. They find empirical evidence that the investment to asset ratios of SEO firms are on average twice as large as the ratios of non-issuing firms. They show that an investment factor, long in low investment stocks and short in high investment stocks, helps explain the new issues puzzle. Adding this factor into standard factor regressions substantially reduces the magnitude of the underperformance following equity and debt offerings. Their evidence is consistent with the real options theory. Their results suggest that matching simply based on size and book-to-market may not be sufficient to control for systematic risk.

In sum, the investment-based theories suggest that SEO firms will have lower expected rate of returns because of lower market risk following SEOs. This offers a potential explanation for the finding that stock returns are relatively low following SEOs.

## 2) Pseudo market timing

Schultz (2003) proposes pseudo market timing as another rational market explanation for the long-run post-issue underperformance. The paper suggests that the long-run underperformance is not because of managers' real market timing ability, but rather to be a statistical illusion that is caused by the clustering of equity issues after high abnormal returns of the previous equity issues. The premise for such a hypothesis is that more firms issue equity at higher prices even though managers have no timing ability. Firms tend to issue stocks after stock prices increase due to many possible reasons, such as better investment opportunities reflected in the higher prices, less earnings dilution or a wealth transfer from new shareholders to existing shareholders. The pseudo market timing hypothesis can be explained by a simple one-period return example. Assume that the market return is zero. The post-issue return is equal to the post-issue market return plus an excess return of either +10% or -10%, which are equally likely. A potential issuer is expected to get the same return as the recent issuer. If the issuer return in period zero is -10%, there will be no new issues at time one. Alternatively, if the issuer return in period zero is +10%, there are more issues (let's say three) in period one. Then the unconditional equal-weighted one-period buy-and-hold abnormal return for the issuers is -3.75%. To value each event equally is more likely to generate more negative post-issue abnormal returns. Schultz (2003) refers to this result as "pseudo market timing".

Some researchers try to explore to what extent pseudo market timing can explain low returns observed after equity issuance (e.g. Dahlquist and De Jong (2008), Viswanathan and Wei

(2008), Baker, Talisaferro and Wurgler (2004)). Dahlquist and De Jong (2008) argue that pseudo market timing is only a small-sample bias under stationary and disappears in large samples. They conclude that pseudo market timing is highly unlikely to be the main explanation for the low post issue stock market returns.

In summary, the pseudo marking timing provides an explanation of the long-run underperformance. However, the debate of its effect in large samples is still ongoing.

### 3.2 Timing theories with non-rational market pricing

The market timing explanation based on non-rational market pricing states that firms time equity issues to periods when stocks are more likely to be overvalued. Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) find post-issue long-run underperformance and propose the market timing hypothesis that managers are relatively better informed and therefore are able to time equity issue to period of overvaluation “windows of opportunity.” Graham and Harvey (2001) do an anonymous survey of CFOs of public corporations. They find that two thirds state that “the amount by which our stock is undervalued or overvalued was an important or very important consideration” in issuing equity. A few other questions in the survey are also related to the role of stock prices in corporate decisions. Overall, stock prices play a very important role in the decisions to issue common equity.

This hypothesis is based on the market inefficiency that in such a window the stock price deviates from the fundamental value. The existence of stock overvaluation (windows of opportunity) could be due to the information asymmetry between managers and outsider investors, investors’ overconfidence, or earning inflation. Daniel, Hirshleifer, and Subrahmanyam (1998) suggest the overconfidence hypothesis. This hypothesis is based on the assumption that investors are overconfident about the precision of their private information, but

not about the precision of public information. Therefore, investors generally overreact to private information and underreact to public information. Prior literature that is related to announcement effects finds that the market responds negatively to equity issue announcements. One explanation is based on the information asymmetry and adverse selection. If investors can rationally incorporate the managerial behavioral in the stock price, we should not expect the long-run underperformance. However, investors are overconfident about their private information and are overly optimistic about the prospect of issuing firms, and as a consequence, prices do not fully incorporate managerial incentives to time equity issues. This results in initial overpricing of issuing firms and a subsequent long-run underperformance when the market gradually adjusts the stock price over time.

Teoh, Welch, and Wong (1998) examine whether unusually aggressive management of earnings through income-increasing accounting adjustments lead investors to be overly optimistic about the issuer's prospects. They examine discretionary accruals around equity offerings. The idea is that investors are more willing to invest in companies that they are optimistic about due to the high past reported earnings. Managers might take advantage of this misinterpretation and therefore have the incentive to cultivate optimism by reporting inflated earnings before an equity offering. When the high-earnings cannot be sustained any longer, the investors will revalue the stock down to the fundamental value. The earning management hypothesis predicts that issuers have high pre-issue reported earnings and poor post-issue reported earnings and stock performance. They find empirical evidence that the earnings growth of issuers is higher than that of matched non-issuers prior to the issuance, but the earning performance of issuers is lower than that of non-issuers after the issuance. They further find that it is the accruals that cause the at-issue peak and post-issue underperformance in earnings.

Moreover, there is a negative relationship between the amount of discretionary accruals prior to seasoned equity offerings and the post-issue long-run stock return performance. The authors view this as evidence of market timing hypothesis.

In addition, instead of timing the firm specific mispricing, Baker and Wurgler (2000) examine the relationship between equity issuances and aggregate market returns. They find that the proportion of equity in total new issues is a strong predictor of future aggregate equity market returns. For example, in the year after the bottom-quartile equity share years, the average value-weighted return is 14%, while in the year after the top-quartile years, the average value-weighted return is -6%. The equity share in new issues has a higher predictability of future market returns than the dividend-to-price ratio or the book-to-market ratio. These results are not consistent with the market efficiency hypothesis. These findings could suggest that managers are able to time the market component of their company's returns. Herderson, Jegadeesh, and Weisbach (2006) examine the relationship between equity issuances and aggregate market returns in several international markets from 1990 to 2001. In 12 out of the 13 markets, they find that the average market return after below-median equity share years is higher than that after above-median equity share years.

Some researchers try to examine managers' timing ability, their tendency to take advantage of the "windows of opportunity" and the overall impact of the market timing on financing decisions. Butler, Grullon and Weston (2005) question the argument that the predictive power of the equity shares is due to the managers' timing ability and propose an efficient market explanation. They point out that the aggregate equity issues tend to be high at market peaks and low at market troughs ex post, which could induce a negative relation between equity issues and aggregate market returns. They find that the negative relation over the period from 1927 to 2002

is mainly driven by the Great depression (1920 to 1931) and the Oil Crisis of the early 1970s. If those two events are excluded from the sample, equity issues can no longer predict the aggregate market returns.

Burch, Christie, and Nanda (2004) examine whether managers exploit the private information to benefit the existing shareholders at the expense of the new investors by comparing the subsequent performance of seasoned equity issued via rights offers and firm commitment offers. They posit that rights offerings, which are targeted to a firm's ongoing shareholders, are less likely to be timed to exploit overvaluation than firm commitment offers, which are targeted to new shareholders. They find more negative post-issue returns for firm commitment offers than for rights offering. These results suggest that managerial timing could at least partially explain the post-issue underperformance. Jenter (2005) provides evidence that managers' view of mispricing is an important factor behind corporate financing decisions. Insider trading patterns show that managers in low valuation firms view their stocks as undervalued and managers in high valuation firms view their stocks as overvalued.

Another branch of literature directly examines the relationship between equity issues and ex ante indicators of overvaluation. However, the challenge of this type of empirical tests is how to measure mispricing, which is hard to pin down. The most common choice is the market-to-book ratio: a high market-to-book ratio suggests that the firm may be overvalued. Fama and French (1992) find that market-to-book ratios are inversely related to future returns in the cross-section and Pontiff and Schall (1998) find the same relationship in the time-series. Jung, Kim and Stulz (1996), Hovakimian, Opler, and Titman (2001) and Erel, Julio, Kim and Weisbach (2012) find a strong positive relationship between market-to-book ratios and seasoned equity

offerings. However, the difficulty that arises with this approach is that market-to-book ratios may be related to investment opportunities.

DellaVigna and Pollet (2013) examine the impact of market timing by using innovative measures of mispricing and investment opportunities. They use the demographic shifts induced by demographics as a measure of investment opportunities. On the one hand, they use the short-term demand shift to examine the capital budgeting hypothesis that the positive short-term demand shift leads to more equity issues. On the other hand, they use the long-term demand shift to measure the mispricing and analyze the market timing hypothesis. Companies in industries with positive (negative) demand shift in five to ten years will tend to be undervalued (overvalued) because only managers have access to these type of information and the current market price fails to incorporate the information about the long-term demand shift. Therefore, the positive demand shift will lead to less equity issues and negative demand shift will lead to more equity issues. Their results suggest that market timing plays a substantial role in seasoned equity offering decisions.

The equity market timing studies continue to be hotly debated. Market timing hypothesis can help explain a puzzle of how or why issuers are able to issue outside equity when potential agency costs are high. Even though market timing cannot fully explain firms' financing decisions, prior evidence indicates that market timing does play a considerable role in equity issuance decisions. DeAngelo, DeAngelo, and Stulz (2010) find that both a firm's market-timing opportunities and its corporate lifecycle state exert statistically and economically significant influences on the probability of seasoned equity offerings.

To summarize, the existence of long-run post-issue abnormal returns doesn't come to an agreement due to the problems with the different abnormal returns methods. Even though

different explanations have been proposed, none of them could fully examine the low post-issue long-run returns.

The implicit assumption of the different aforementioned models is that managers will behave on the interest of existing shareholders. However, little research has been done to examine whether this assumption is true. The most related research is Tserlukevich, Babenko and Wan (2013). They develop a rational expectation model to examine the conflicts of interest between different groups of shareholders in firms' market timing decisions. Chapter 2 will examine whether the existing shareholders would benefit from SEO market timing. Using the 13F institutional holding data, I examine the holding and trading of institutional investors around SEOs and whether the existing shareholders would benefit from SEO market timing.

There is a large amount of uncertainty and complexity involved in the firms' financing decisions. Kahneman and Tversky (1974) suggest that individuals use heuristics to cope with complex and uncertain situations. Prior empirical literature provides evidence of various cognitive biases among market participants. Therefore, chapter 3 examines the impact of reference point prices on seasoned equity offerings.

## CHAPTER 2

### INSTITUTIONAL SHAREHOLDERS AND SEO MARKET TIMING

The consensus view in corporate finance is that firms time their seasoned equity offerings (SEO) to periods of relatively high share prices, presumably because managers believe that their shares are likely to be overpriced at such times. The perceived mispricing underlying such market timing efforts could be due to information asymmetry between managers and investors or behavioral biases prevailing in equity markets. Pecking order (Myers and Majluf, 1984) and market timing (Baker and Wurgler, 2002) theories of corporate financing that can explain such behavior assume that corporate financing decisions are made in the interests of existing shareholders who are passive. In this paper, I examine if the data are consistent with such an assumption.

Agency theories of corporate financing emphasize that separation of ownership and control leads to conflicts of interest between outside shareholders and managers (Jensen, 1986). The literature argues that large institutional shareholders can mitigate such conflicts by monitoring managers (Hartzell and Starks, 2003). To the extent that institutional shareholders can monitor and discipline managers, I expect SEO timing decisions to be in the interest of such shareholders in particular.

Yet, not all institutional shareholders benefit from SEO timing. Specifically, any institutions whose fractional allocation in the SEO exceeded its fractional pre-existing stake in the firm would suffer losses if SEOs were timed to sell overvalued equity. Such shareholders are likely to be dissatisfied with the management. Hence, I hypothesize that the managers' incentives to sell overvalued equity in SEOs increase with the pre-existing institutional shareholder ownership and decline with institutional shareholder participation in the SEO. Accordingly, my

empirical strategy is to examine whether SEO timing varies with institutional shareholdings and if the timing patterns of SEOs and institutional shareholder trades are consistent with the view that SEO timing benefits the issuing firm's existing institutional shareholders.

In addition to examining the overall levels of institutional ownership around SEOs, the paper distinguishes institutional shareholders along two relevant dimensions. First, I separate the trading of existing institutional shareholders from the purchases by new institutions that establish new initial positions in SEO firms. I further separate existing institutional shareholders that continue to maintain ownership interest in the firm after the SEO from those that liquidate their positions around the time of the SEO. One could argue that management should be expected to act especially in the interest of existing institutional shareholders with continued ownership interest since shareholders who liquidate their stakes relinquish any power to discipline the managers.

Since monitoring by institutional shareholders is the basis of many of my empirical predictions, I also separate institutional investors that are more likely to monitor from those that are not. Prior literature suggests that some institutional investors monitor and invest for the long run whereas others concentrate their efforts on identifying short-run mispricing and trade actively to exploit their informational advantages. I follow Gaspar, Massa, and Matos (2005) and Yan and Zhang (2009) and classify institutional investors as having short or long investment horizons based on their average portfolio turnover in the previous four quarters.

I find that trading patterns of institutional investors around SEOs imply that such investors, on average, significantly increase their share ownership at the time of the SEO. I further find no evidence that these increases take into account the timing patterns of SEOs. These patterns hold for both institutional shareholders with long and short investment horizons. Finally,

my results show that firms with higher institutional shareholdings (both short- and long-term) tend to engage less in timing of their SEOs. Overall, these results imply that SEO timing does not, on average, benefit institutional shareholders. Considering that institutional shareholders willingly purchase shares in SEOs and that, collectively, they can discipline the managers, the results further imply that the goal of SEO timing is unlikely to be to sell overvalued equity.

The paper is related to a number of other papers that examine institutional ownership and SEO timing. Gibson, Saffieddine, and Sonti (2004) find that seasoned equity issuers with the largest increase in institutional ownership between quarters -1 and +1 relative to SEO outperform their benchmark portfolios in the year following the issue and attribute this to their informational advantage. Chemmanur, He, and Hu (2009) find that institutions are able to receive more allocations in SEOs with better long-run stock returns and their post-SEO trading significantly outperforms a naive buy-and-hold trading strategy. Unlike these papers that focus on whether institutions are better-informed, the current paper focuses on the principal-agent relationship between institutional shareholders and managers.

The paper is organized as follows Section 1 describes the data and the institutional ownership variables; Section 2 examines the time series patterns of stock prices and institutional holdings around SEOs; Section 3 examines the relation between SEO timing and institutional share purchases; Section 4 examines the impact of institutional holdings on SEO timing and section 5 summarizes my conclusions.

## **1. Data and institutional ownership variables**

The data for this study come from several sources. The institutional shareholdings data for 1983-2009 are retrieved from Thomson Financial institutional holdings 13f database, which reports institutional shareholdings as of end of calendar quarters ending in March, June,

September, and December.<sup>3</sup> These numbers are used to calculate total institutional holdings and changes in holdings of 13f investors as percentages of the firms' total shares outstanding and to identify the institutional shareholders' investment horizons. Specifically, for each firm  $i$  and quarter  $t$ , I calculate net institutional purchases as

$$\Delta IO_{i,t} = \sum_{k=1}^{N_{i,t}} (S_{k,i,t} - S_{k,i,t-1}) / SHOUT_{it} \quad (1)$$

Here,  $S_{k,i,t-1}$  and  $S_{k,i,t}$  are institution  $k$ 's holdings of stock at the ends of quarters  $t-1$  and  $t$ , respectively.  $SHOUT_{i,t}$  is the number of shares outstanding at the end of quarter  $t$ . Institutional holdings are only reported in the database if they are non-zero. In addition to net institutional purchases calculated using equation (1) for all observations with non-missing values, I separately track purchases that establish the institutions' initial ownership positions and sales that liquidate the institutions' entire holdings in the firm by treating missing holdings,  $S$ , as absence of any holdings.

I identify short- and long-term institutional investors based on their average portfolio turnover in the last four quarters, as in Yan and Zhang (2009). Specifically, I first calculate the aggregate purchases and sales for each institution  $k$ :

$$CR\_buy_{k,t} = \sum_{\substack{i=1 \\ S_{k,i,t} > S_{k,i,t-1}}}^{N_k} |S_{k,i,t} P_{i,t} - S_{k,i,t-1} P_{i,t-1} - S_{k,i,t-1} \Delta P_{i,t}|, \quad (2)$$

$$CR\_sell_{k,t} = \sum_{\substack{i=1 \\ S_{k,i,t} \leq S_{k,i,t-1}}}^{N_k} |S_{k,i,t} P_{i,t} - S_{k,i,t-1} P_{i,t-1} - S_{k,i,t-1} \Delta P_{i,t}|. \quad (3)$$

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<sup>3</sup> The Securities and Exchange Commission (SEC) requires that all institutions with greater than \$100 million of equity securities under discretionary management report their holdings quarterly using the SEC's Form 13f; common stock positions greater than 10,000 shares or \$200,000 must be reported to the SEC at the end of each quarter.

Here,  $P_{i,t-1}$  and  $P_{i,t}$  are the share prices for stock  $i$  at the ends of quarters  $t-1$  and  $t$ , respectively.  $\Delta P_{i,t}$  is  $(P_{i,t} - P_{i,t-1})$ .  $S_{k,i,t-1}$  and  $S_{k,i,t}$  are institution  $k$ 's holdings of stock  $i$  at the ends of quarters  $t-1$  and  $t$ , respectively.  $CR\_buy_{k,t}$  and  $CR\_sell_{k,t}$  denote institution  $k$ 's aggregate purchases and sales in quarter  $t$ . The churn rate of institution  $k$  in quarter  $t$  is then defined as:

$$CR_{k,t} = \frac{\min(CR\_buy_{k,t}, CR\_sell_{k,t})}{\sum_{i=1}^{N_k} \frac{S_{k,i,t} P_{i,t} + S_{k,i,t-1} P_{i,t-1}}{2}}. \quad (4)$$

I then calculate each institution's average churn rate over the past four quarters as:

$$AVG\_CR_{k,t} = \frac{1}{4} \sum_{i=0}^3 CR_{k,t-j}. \quad (5)$$

Next, for each quarter, I sort all institutions into three equal portfolios based on  $AVG\_CR_{k,t}$ . The institutions ranked in the top third have the highest turnover and are classified as short-term institutional investors. The institutions ranked in the bottom third have the lowest turnover and are classified as long-term institutional investors. I then define each firm's short-, medium-, and long-term institutional holdings at the end of quarter  $t$  as the percentage of the firms' total shares outstanding held by all short-, medium-, and long-term institutions, respectively.

The share prices and the shares outstanding needed for the churn rate and institutional holdings calculations are from the Center for Research in Security Prices (CRSP).<sup>4</sup> Also from CRSP are the stock return and volume data. I use only data for securities with CRSP share codes 10 and 11. Firm financial characteristics come from Compustat. Compustat data are reported on a fiscal year basis, which determines how my sample is organized and how institutional and stock market data are matched with financial characteristics. Specifically, Compustat variables

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<sup>4</sup> I adjust for splits using cumulative factors to adjust shares outstanding from CRSP.

for fiscal year  $t$  are matched with institutional ownership as of the last calendar quarter that falls within the fiscal year  $t$ .<sup>5</sup> Similarly, stock market data, such as stock returns and trading volume, are aggregated on fiscal year basis.

Seasoned equity offerings are identified from Thomson Financial SDC database. Pure secondary offerings are excluded, while pure primary and combinations of primary and secondary offerings are kept in the sample. Following earlier seasoned equity studies, units offerings, rights offerings and shelf registrations are excluded. I retain the issues that have matching financial statement data from COMPUSTAT, institutional investor holding data from Thomson Reuters (CDA/Spectrum), and stock return data from the Center for Research in Security Prices (CRSP). The cases with more than one offering within the same fiscal year are treated as single issues in the analyses that utilize annual Compustat data.<sup>6</sup>

The combined sample is subjected to the following additional screens and treatments. I retain only firms incorporated in the United States. Following prior studies of corporate financing, I exclude financial firms (SIC codes 6000-6999) and utility firms (SIC codes 4900-4949). To minimize the influence of outliers and misreported data in my analyses, I exclude firms with values of total assets or sales less than one million dollars and replace extreme observations of all ratio variables used in my analyses with missing values. Extreme values are defined as those in one percent of both tails of the distribution. Variables that take on only positive (negative) values are trimmed only on the right (left) tail of the distribution.<sup>7</sup> The

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<sup>5</sup> For example, for firms with fiscal year ends in December, January, and February, I use December institutional ownership levels, for firms with fiscal year ends in March, April, and May; I use March institutional ownership levels, etc.

<sup>6</sup> Some of my analyses utilize quarterly data, in which case I treat multiple issues within the same quarter as one issue.

<sup>7</sup> Leverage ratios and institutional holdings are trimmed at one.

resulting sample is an unbalanced panel covering 1983-2009, with up to 89,065 observations, including 3,738 SEOs.<sup>8</sup> The descriptive statistics for the sample are presented in Table 2.1.

## **2. Institutional ownership and equity issues**

In this section, I present initial evidence on stock performance and institutional ownership around equity issues.

### **2.1 Equity issue timing**

Figure 2.1 and Table 2.2 present the time-series patterns of mean market-to-book ratios and stock returns for three years prior and three years after the year of equity issue. The presented patterns are consistent with prior evidence in the literature on equity issue timing that stock returns and market-to-book ratios tend to increase prior to equity issuance and tend to decline following the issuance. Table 2.2 presents the results of the tests of statistical significance of the changes in stock returns and market-to-book ratios between years -3 and -1, -1 and 0, and -1 and +3. All the changes are statistically significant at 1% level. These results establish that the patterns, commonly referred to as market timing in the literature, are also present in my sample.

### **2.2 Institutional ownership around equity issues**

I next examine the patterns of institutional ownership and changes in institutional ownership around equity issues. The results are summarized in Figures 2.2, Table 2.3 and Table 2.4. Table 2.3.A and Figure 2.2.A tracks the level of institutional ownership from year -3 to year +3 around the equity issues and indicates a substantial increase in the level of institutional ownership from about 28% in year -3 to about 46% in year +3. Most of this increase occurs in

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<sup>8</sup> My sample period starts from 1982 because I need turnover in 1980 to classify short-term and long-term institutional investors in 1981 that are used to predict the equity issues in 1982.

year 0. Table 2.3.B and Figure 2.2.B tracks the level of institutional ownership more precisely, on a quarterly basis, but for a shorter period of time. The pattern in Figure 2.2.B indicates that a substantial part of the increase in institutional ownership observed in Figure 2.2.A, takes place during quarter 0, the quarter when equity is issued. The ownership level of institutional investors increases from about 37% at the end of quarter -1 to about 46% at the end of quarter 0. These results suggest that, on average, institutional investors increase their ownership positions by purchasing shares in the SEOs. This finding raises questions about the interpretation of SEO timing reflected in patterns presented in Figure 2.1 and Table 2.2 as attempts to sell overvalued equity.

Figures 2.2.A and 2.2.B track the total level of institutional ownership. I do not know whether the increase comes from existing institutional shareholders or from new investors. Table 2.4 clarifies this question by presenting the changes in the ownership of institutional investors who report ownership interest at the ends of periods (fiscal year or quarter) immediately preceding and following the SEO (continuing ownership), those who own shares before the SEO but have no holdings after the SEO (liquidations), and those who own no shares before the SEO but report ownership interest immediately after the SEO (initiations).

If SEOs are timed to sell overvalued shares, then wealth is transferred from shareholders buying SEO shares to existing shareholders who do not buy SEO shares. Shareholders who buy or sell shares in the open market around the time of SEO neither lose nor benefit from SEO timing. Hence, only continuing shareholders can benefit from SEO market timing whereas initiating shareholders can only lose from SEO timing.

Panel A in Table 2.4 presents annual results for fiscal years -3 through +3 around the year of the issue and Panel B presents quarterly results for calendar quarters -3 through +3 around the

quarter of the issue.<sup>9</sup> The significance levels reported in the table are for the tests comparing the changes during the indicated period to changes in period 0. The results show that both the changes in continuing ownership and the level of initiations increase sharply in the year and, more specifically, in the quarter of the issue then drop back to the pre-issue levels by the second or third year after the issue. The level of liquidations remains relatively constant through the year and the quarter of the issue, but then increases substantially in the post-issue period.

To summarize, both new and existing institutional shareholders increase their purchases in the year and the quarter of the issue. These results suggest that neither existing nor new institutional shareholders seem to be concerned that SEO issuance might indicate that the shares are overpriced. Furthermore, the fractional ownership level of existing institutional investors increases in the SEO quarter (Figure 2.2.B), which implies that SEO's fractional allocation to these shareholders exceeds their fractional pre-existing stakes in the firm. This means that, collectively, existing institutional shareholders would suffer losses if SEOs were timed to sell overvalued equity. The caveat here is that existing shareholders may be buying fewer shares in overpriced SEOs and more shares in underpriced SEOs. I will examine this issue in Section 3.

### 2.3 Institutional ownership around equity issues by institutional investor horizon

Chen, Harford, and Li (2007) argue that long-term institutions tend to be better monitors, whereas short-term institutions are better informed and tend to trade actively to exploit their informational advantage. Therefore, in this subsection, I separately examine changes in ownership of institutional investors with short and long investment horizons. The analysis

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<sup>9</sup> While quarterly results allow us to more closely associate ownership changes with SEOs, annual results are presented for two reasons. First, they help us understand how unusual the changes in ownership at the time of SEO are, relative not only to the quarters immediately around the SEO but also in more distant time periods. Second, the fiscal year results provide consistency with subsequent regressions, which are estimated using fiscal year data.

presented in Table 2.4 is repeated separately for long-term institutional investors (Table 2.5) and for short-term institutional investors (Table 2.6). In both tables, Panels A present annual changes in ownership between fiscal years -3 and +3, whereas Panels B present quarterly changes between calendar quarters -3 and +3. The significance levels reported in these tables are for the tests comparing the changes during the indicated period to changes in period 0.

The results in Table 2.5 show that existing long-term institutional shareholders sharply increase their share purchases and reduce liquidations of their ownership positions in the year and, specifically, in the quarter of the issue. The changes are significantly different from zero. The level of share purchases by continuing long-term shareholders remains elevated for three years after the issue whereas the level of liquidations gradually increases after the issue. The results also show that the level of new ownership initiations rises in the year and the quarter of the issue and then gradually declines over the three-year post-issue period examined in the table. These results suggest that neither new nor existing long-term shareholders act as if they are concerned about SEO timing. Furthermore, the fractional ownership level of existing long-term institutional investors slightly increases in the SEO quarter (Figure 2.3.A), which implies that SEO's fractional allocation to these shareholders exceeds their fractional pre-existing stakes in the firm. This means that existing long-term institutional shareholders do not benefit from SEO timing.

The results in Table 2.6 show that, similar to long-term institutional shareholders, existing short-term institutional shareholders sharply increase their share purchases in the year and especially in the quarter of the issue. In the period following the issue, the level of share purchases by continuing short-term shareholders drops below the pre-issue level. The level of

liquidations increases somewhat in the year and the quarter of the issue and shows further increases after the issue, substantially exceeding the pre-issue level.

The results also show that the level of new ownership position initiations rises in the year and the quarter of the issue and then drops back to the pre-issue levels. Overall, these results suggest that neither new nor existing short-term shareholders act as if they are concerned about SEO timing. Furthermore, the fractional ownership level of existing short-term institutional investors increases in the SEO quarter (Figure 2.3.B), which implies that SEO's fractional allocation to these shareholders exceeds their fractional pre-existing stakes in the firm. This means that existing short-term institutional shareholders do not benefit from SEO timing.

#### 2.4 Institutional ownership around equity issues: regression results

My results, thus far, suggest that institutional investors, both existing and new, actively participate in SEOs by purchasing enough shares to substantially increase their shareholdings in the issuing firms. It is possible, however, that firm characteristics that make equity issuance likely also make issuers' shares more attractive to institutional investors. In this section, I reexamine the evidence on changes in continuing institutional ownership around equity issues in a regression framework while controlling for various firm characteristics. The regression model has the following form:

$$\begin{aligned}
 \Delta CIO_{it} = & \beta_0 j + \beta_1 Lev_{it-1} + \beta_2 IndLev_{it-1} + \beta_3 R\&D_{it-1} + \beta_4 R\&DD_{it-1} + \beta_5 NOLC_{it-1} \\
 & + \beta_6 Prof_{it-1} + \beta_7 Tng_{it-1} + \beta_8 Sz_{it-1} + \beta_9 Age_{it-1} + \beta_{10} Pr_{it-1} + \beta_{11} Trn \\
 & + \beta_{12} Div_{it-1} + \beta_{13} Vol_{it-1} + \beta_{14} SP500_{it-1} + \beta_{15} Ret_{it-1} + \beta_{16} MB_{it-1} \\
 & + \beta_{17} SEO + \varepsilon_{it}
 \end{aligned} \tag{6}$$

In (6), the dependent variable,  $\Delta CIO$ , is the change in continuing institutional ownership. The main independent variable is the SEO indicator set to one if there is an SEO in the fiscal

year and to zero otherwise. A number of independent variables in (6) are motivated by the earlier studies by Hartzell and Starks (2003), Grinstein and Michaely (2005), and Yan and Zhang (2009). *Sz* is firm size measured as the natural log of sales (Compustat item SALE), adjusted for inflation. *Age* is the natural logarithm of the number of years since the time the stock first appears in CRSP. *Pr* is the natural logarithm of  $(1+P)$ , where  $P$  is the stock price at the fiscal year end. *Trn* is the share turnover measured as the annual share trading volume scaled by shares outstanding. *Div* is dividends yield measured as dividend over fiscal year end share price. *Vol* is the annualized standard deviation of daily returns observed in the fiscal year. *SP500* is an indicator for firms included in S&P500 stock index. *Ret* is the stock return over the fiscal year. *MB* is the market-to-book ratio measured as market value of assets over total assets.<sup>10</sup>

A number of factors, known to affect the equity issuance decision, are also included as control variables. *Lev* is leverage measured as the sum of long-term (DLTT) and short-term debt (DLC) scaled by book value of assets (AT). *IndLev* is the median leverage for firms with the same 2-digit SIC code. *Tng* is tangibility measured as the property, plant, and equipment (PPENT) scaled by total assets (AT). *NOLC* is defined as net operating loss carry forwards over total assets. *Prof* is profitability measured as operating income (OIBDP) scaled by lagged total assets. *R&D* is the research and development expense (XRD) scaled by total assets. A large number of firms in Compustat do not report R&D because they have no R&D. Such missing values are replaced with zeroes. To control for the possibility that observations with missing R&D may be different from observations with reported zero R&D I include an indicator variable

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<sup>10</sup> Market value of assets is (total assets – book equity + market equity). Book equity is the book value of stockholders' equity, plus balance sheet deferred taxes and investment tax credit, if available (TXDITC), minus the book value of preferred stock. Depending on availability, I use the redemption (PSTKRV), liquidation (PSTKL), or par value (PSTK) to estimate the book value of preferred stock. Stockholders' equity is (SEQ), if it is available. If not, I measure stockholders' equity as the book value of common equity (CEQ) plus the par value of preferred stock, or the book value of assets minus total liabilities (LT).

(R&DD), which is coded one when R&D is not missing. Year indicators are included to control for macroeconomic factors.

Table 2.7 presents three sets of results. The first set of results is for the case when the dependent variable measures the change in continuing total institutional ownership. The second set of results is for the regression of change in continuing long-term institutional ownership. The third set of results is for the regression of change in continuing short-term institutional ownership. The results in panel A show that, indeed, many factors, including those that affect SEOs, influence institutional ownership. Importantly, however, in all three regressions the coefficient estimates on the SEO indicators are positive and statistically significant. These results imply that institutional investors increase their shareholdings of firms conducting SEOs even after controlling for factors that could affect both the firm's issuance decision and the investors' purchase decisions.

### **3. Do institutional investors recognize equity issue timing**

The results thus far suggest that institutional investors, on average, purchase additional shares in SEOs. It is possible, however, that these investors selectively purchase shares only in SEOs that are not timed to be overpriced. In this section, I examine this issue.

#### **3.1 Time-series patterns by changes in institutional ownership during the SEO**

Within the sample of SEO firms, some firms experience negative changes in the continuing institutional ownership, while others experience positive changes. In this section, I examine the differences in pre- and post-issue stock returns of equity issuers depending on changes in institutional ownership in the calendar quarter of the SEO. The idea is that if institutional investors selectively buy shares in SEOs that are not overpriced, then I should observe lower pre- and higher post-issue returns when these investors' purchase shares.

To test this hypothesis, I split the sample of SEO firms into two groups based on whether the change in continuing institutional holdings in the issue quarter was positive or negative. Positive includes zero change in holdings. Next, I calculate mean pre-issue stock returns during months -12 through -2 relative to the offer month and post-issue stock returns during months +1 through +12. I then calculate mean benchmark-adjusted returns for these months. The benchmark returns are from Daniel, Grinblatt, Titman, and Wermers (DGTW, 1997) and Wermers (2004).<sup>11</sup> DGTW generate 125 characteristic-sorted benchmark portfolios based on annual triple sorts into equity market capitalization (size), twelve-month momentum, and book-to-market ratio quintiles. The dataset provides monthly buy and hold returns for each of these portfolios along with yearly benchmark assignments (updated every July) for each firm listed on the NYSE, Amex, or Nasdaq.

Panel A of Table 2.7 presents pre- and post-issue returns of SEO stocks conditional on whether the changes in the level of ownership of continuing institutional shareholders are positive or not. Investors in the negative change group, on average, reduce their holdings by 1.7 percentage points, whereas investors in the positive change group, on average, increase their holdings by 4.1 percentage point.

Pre-issue returns, measured for months -12 through -2 relative to the SEO date, are very high for both the negative (123.8%) and the positive (106.2%) ownership change groups, with differences between the groups statistically insignificant at conventional significance levels. The post-issue returns, measured for months +1 through +12, are much lower with the differences between the negative (5.7%) and the positive (4.1%) ownership change groups statistically insignificant at conventional levels. The differences in abnormal returns across low and high

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<sup>11</sup> The DGTW benchmarks and the details of the benchmark generating procedures are available via <http://www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm>.

ownership change groups are also statistically insignificant, although the abnormal return itself is significantly negative for the positive ownership change group, but not for the negative ownership change group.

In Panel B of Table 2.7 I repeat the analysis using changes in the level of ownership of long-term institutional investors. Investors in the negative change group, on average, reduce their holdings by 0.7 percentage points, whereas investors in the high change group, on average, increase their holdings by 0.8 percentage points. Pre-issue returns are very high (106.2%-115.6%) for both groups, with statistically insignificant differences in pre-issue returns of negative and positive ownership change groups. The post-issue returns are much lower (3.3%-4.6%) and the differences between the positive and the negative ownership change groups are statistically insignificant. The abnormal returns for both groups are significantly negative. The differences in abnormal returns between the positive and the negative ownership change groups are statistically insignificant.

In Panel C, the analysis is repeated using changes in the level of ownership of short-term institutional investors. Investors in the negative change group, on average, reduce their holdings by 1.9 percentage points, whereas investors in the positive change group, on average, increase their holdings by 3.6 percentage points. Pre-issue returns are very high (106.3%-116.9%) across all groups, with statistically insignificant differences in pre-issue returns of negative and positive ownership change groups. The post-issue returns are much lower for both groups, with the group where short-term shareholders increase their ownership showing statistically significantly higher returns than the group where the short-term institutional ownership declines. Still, the abnormal returns for both groups are significantly negative, and the differences in abnormal returns between the negative and the positive ownership change groups are statistically insignificant.

Figure 2.4 presents quarterly pre- and post-issue returns for SEO portfolios by the change in continuing ownership. The figures show that there is no significant difference in pre and post-issue returns between the group with positive changes and the group with

To summarize, the results in this section show no evidence that existing institutional shareholders purchase shares in less aggressively timed SEOs and not purchase shares in more aggressively timed SEOs. Overall, the results imply that neither long-term nor short-term institutional shareholders act as if they are concerned about SEO timing. The results also imply that SEO timing does not transfer wealth to existing institutional shareholders.

### 3.2 Regression results

The results thus far suggest that, when purchasing shares in SEOs, institutional investors do not take into account how aggressively the SEOs are timed. It is possible, however, that the relation between SEO timing and institutional purchases is confounded by other firm characteristics. In this section, I reexamine the relation between pre-issue returns and changes in institutional ownership around equity issues by estimating regression (6) on the subsample of SEO observations.<sup>12</sup>

Table 2.9 presents three sets of results. The first set of results is for the case when the dependent variable measures the change in continuing total institutional ownership. The second set of results is for the regression of change in continuing long-term institutional ownership. The third set of results is for the regression of change in continuing short-term institutional ownership. The results show that the changes in continuing institutional ownership in the year of the SEO are unrelated to the pre-SEO returns. Combined with the earlier findings, these results

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<sup>12</sup> SEO dummy is dropped from regression (6) in this case as only observations with SEOs are used to estimate the regression.

imply that institutional investors increase their shareholdings of firms conducting SEOs without an apparent concern that the SEOs may be timed. The results also imply that SEO timing is not in the interest of these institutional shareholders.

### 3.3 Returns to SEO investors

The returns and abnormal returns thus far are calculated starting from the month following the month of the issue and, hence, do not represent the returns earned by the investors who purchased shares in the SEO. Earlier literature finds that SEOs are offered at a significant discount to the market price. Furthermore, prior studies find evidence of positive average returns on the offer date. Hence, the post-issue returns and abnormal returns reported in Table 8 likely underestimate the returns that buyers of SEO shares could obtain.

Therefore, I also calculate the post-issue returns including the returns from the offer date through the end of the issue month. The results, presented in Table 2.10 show that the post-issue returns calculated from the SEO offer price are substantially higher (9.4% for the negative group and 9.3% for the positive group) than the post-issue returns reported earlier in Table 8. Furthermore, the abnormal post-issue returns are now insignificant, both statistically and economically, for both the negative group (-0.8%) and the positive group (0.0%). The differences in returns, as well as abnormal returns, between the groups are also statistically insignificant and economically trivial. These patterns also hold for institutional shareholders with long- and short- investment horizons reported in Panels B and C, respectively.

Thus, the results in this section show that while firms tend to issue equity when the stock prices are relatively high, SEO investors' risk-adjusted returns are not significantly different from zero. Hence, SEO timing does not transfer wealth from SEO investors to existing shareholders.

#### 4. The impact of institutional ownership on equity issue timing

To the extent that institutional shareholders can monitor and discipline managers, the SEO timing decisions can be expected to be made in the interest of such shareholders. In this section, I examine if the level of institutional ownership affects how aggressively firms time their SEOs.

Table 2.11 presents a summary of pre- and post-issue returns for the SEO sample split in half based on the level of institutional ownership two years prior to the SEO. The results show that, compared to firms with higher total institutional ownership, firms with lower institutional ownership have significantly higher stock returns in the year before the issue (-1) and have lower stock returns in years +1 and +2 after the issue, although the differences in post-issue returns are not statistically significant. The patterns are similar when long-term and short-term institutional ownership levels are considered. I do the similar test based on the level of institutional ownership one year prior to the SEO. The results are presented in Table 2.12. These results suggest that higher institutional ownership tends to be associated with less market timing of SEOs.

As an alternative testing method, I also estimate the following regression that models the decision to issue equity:

$$\begin{aligned}
 SEO_{it}^* = & \beta_0 + \beta_1 Lev_{it-1} + \beta_2 IndLev_{it-1} + \beta_3 R\&D_{it-1} + \beta_4 R\&DD_{it-1} + \beta_5 NOLC_{it-1} \\
 & + \beta_6 Prof_{it-1} + \beta_7 Tng_{it-1} + \beta_8 Sz_{it-1} + \beta_9 Ret_{it-1} + \beta_{10} MB_{it-1} \\
 & + \varepsilon_{it}
 \end{aligned}
 \tag{7}$$

In (7), the dependent variable,  $SEO^*$ , is a latent continuous variable measuring the propensity to issue debt rather than equity. Its observable counterpart is a binary variable set to

one if the firm issues equity and set to zero otherwise. The set of independent variables consists of variables such as lagged leverage, firm size, asset tangibility, market-to-book, research and development expenses, and profitability, which were defined earlier in the paper. These firm characteristics proxy for important determinants of the target as predicted by the tradeoff theory.<sup>13</sup> Year indicators are included to control for macroeconomic factors. The estimates reported in Table 2.13 are for the marginal effects of independent variables assessed at the point of the sample means. Since most firms in my sample issue or repurchase debt or equity only occasionally and since aggregate financing activity shows substantial variation in time, the t-statistics reported in Table 2.13 reflect robust standard errors adjusted for heteroskedasticity, as well as clustering by firms.

The first set of results in Panel A of Table 2.13 is for the sample of firms with at least one seasoned equity issuance during the sample period. I also estimate regression (7) separately for subsamples with low vs. high long-term and short-term institutional holdings. The second set of results is for observations with low long-term institutional ownership whereas the third set of results is for observations with high long-term institutional ownership. The fourth and fifth sets of results are for observations with, respectively, low and high short-term institutional ownership. The idea is that if institutional ownership affects market timing incentives, then I should observe differences in the coefficient estimates on standard market timing variables such as past stock returns and market-to-book ratios.

In all five regressions, the coefficient estimates for the pre-issue stock return and the market-to-book ratio are significantly positive, consistent with prior evidence on equity issue

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<sup>13</sup> These variables have been previously considered by Titman and Wessels (1988), Rajan and Zingales (1995), and others.

timing. The stock return coefficient estimate for the subsample with low long-term institutional holdings is significantly higher than the coefficient estimate for the subsample with high holdings. The difference between the stock return coefficient estimates for the subsamples with low vs. high short-term institutional holdings is statistically insignificant. The market-to-book ratio coefficient estimates for the subsamples with low long-term and short-term institutional holdings are significantly higher than the coefficient estimates for the subsamples with high holdings. These results imply that higher institutional ownership, in particular, long-term, tends to be associated with less market timing of SEOs.

While variables such as market-to-book ratio and past stock return have been linked to market timing, alternative interpretations, e.g., as proxies for growth opportunities, are also common. Baker, Stein, and Wurgler (2003) propose future stock return as a better measure of market timing. In Panel B of Table 2.13, I re-estimate regression (7) with one-year post-issue stock return as an additional variable on the right hand side. Consistent with market timing arguments, in all regressions, the coefficient estimates for the pre-issue stock returns are significantly positive whereas the coefficient estimates for the post-issue stock returns are significantly negative. The post-issue stock return coefficient estimate for the subsample with low long-term institutional holdings is significantly higher than the coefficient estimate for the subsample with high holdings. The post-issue stock return coefficient estimate for the subsample with low short-term institutional holdings is significantly higher than the coefficient estimate for the subsample with high holdings. These results imply that higher institutional ownership tends to be associated with less market timing of SEOs. Similar tests are done for the subsample split by the institutional ownership at  $t-1$ , the results of which are presented in table 2.14. The results are identical.

## 5. Conclusions

Pecking order and market timing theories of corporate financing assume that corporate financing decisions are made in the interests of existing shareholders. It is frequently argued that monitoring capabilities of institutional shareholders improve corporate governance and lead to a better alignment of managerial incentives and shareholder interests. One would, therefore, expect that higher institutional holdings should lead to more timing.

The current paper contributes to the literature by examining if timing patterns of SEOs and institutional shareholder trading are consistent with the view that SEO timing benefits the issuing firm's existing shareholders. The paper further differentiates between institutional investors with short and long investment horizons and between institutional investors that continue to hold a stake in the issuing firm and those who liquidate their stakes.

Trading patterns of institutional investors around SEOs show that such investors, on average, significantly increase their share ownership at the time of the SEO. I find no evidence that these increases taking into account the timing patterns of SEOs. These patterns hold for both institutional shareholders with long- and short- investment horizon. Finally, the results show that firms with higher institutional shareholdings, especially investors with long investment horizons, are less likely to engage in timing of their SEOs. Overall, these results imply that SEO timing does not benefit institutional shareholders.

**CHAPTER 3**  
**THE IMPACT OF REFERENCE POINT PRICES**  
**ON SEASONED EQUITY OFFERINGS**

**1. Introduction**

High pre-equity-issue and low post-equity-issue returns have been widely documented in finance literature. Loughran and Ritter (1995) and Baker and Wurgler (2002) suggest a behavioral explanation, market timing, that managers take advantage of temporary overpricing by selling shares to overly optimistic investors. The underlying assumption of the market-timing hypothesis is that managers are informed and sophisticated enough to identify mispricing. Although it is widely believed that firm insiders are better than outsiders at identifying the potential mispricing of their shares, this does not preclude the possibility that managers look for public information to determine the best timing opportunities for SEOs.

In this paper, I propose a “reference point” view that the widely available stock price information, the historical peak price, serves as a reference point role in firms’ seasoned equity offering decisions. The idea of reference point was first explored in Kahneman and Tversky (1974). They find that individuals typically make estimates by starting with an easily available starting value, or anchor, which is then adjusted to yield the final answer. The adjustment is not complete in the sense that different starting values lead to different estimates.

There are a number of reasons why the past peak price could possibly play a reference point role in the firm’s financing decisions. First, Kahneman and Tversky (1974) suggest that individuals use heuristics to cope with complex and uncertain situations. Prior empirical literature provides evidence of various cognitive biases among market participants. Campbell and Sharpe (2009) show that professional forecasters anchor their predictions of macroeconomic

data such as the consumer price index on previous values, which leads to systematic and sizeable forecast errors. Cen, Hilary and Wei (2013) find that analysts anchor their earnings forecasts on the industry medians. Analysts make optimistic forecasts when a firm's forecast earnings per share is lower than the industry median but pessimistic forecasts when higher than the industry median. In a study that is the closest to mine, Baker, Pan and Wurgler (2012) find that in mergers and acquisitions, managers use past peak prices as a reference point in valuing the target, which can explain offering prices, the success rate of mergers and acquisitions and announcement effects.

To identify when the firm's shares are overvalued is a very complex task with substantial uncertainty. Hence, it would not be surprising that managers use heuristics and look for public information to help them time new equity issues. Huang and Ritter (2009) refer to anecdotal evidence that whether a client's stock price is near a 52-week high is one of the most important factors when investment bankers advise on the choice between debt and external equity financing. Rosenbaum and Pearl (2009) state that a company's current share price as a percentage of its 52-week high is a widely used metric that provides perspective on valuation and calibrates current market sentiment and outlook.

In this paper, I provide empirical support for the reference point price hypothesis that managers use historical peak prices as their reference point when they time new equity issuances to periods of high share prices. I first examine the relation between seasoned equity-offering prices and historical peak prices. The distribution of the ratios of the offering price to the past peak price shows that the probability of offering exactly at the historical high is much higher than that at prices slightly below and above the historical peak price.

Furthermore, a comparison of the empirical distributions of the ratios of the stock price to the historical peak price between issuers and non-issuers shows that the two distributions are significantly different from each other. The density of the ratio of the last monthly closing price to the past peak price of issuers exceeds that of non-issuers for values of the ratio in excess of about 1. These results suggest that historical peak prices influence seasoned equity offering decisions. It is likely that the described univariate results are influenced by other firm characteristics that are known to affect equity issuances, in particular, by pre-issue stock returns and market to book ratios. Therefore, I test whether historical peak prices play an important and separate role in equity financing decisions while controlling for a variety of other variables in regression analyses. The results show that after accounting for past stock returns, market to book ratios, and other firm characteristics, the impact of historical peak prices on equity issuance is still significantly positive.

Finally, I provide evidence that the historical peak price is not only a pure indicator of overvaluation in managers' mind but also plays a reference point role. In particular, the likelihood of equity issuance is significantly higher following the months in which the stock hits a high. Within the subsample of high stock returns, the likelihood of equity issuance is significantly larger following the months in which the stock hits a high. The sensitivity of the probability of equity issuance is substantially higher as the price passes but is less than 120% of the historical peak price. Taken together, the evidence suggests that the public available information, the historical peak price, plays a reference point role in firms' financing decisions.

This study contributes to the SEO literature by showing evidence that historical peak prices play a reference point role in corporate financing decisions. Instead of explaining return patterns around SEO ex post, I directly examine how managers make SEO decisions. My study

also contributes to the recent burgeoning literature that recognizes the importance of managerial cognitive biases in corporate finance. Baker and Pan (2011) find that the CEO-specific share price performance affects corporate financing decisions. The probability of equity issuance increases discontinuously when the share price exceeds the inherited price and the impact of recent stock returns is stronger when the return occurs during the current CEO's tenure. The current paper differs by providing evidence that the widely available stock price information, the historical peak price, serves as a reference point that influences managers' financing decisions.

The paper is organized as follows: Section 2 describes the sample; Section 3 documents the effect of historical peak prices on equity offering prices; Section 4 displays the result that past peak prices affect equity financing decisions; Section 5 further demonstrates evidence that a firm is more likely to issue equity after the stock hits a high; Section 6 provides evidence that a firm is more likely to repurchase shares if the price is lower than the historical low price and section VII makes the conclusion.

## **2. Sample and variables**

The initial sample consists of all the firms that: (1) are present on both Center for Research in Security Prices (CRSP) and Compustat; (2) are not utilities or financials (SIC codes 4900 through 4999 or codes 6000 through 6999); (3) are not firms with values of total assets or sales of less than \$ 1million. These restrictions generate a sample of 77349 firm-year observations from 1975 to 2009.

The sample of seasoned equity offerings that took place over the period from 1975 to 2009 is obtained from Thomson Financial SDC database. Following earlier new issue studies, I exclude issues by non-US firms, private placements, pure secondary issues, rights issues, shelf registration issues, and unit offerings. I retain the issues that have matched stock return data from

Center for Research in Security Prices (CRSP). The cases with more than one offering within the same fiscal year are treated as single issues in the analyses that utilize annual COMPUSTAT data. These selection criteria generate a sample of 4,202 SEOs from 1975 to 2009. SEO allocation over the sample period is presented in Figure 3.1. Firm level characteristics are from COMPUSTAT. There are financial ratios available for 2,394 SEOs.

Using monthly CRSP data, for each firm-month I calculate the peak prices over past various time horizons, such as 12-month, 24-month, 36-month, 48-month and 60-month. The historical peak stock prices are taken over the period ending one month prior. Then I calculate the ratio of the stock price to the historical peak price. Table 3.1 reports the numbers of observations, the means, the medians and the standard deviations of the peak price ratios and measures of stock performance for the entire sample. Table 3.2 separately provides the summary statistic for firm-years with and without equity issues. Consistent with the previous literature, firms issue equity when their valuations are high. The average stock return during the preceding fiscal year is significantly higher for issuing firms (0.519) than for non-issuing firms (0.14). Similarly, the mean issuing firms' market-to-book ratio (2.012) is significantly higher than the ratio of non-issuing firms (1.545). Furthermore, the ratios of the stock price to the past peak price of issuers are significantly higher than the ratios of non-issuers. For example, the mean ratio of the share price to the past 12-month peak price is 0.869 for issuers and 0.741 for non-issuers. These results are consistent with the hypothesis that managers use past high prices as a reference point in SEO decisions. A firm is more likely to issue equity when the current stock price is closer to or higher than the historical peak price.

### **3. Equity offering prices and historical peak prices**

Reference point hypothesis suggests that past peak prices are used as a reference point to determine when to issue equity. If a firm is more likely to issue equity when the stock price is close to the past peak price, this impact could be reflected in offering prices. Therefore, in this section, I begin by documenting the effect of past peak prices on offering prices. I predict that offering prices are highly correlated with past peak prices and cluster around past peak prices.

### 3.1 Distribution of the ratios of the offering price to the past peak price

Figure 3.2 displays the histogram of the ratios of the offering price to the historical peak price over the past 52-week, 24-month, 36-month, 48-month and 60-month ending one month prior to the issue month. The figure shows that offering prices are close to issuers' peak prices with the probability of issuing exactly at the past peak price much higher than that at prices slightly below or above. The spike at one is not mechanically related to the way in which the ratios are calculated, because past peak prices are obtained over the time horizon ending one month before the issue month. In addition, I examine how often the spike could happen. I use the mean and standard deviation of the ratios of the offering price to the peak price to generate 5000 observations per sample. I run the similar experiment five thousand times. I find that the probability of occurrence of a spike at 1 is less than 1%. The main takeaway from Figure 3.2 is that the past peak prices play a special role in equity issue decisions, consistent with the reference dependence hypothesis.

### 3.2 Multivariate regression

I further examine the relationship between offering prices and past peak prices because vast majority of offering prices are not equal to past peak prices. Table 3.3 provides correlation coefficients between the two variables. Results in Table 3.3 show that the correlation coefficient between offering prices and past 52-week peak prices is 0.82, which is significant at 5% level.

Likewise, peak prices over longer horizons are also significantly positively correlated to the offering prices although the long past peak prices are of less relevance.

In addition, I run the following regression of offering prices on past peak prices:

$$Offer_{it} = a + \beta_1 PeakPrice_{it-1} + \varepsilon_{it} \quad (1)$$

*Offer* is the equity-offering price and *PeakPrice* is the peak stock price over different time horizons. One concern is that the past peak price could reflect the average price level of a stock, which induces a positive correlation between offering prices and peak prices. I therefore scale both variables by the average stock price over the recent 12 months. The inverse of the average stock price is also included in the specification. The t-statistics reported in Table 3.4 reflect robust t-statistics with standard errors clustered by month.

The past peak price is obtained over the time horizons ending one month prior to the announcement month in Panel A and one month prior to the issue month in Panel B of Table 3.4<sup>14</sup>. Both peak prices are relevant because the former determines whether to file for equity issue and the latter influences whether to successfully issue equity. Results in Table 3.4 show that the coefficient of the peak price is significantly positive. A 10% increase in the 12-month peak price relative to the average stock price leads to a 2.6 % increase in the offering price relatively to the average stock price. In other words, *ceteris paribus*, a firm with a higher historical price is more likely to issue at a higher price than a firm with a relatively lower historical price.

Taken together, the above results show evidence of the importance of historical high prices in seasoned equity offering decisions.

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<sup>14</sup> The number of observations in Panel A is smaller than that in Panel B because for some issues, the announcement date is missing.

#### **4. Equity issue decisions and historical peak prices**

In prior section, I demonstrate the compelling relationship between offering prices and past peak prices. In this section, I further examine whether past peak prices play an incremental role as a reference point in firms' equity financing decisions in addition to the traditional measures of stock performance, such as past stock returns and market-to-book ratios.

As we know, an issuer could choose when to issue but has little flexibility in terms of the offering price once the timing is pinned down because it is impossible that the offering price is very different from the stock price at a given time. Thus, the current market price relative to the past peak price is an important determinant of the likelihood of equity issuance. It is possible that the reason why many firms don't take action when according to the market timing theory they should issue equity to take advantage of the "windows of opportunity" is that the current market prices are much lower than the reference point prices. In this section, I first separately examine the relationship between market prices and past peak prices for issuers and non-issuers. Then, I run regressions to test whether past peak prices play a separate role in addition to those other factors that have been documented in earlier studies.

##### **4.1 Univariate analysis**

In this subsection, I separately compare stock prices to past peak prices for issuers and non-issuers. If past peak prices play a reference point role in a firm's financing decision, I expect to find that the ratios of the stock price to the past peak price are higher among issuers than the ratios of non-issuers and that the ratios increase prior to the equity issue and then decrease after the equity issue.

Using the CRSP monthly data, I calculate the ratios of the last monthly closing stock price to the past peak prices over 12-month, 24-month, 36-month, 48-month and 60-month

ending one month prior to the filing month for issuers and one month prior to the fiscal year end for non-issuers<sup>15</sup>.

Table 3.5 separately displays a time series profile of the ratios of the stock price to the past peak price for issuers and non-issuers. For non-issuers, the ratios keep constant over years, while for issuers the ratios increase from year -3 to the issue year and then decline after the issue year. This time-series pattern is consistent with the hypothesis that firms use past peak prices as a reference point in equity financing decisions.

Table 3.5 provides the average pre-issue and post-issue ratios. It is possible that some large numbers drives the high average ratios at the issue years. Therefore, Figure 3.3 provides a snapshot of the ratios of the stock price to the past peak price for both issuers and non-issuers at a given time. Figure 3.3 shows that the percentage of the values that lie to the right of the distribution for issuers is much higher than that for non-issuers. In terms of the ratio of the stock price to the past 52-week peak price, 67% of the issuers have the value higher than one, while only 25% of the non-issuers have the value higher than one. I use two-sample Kolmogorov–Smirnov test (K–S test), which is a nonparametric test for the equality of continuous, one-dimensional probability distributions of two samples. The test results show that the two-sample distributions are significantly different from each other at 1% level.

#### 4.2 Logit analysis of equity offering decisions

Prior literature shows evidence that some firm characteristics and market value variables affect the probability of equity issue. It is possible that the relation between past peak prices and equity offering decisions is confounded by other firm characteristics. My purpose is not to

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<sup>15</sup> For non-issuers, I also take a fixed month for each year or take a random month for each firm-year. The results are identical.

dismiss the impact of any of those variables but to show that the reference point, more specifically historical peak prices, plays an incremental role on firms' equity financing decisions in addition to stock returns, market-to-book ratios and other firm characteristics.

Before proceeding to the main test, I first estimate a baseline regression. It is a logit regression of the likelihood of seasoned equity offerings on a set of firm characteristics used in earlier studies of seasoned equity offerings;

$$SEO_{it} = \beta_0 + \beta_1 LEV_{it-1} + \beta_2 RD_{it-1} + \beta_3 NOLC_{it-1} + \beta_4 Prof_{it-1} + \beta_5 Tng_{it-1} + \beta_6 SZ_{it-1} + \beta_7 Ret_{it-1} + \beta_8 MB_{it-1} + \varepsilon_{it} \quad (2)$$

In equation (2), the dependent variable, SEO is a binary variable set to one if the firm issues equity in the fiscal year and set to zero otherwise. The set of independent variables consists of variables such as lagged leverage (*LEV*), research and development (*R&D*) expenses, Net operating Loss carry forward (*NOLC*), profitability (*Prof*), asset tangibility (*Tng*), size (*SZ*), return (*Ret*) and market-to-book (*MB*). Leverage (*LEV*) is measured as the sum of long-term debt and short-term debt over total assets. Tangible assets ratio (*Tng*) is defined as net property, plant, and equipment over total assets. R&D is defined as research and development expense over sales. *NOLC* is defined as net operating loss carry forwards over total assets. Profitability (*Prof*) is measured as operating income over total assets. Size (*SZ*) is the natural logarithm of sales. Return (*Ret*) is the stock return measured over the fiscal year. Market-to-book (*MB*) is defined as total assets minus book equity plus market equity over total assets. These firm characteristics are all annual data and proxy for important determinants of the leverage as predicted by the tradeoff theory. Year indicators are included to control for macroeconomic factors. The reported statistics reflect robust standard errors adjusted for heteroskedasticity and firm-level clustering.

The sample only includes firms that at least have one SEO over the sample period.<sup>16</sup> The non-issuer subsample consists of observations with no issue in the current year. Thus the model attempts to explain why a firm issues equity at time  $t$  but not at other times. The estimates reported in Table 3.6 are marginal effects of independent variables assessed at the point of the sample means. The results in Table 3.6 are consistent with the findings of earlier studies. The return and market-to-book value are both positively correlated to the probability of equity issues. Previous empirical literature uses this as evidence that firms time equity issue to a point when the stock is overvalued.

Next I run the regressions to test the impact of past peak prices on firms' equity financing decisions in addition to those other factors that could influence firms' leverage according to the trade-off theory.

I estimate the following logit regression of SEO dummy on firm fundamentals, market valuation variables and past peak prices:

$$\begin{aligned}
 SEO_{it} = & \beta_0 + \beta_1 LEV_{it-1} + \beta_2 RD_{it-1} + \beta_3 NOLC_{it-1} + \beta_4 Prof_{it-1} + \\
 & \beta_5 Tng_{it-1} + \beta_6 SZ_{it-1} + \beta_7 Ret_{it-1} + \beta_8 MB_{it-1} \\
 & + \beta_9 Prc_{im-1}/Peakprice + \varepsilon_{it}
 \end{aligned} \tag{3}$$

In equation (3), the dependent variable, SEO, is a binary variable set to one if the firm issues equity and set to zero otherwise. In addition, I add one variable, which is the ratio of the stock price to the past peak price. The estimate coefficient of interest is  $\beta_9$ . I hypothesize that a firm is more likely to issue equity as the stock price is close to or higher than the historical high

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<sup>16</sup> I also use all firms including both firms that have at least one following equity offering and firms that never do a following equity offering. The results are similar.

price. Therefore, I expect the coefficient  $\beta_9$  to be positive. The marginal results are presented in Table 7. Column one describes the logit regression of equity issue on the ratio of the stock price to the past 12-month high. The coefficient of the stock return is 0.016, indicating that the probability of equity issue increases with the past stock return. The coefficient of the ratio of the stock price to the past peak price is 0.099, suggesting that, holding the stock return constant, the probability of issuing equity rises with the ratio of the stock price to the past peak price. Both coefficients are highly significant. The results suggest that the probability of equity issue is determined more by the ratio of the stock price to the past peak price. Column 2 to column 5 reports the results of regressions on the ratios of the stock price to the historical peak prices over longer horizons. The coefficients range from 0.99 to 0.104, suggesting that the longer the time horizon is, the bigger the impact is. The pseudo R squares are higher in those regressions than that in the base regression. The above results suggest that historical peak prices play a significantly important and separate role in firms' equity financing decisions in addition to other firm fundamental variables and stock valuation variables.

#### 4.3 Robustness tests

There are a few concerns about the positive relation between the peak price ratio and the probability of equity issuance in the above analyses. First, in equation (3), past stock returns and market-to-book ratios are both linked to market timing. However, market-to-book ratio is also used as a proxy for growth opportunity. Therefore, one concern is that the ratio of the price to the historical peak price picks up the mispricing effects that are left out due the imperfect measure of mispricing. Baker, Stein and Wurgler (2003) propose to use future stock return as a measure of mispricing. Therefore, I rerun the regression (3) with an additional variable of future stock

return. The results are presented in panel B of Table 3.7. The coefficient estimates of the ratio of the price to the historical peak price are always significantly positive.

The second concern is that the historical peak price might reflect the average stock price level, which induces a positive relationship between the price to peak price ratio and the equity issue probability. To resolve this concern, I re-estimate equation (3) with the ratio of the stock price to the past 12-month average price. The results in panel C of Table 3.7 show that the role of the historical peak price is always significant after controlling for the average stock price. Regressions in Panel D of Table 3.7 include both the future stock return and the ratio of the stock price to the past average stock. The results are identical. Because adding these two variables don't change the results, I will stick to equation (3) in the later analyses.

In the prior analyses, I use SDC to define the equity issuers. The advantage of using SDC is that I can pin down the announcement date, the issue date, and the offering price. However, it is well known that public seasoned equity offerings are rare. In addition to SEOs, firms could issue equity in mergers or through other channels, such as private placements, convertible debt, employee options, grants, benefit plans, etc. Therefore, in this section, I use COMPUSTAT to define the equity issuers. I define the observations with net equity issued higher than 5% as issuers. Net equity issue is measured as the change in book equity, minus the change in retained earnings, divided by assets.

Table 3.8 shows that although the magnitude of the effect weakens, the past peak prices do affect equity financing decisions.

To summarize, the above results provide additional support for the importance of past peak prices in firms' equity issue decisions.

## **5. Is a firm more likely to issue equity after the stock hits a high**

The aforementioned results provide evidence that past peak prices play a role in firms' financing decisions after controlling for other firm fundamental characteristics. However, the positive relation between the ratio of the stock price to the historical peak price and the likelihood of equity issuance only suggests that firms prefer to issue equity at high share prices but provides little information about the reference point role of past peak prices. In this section, I further examine if historical peak prices play a reference point role in firms' financing decisions. I test whether firms are more likely to issue equity following the months in which the stocks hit the 12-month, 24-month, 36-month, 48-month or 60-month high.

### 5.1 Univariate tests

I begin by examining the association between whether the stock hits a high and the likelihood of SEOs. For each firm-month, I create a *HighDummy* variable to indicate whether the stock hits the historical peak price. Another *IssueDummy* is set to one if there is an equity offering over the following 12 months<sup>17</sup> and zero otherwise. For each month, I calculate the proportion of the firms that issue equity in 12 months if the stocks don't hit high and the proportion of the firms with equity issue during the following 12 months if the stocks hit high, respectively. Then the average values are obtained over the sample period from 1975 to 2009.

Table 3.9 displays the comparison between months in which the stock does not hit high and months in which the stock hits a high. The first set of results in Table 3.9 is for the entire sample. It shows that 7.4% of the firm-months in which the stock hits a high are followed by an equity offering and only 2.72% of the firm-months in which the stock does not hit high are followed by an equity offering. The difference is statistically significant. As the time horizon gets longer, the difference is getting bigger, which is consistent with the results in Table 3.7.

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<sup>17</sup> I also check different time horizons, such as 3 months, 6 months. The results are similar in both cases.

However, the fact that firms prefer to issue stocks at higher prices could possibly lead to the difference in the likelihood of equity issuance. In addition, it is possible that the big difference is driven by extreme cases. To solve the above concern, I limit the sample to situations where the current month high is more than 80% of historical peak prices and is less than 120% of historical peak prices. If the reference point prices don't play a role, I expect that the probability of equity issue to be similar regardless of whether the stocks hit high because overall, this sample represents high share prices. The second set of results in Table 3.9 show that 3.8% of the firm-months in which the stock hits a high are followed by an equity offering and 6.59% of the firm-months in which the stock doesn't hit high are followed by an issue. The difference is statistically significant.

## 5.2 Multivariate regressions: predicting SEOs

The relation between whether the stock hits a high and the probability of equity issuance could have been captured by some firm characteristics. Next, I use logit regressions to control for a host of other firm fundamental variables that could impact the likelihood of SEO issuance.

$$\begin{aligned}
 Issue_{it+12} = & \beta_0 + \beta_1 LEV_{it-1} + \beta_2 RD_{it-1} + \beta_3 NOLC_{it-1} + \beta_4 Prof_{it-1} + \\
 & \beta_5 Tng_{it-1} + \beta_6 SZ_{it-1} + \beta_7 Ret_{it-1} + \beta_8 MB_{it-1} \\
 & + \beta_8 Prc_{im-1}/Peakprice + \varepsilon_{it}
 \end{aligned} \tag{4}$$

In equation (4), the dependent variable, *Issue*, is a binary variable set to one if there is an equity issue over the following 12 months. *HighDummy* in equation (4) is a binary variable set to one if the stock hits a high and zero otherwise. *Ret* is the stock return over the previous 12 months. Other firm characteristics, such as lagged leverage (*LEV*), research and development (*R&D*) expenses, Net operating Loss carry forward (*NOLC*), profitability (*Prof*), asset tangibility (*Tng*), size (*SZ*) and market-to-book (*MB*) are all annual data and proxy for important

determinants of the leverage. Year indicators are included to control for macroeconomic factors. I cluster the standard errors at firm level to account for the correlation among observations from the same firm. Panel A of Table 3.10 provides results of monthly logit regressions, Panel B presents the regression results with the future stock return and Panel C displays results of yearly logit regressions in which a month is randomly chosen for each firm-year. The reason why I run the two types of regressions is that the firm characteristics are updated annually.

Table 3.10 shows that the coefficient of stock return is 0.007, indicating that the probability of equity issue over the following 12 months increases with the stock return. Regression (1) shows that *HighDummy* positively predicts equity issue. The coefficient of the *HighDummy* is 0.016, suggesting that holding the stock return constant, a firm is more likely to issue equity over the 12 months after the months in which the stock hits a high. Both coefficients are highly significant. The results are persistent after controlling for future stock return. Overall, the results are consistent with the reference point hypothesis.

### 5.3 Group analysis

Furthermore, I sort the entire firm-months into 14 groups according to the ratio of the current-month high to the historical high, with equal bandwidth (0.1). The highest bin includes firm-months in which the ratio is higher than 1.4. The lowest group includes the firm-months in which the ratio is lower than 0.2. The rest of the months are split into 12 groups with equal bandwidth of 0.1. Within each group, the average percent of firm-months that are followed by equity issues in 12 months is obtained. Figure 3.4 shows that as the current month high price approaches the historical high price, the percent of firms that issue equity increases. Another feature is also revealed in Figure 3.4. There is a light increase in the likelihood as the price approaches the historical high from below and a surge as the price passes the historical high. As

the price is more than 20% higher than the historical high, the likelihood remains constant. This is consistent with the reference point hypothesis that the historical peak price is not only a measure of high valuation but serves as a triggering event in firms' equity financing decisions. With the non-linearity of Figure 3.4 in mind, I estimate the following logit regression model for different subsamples.

$$\begin{aligned}
 Issue_{it+12} = & \beta_0 + \beta_1 LEV_{it-1} + \beta_2 RD_{it-1} + \beta_3 NOLC_{it-1} + \beta_4 Prof_{it-1} + \\
 & \beta_5 Tng_{it-1} + \beta_6 SZ_{it-1} + \beta_7 Ret_{it-1} + \beta_8 MB_{it-1} \\
 & + \beta_8 Peakprice_{im}/PastPeakPrice + \varepsilon_{it}
 \end{aligned} \tag{5}$$

In equation (5), the dependent variable,  $Issue_{it+12}$  is a binary variable set to one if there is an equity issue over the following 12 months.  $PeakPrice_{it}/PastPeakprice$  in equation (5) is defined as the ratio of the current month peak price to the past peak price over different time horizons.  $Ret$  is the stock return over the previous 12 months. Other firm characteristics, such as lagged leverage ( $LEV$ ), research and development ( $R\&D$ ) expenses, Net operating Loss carry forward ( $NOLC$ ), profitability ( $Prof$ ), asset tangibility ( $Tng$ ), size ( $SZ$ ) and market-to-book ( $MB$ ) are all annual data and proxy for important determinants of the leverage. Year indicators are included to control for macroeconomic factors. I cluster the standard errors at firm level to account for the correlation among observations from the same firm.

The first set of results in Panel A in Table 3.11 is for the entire sample. The second set of results is for observations with the current month peak price lower than the historical peak price. The third set of results is for observations with the current month high price higher but less than 20% higher than the historical high. The fourth set of results is for observations with the current month peak price more than 20% higher than the historical high. The results show that while the likelihood of equity issuance increases with the ratio of the current month high price to the

historical high price, the sensitivity is especially higher when the ratios are between 1 and 1.2. For the subsample with the low ratios of the current month peak price to the historical high, the coefficient of the ratio is 0.032, while for the subsample with ratios between 1 and 1.2, the coefficient is 0.17. And beyond the 1.2 level, the estimated incremental effect of the historical peak prices flips the sign. Panel B, Panel C, Panel D and Panel E in table 3.11 show similar results for longer time horizons.

The aforementioned results are consistent with the reference point hypothesis that managers use past peak prices as a reference point to simplify equity financing decisions.

## **6. Equity repurchasing and historical low prices**

If the reference point plays a special role in firms' equity offering decisions, likewise, it should also affect firms' repurchasing decisions. The reference point in stock repurchasing could be the past low price. I hypothesize that a firm is more likely to repurchase shares if the stock price is closer or lower than the historical low price.

I use COMPUSTAT data to define repurchasers because the repurchasing data in SDC is incomplete.

Net equity issue is measured as the change in book equity, minus the change in retained earnings, divided by assets. Those with net equity repurchased higher than 5% are defined as repurchasers. Since it is impossible to figure out the repurchasing month, I use fiscal year end stock prices for both issues and non-issuers. I obtain the past low prices over 52-week, 24-month, 36-month, 48-month and 60-month ending one month prior to the fiscal year end and then calculate the ratios of the stock price to the past low price over different time horizons.

I run the following logit regression to examine the impact of historical low prices on repurchasing decisions:

$$\begin{aligned}
\text{Repurchasing}(ER)_{it} = & \beta_0 j + \beta_1 LEV_{it-1} + \beta_2 RD_{it-1} + \beta_3 NOLC_{it-1} + \beta_4 Prof_{it-1} + \\
& \beta_5 Tng_{it-1} + \beta_6 SZ_{it-1} + \beta_7 Ret_{it-1} + \beta_8 MB_{it-1} \\
& + \beta_8 \text{Price}_{im-1} / \text{Past low} + \varepsilon_{it}
\end{aligned} \tag{6}$$

In equation (6), the dependent variable, *Repurchasing* (ER) is a binary variable set to one if the firm repurchases shares and zero otherwise. Price/Past Low is defined as the ratio of the stock price to the historical low price. Other firm characteristics, such as lagged leverage (*LEV*), research and development (*R&D*) expenses, Net operating Loss carry forward (*NOLC*), profitability (*Prof*), asset tangibility (*Tng*), size (*SZ*), return (*Ret*) and market-to-book (*MB*) are all annual data and proxy for important determinants of the leverage. Year indicators are included to control for macroeconomic factors. The reported statistics reflect robust standard errors adjusted for heteroskedasticity and firm-level clustering.

Table 3.12 provides the regression results of corporate repurchasing decisions on historical low prices. As predicted, the coefficient is significantly negative (-0.007), suggesting that the lower the stock price is relative to the historical low price, the more likely the firm is to retire stocks.

## 7. Conclusions

Early literature has documented the underperformance after seasoned equity offerings. Pecking order theory and trade off theory are problematic because pecking order theory predicts that firms will not issue equity as long as they have debt capacity to tap and trade off theory suggests that firms will lever up after the increase in the stock value. Market timing theory suggests that managers have market timing ability and time equity issues to a point when their stocks are overvalued, which could explain the positive relationship between equity issue and stock returns. However, the marketing timing hypothesis keeps silent on how managers could

constantly beat market. In this paper, I hypothesize that past peak prices play a special role as a reference point in firms' seasoned equity offerings.

I find evidence that past peak prices do impact the probability of seasoned equity offerings. The ratios of the offering price to the historical peak price cluster around one with the probability of issuing exactly at the past peak price much higher than that at prices slightly below or above. In addition, the higher the stock price is relative to the past peak price, the higher the probability of equity issue is. Past peak prices play a separate role in addition to the traditional stock performance measurements, such as stock return and market-to-book ratio. Furthermore, the likelihood of equity issuance is significantly higher following the months in which the stock hits a high.

The results suggest that managers use past peak prices as a reference point to simplify their equity financing decisions. It is either because of the complexity of tasks or because the managers don't have the real market timing ability. These results are consistent with the result in Lee(1997) that those managers do not appear to profit from their selling activities.

**Table 2.1 Sample statistics**

This table presents the summary statistics of issuers and non-issuers from 1983 to 2009. Seasoned equity offering firms are obtained from SDC. Market-to-book is (total assets – book equity + market equity)/total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. LT institutional ownership is long-term institutional ownership. ST institutional ownership is short-term institutional ownership. Institutional investors' horizons are identified based on their portfolio turnover over the last four quarters. Continuing Ownership are the changes in ownership of institutional investors who own shares both at the beginning and at the end of the fiscal year examined, liquidations are those who own shares at the beginning of the period but liquidate their holdings by the end of the period, and initiations are those who own no shares at the beginning of the period but establish new positions by the end of the period. Difference is the difference in mean between issuers and non issuers. Changes significantly different from zero at 5% and 1% level are marked \* and \*\* respectively.

	Obs	Issuers Mean	Median	Obs	Non issuers Mean	Median	Difference
Panel A. Firm characteristics							
Size	3738	4.473	4.470	85327	4.599	4.520	-0.039
Return (annual)	3738	0.542	0.291	85327	0.127	0.007	0.456**
Market-to-book	3738	2.341	1.822	85327	1.781	1.362	0.584**
Total Ownership	3738	44.89	44.72	85327	44.89	30.33	9.998**
LT Institution Ownership	3738	7.025	5.727	85327	9.264	7.043	-2.052**
ST Institution Ownership	3738	22.12	20.32	85327	10.68	7.567	11.328**
Panel B. Changes in ownership							
Continuing Ownership	3348	3.855	3.025	79241	1.065	0.279	2.79**
LT institution Continuing Ownership	3416	0.958	0.603	81028	0.589	0.189	0.369**
ST institution Continuing Ownership	3468	2.115	0.899	78932	0.127	0	1.988**
Liquidations	3531	-6.794	-5.170	79884	-7.341	-5.163	0.547**
LT institution Liquidations	2712	-0.763	-0.270	65458	-1.010	-0.354	0.248**
ST institution Liquidations	3324	-4.044	-2.674	74037	-3.852	-2.061	-0.192*
Initiations	3599	20.94	20.05	80325	8.865	6.276	12.079**
LT institution Initiations	3518	2.791	2.091	73822	2.095	1.151	0.696**
ST institution Initiations	3567	11.95	10.52	73237	4.446	2.444	7.501**

**Table 2.2 Market timing of equity issues**

This table presents the time-series profiles of mean market-to-book ratios and returns of equity issuers from Year -3 to +3 relative to the issue years. Market-to-book is (total assets – book equity + market equity)/total assets. Return is the stock return measured over the fiscal year. Issue years are defined from SDC. In panel A, the sample in each year is not same. In panel B, the sample over the years is constant. Changes significantly different from zero at 5% and 1% level are marked \* and \*\* respectively.

Panel A:

Year	Levels							Changes		
	-3	-2	-1	0	1	2	3	-3 to -1	-1 to 0	-1 to 3
Market-to-book	1.893	2.053	2.53	2.421	2.006	1.858	1.822	0.290**	-0.233**	-0.734**
Return	0.258	0.308	0.745	0.594	0.002	0.086	0.141	0.520**	-0.129**	-0.631**

Panel B:

Year	Levels							Changes		
	-3	-2	-1	0	1	2	3	-3 to -1	-1 to 0	-1 to 3
Market-to-book	1.798	1.765	2.068	2.027	1.771	1.665	1.627	0.278**	-0.049	-0.442**
Return	0.258	0.313	0.786	0.642	0.041	0.112	0.132	0.527**	-0.144**	-0.654**

**Table 2.3 Institutional ownership around equity issues**

This table presents the mean annual (quarterly) institutional holdings around seasoned equity offerings between 1983 and 2009. Time 0 is the issue year (quarter).

## Panel A

Year	Level						
	-3	-2	-1	0	1	2	3
Ownership	28.111	28.843	32.242	44.121	44.476	45.344	46.220
LT Ownership	6.304	6.049	5.873	6.727	8.114	9.177	9.839
ST Ownership	11.340	12.045	15.126	22.024	19.044	17.407	16.768

## Panel B

Quarter	Level						
	-3	-2	-1	0	1	2	3
Ownership	33.58	35.11	37.08	46.81	46.54	46.42	46.28
LT Ownership	7.183	7.326	7.375	7.669	7.852	8.328	8.613
ST Ownership	14.16	15.24	16.87	23.59	22.76	21.60	20.40

**Table 2.4 Changes in institutional ownership from year -3 to +3 relative to the event year**

This table presents the time-series profiles of institutional ownership change of equity issuers from Year -3 to +3 relative to the issue years. Continuing ownership are the changes in ownership of institutional investors who own shares both at the beginning and at the end of the periods (fiscal year or quarter). Liquidations are those who own shares at the beginning of the periods but liquidate their holdings by the end of the periods. Initiations are those who own no shares at the beginning of the periods but establish new positions by the end of the periods. Values significantly different from the value at issue year/quarter at 5% and 1% level are marked \* and \*\* respectively.

Year	Changes						
	-3	-2	-1	0	+1	+2	+3
Continuing ownership	1.328**	1.504**	1.619**	3.855	2.877**	2.191**	1.859**
Liquidations	-6.691**	-6.719**	-6.625**	-6.794	-12.407**	-11.378**	-10.803**
Initiations	10.013**	10.400**	12.767**	20.944	14.078**	13.229**	12.405**

Quarter	Changes						
	-3	-2	-1	0	+1	+2	+3
Continuing ownership	0.697**	0.746**	0.614**	3.432	1.603**	1.074**	0.870**
Liquidations	-2.716**	-2.832**	-3.075	-3.077	-4.863**	-4.925**	-4.817**
Initiations	4.482**	4.796**	5.472**	10.879	5.118**	5.217**	5.185**

**Table 2.5 Changes in long-term institutional ownership from Year -3 to +3 relative to the event year**

This table presents the time-series profiles of long-term institutional ownership change of equity issuers from Year -3 to +3 relative to the issue years. Institutional investors' horizons are identified based on their portfolio turnover during the last four quarters. Continuing ownership are the changes in ownership of institutional investors who own shares both at the beginning and at the end of the periods (fiscal year or quarter). Liquidations are those who own shares at the beginning of the periods but liquidate their holdings by the end of the periods. Initiations are those who own no shares at the beginning of the periods but establish new positions by the end of the periods. Values significantly different from the value at issue year/quarter at 5% and 1% level are marked \* and \*\* respectively.

Year	Changes						
	-3	-2	-1	0	+1	+2	+3
Continuing ownership	0.615**	0.536**	0.478**	0.958	1.114**	1.027	0.895
Liquidations	-0.985	-0.961	-0.918	-0.763	-0.948**	-1.068**	-1.168**
Initiations	2.265**	2.061**	2.342**	2.791	2.602**	2.425**	2.374**

Quarter	Changes						
	-3	-2	-1	0	+1	+2	+3
Continuing ownership	0.189**	0.210**	0.193**	0.518	0.404*	0.408*	0.373**
Liquidations	-0.665	-0.684	-0.799	-0.708	-0.823*	-0.842**	-0.889**
Initiations	1.359**	1.375**	1.451**	1.666	1.453**	1.631	1.603*

**Table 2.6 Changes in short-term institutional ownership from year -3 to +3 relative to the event year**

This table presents the time-series profiles of short-term institutional ownership change of equity issuers from Year -3 to +3 relative to the issue years. Institutional investors' horizons are identified based on their portfolio turnover during the last four quarters. Continuing ownership are the changes in ownership of institutional investors who own shares both at the beginning and at the end of the periods (fiscal year or quarter). Liquidations are those who own shares at the beginning of the periods but liquidate their holdings by the end of the periods. Initiations are those who own no shares at the beginning of the periods but establish new positions by the end of the periods. Values significantly different from the value at issue year/quarter at 5% and 1% level are marked \* and \*\* respectively.

Year	Changes						
	-3	-2	-1	0	+1	+2	+3
Continuing ownership	0.299**	0.432**	0.708**	2.115	0.610**	0.342**	0.252**
Liquidations	-3.747*	-3.800	-3.685**	-4.044	-7.814**	-6.497**	-5.955**
Initiations	5.321**	5.697**	7.375**	11.947	7.404**	6.967**	6.588**

Quarter	Changes						
	-3	-2	-1	0	+1	+2	+3
Continuing ownership	0.287**	0.539**	0.429**	2.630	0.754**	0.177**	-0.111**
Liquidations	-1.553**	-1.658**	-1.760	-1.797	-3.165**	-3.143**	-3.000**
Initiations	2.384**	2.572**	3.081**	6.458	2.639**	2.468**	2.413**

**Table 2.7 Institutional buying regressions**

This table presents the results of regressions of changes in institutional ownership on firm characteristics over the full sample including issuers and non-issuers. The dependent variables are the changes in continuing total institutional ownership ( $\Delta$ CIO), changes in continuing long-term institutional ownership ( $\Delta$ CLIO), and changes in continuing short-term institutional ownership ( $\Delta$ CSIO). Leverage is (long-term debt + short-term debt)/total assets. Industry leverage ratio is the median leverage for firms with the same 2-digit SIC code. Tangible assets ratio is measured as net property, plant, and equipment /total assets. R&D is research and development expenses / total assets. R&DD is 1 if R&D is not missing. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Age is the natural logarithm of the number of years since the time the stock first appears in CRSP. Price is the natural logarithm (1+P), where P is the stock price at the fiscal year end. Turnover is the share turnover measured as the annual share trading volume as a fraction of the shares outstanding. Dividend yield is dividends /fiscal year end share price. SP500 is an indicator for firms included in S&P500 stock index. SEO dummy is 1 if a firms issue equity in the fiscal year, 0 otherwise. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively. T-statistics reported reflect robust standard errors adjusted for clustering by firms.

	$\Delta$ CIO		$\Delta$ CLIO		$\Delta$ CSIO	
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
Leverage	0.661**	(3.0)	0.104	(0.9)	0.331*	(2.0)
Industry leverage	-0.178	(-0.4)	-0.058	(-0.2)	0.495	(1.6)
R&D	-0.327	(-0.4)	-0.627	(-1.6)	0.232	(0.4)
R&DD	0.219	(1.8)	0.034	(0.6)	-0.026	(-0.3)
NOLC	0.067	(0.9)	0.026	(0.8)	-0.056	(-1.1)
Profitability	0.371	(1.4)	-0.056	(-0.5)	-0.679**	(-3.4)
Tangibility	-0.453	(-1.5)	-0.233	(-1.6)	-0.270	(-1.2)
Size	0.072	(1.2)	0.120**	(4.5)	-0.090*	(-2.2)
Age	-0.558**	(-5.0)	-0.027	(-0.5)	-0.249**	(-3.3)
Price	0.144	(1.9)	0.197**	(4.9)	-0.163**	(-3.0)
Turnover	0.707**	(13.4)	0.202**	(7.4)	0.141**	(3.9)
Dividend yield	0.261	(0.8)	-0.028	(-0.3)	0.228	(0.7)
Volatility	-0.652**	(-5.3)	-0.092	(-1.5)	-0.438**	(-4.5)
SP500	-0.280	(-1.4)	-0.422**	(-4.2)	0.118	(0.9)
Return	0.097	(1.8)	-0.031	(-1.2)	0.156**	(3.7)
MB	0.088*	(2.0)	0.023	(1.3)	-0.070*	(-2.2)
SEO dummy	1.793**	(11.5)	0.136*	(2.2)	1.517**	(11.0)
R2	0.027		0.020		0.018	
N	50214		51441		49890	

**Table 2.8 Market timing by institutional buying**

This table presents data regarding pre-issue and post-issue performance of SEO stocks. The sample of SEO firms is sorted into two groups by the continuing growth between quarters -1 and 0 relative to the offer quarter. SEO firms with positive change in the continuing ownership and negative change are categorized as positive and negative, respectively. Continuing ownership are the changes in ownership of institutional investors who own shares both at the beginning and at the end of the quarter examined. Column 2 reports the change in institutional holdings. Column 3 provides the pre-issue returns from month -12 to month -2 prior to the offer month. Column 4 and 5 report the post-issue 12-month returns and post-issue 12-month abnormal return relative to the value-weighted benchmark portfolio return, respectively. Benchmark portfolios are formed based on size, book-to-market ratio and price momentum. Panel A, B, and C report results for subgroups formed by sorting on continuing ownership of all institutional investors, long-term institutional investors and short-term institutional investors, respectively. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively.

<u>Existing Ownership</u>	Change in Ownership (%)	Pre-issue return (%)	Post-issue return (%)	Post-issue abnormal return (%)
Panel A. All ownership				
Negative	-1.7**	123.8**	5.7	-4.6
Positive	4.2**	106.2**	4.1**	-5.1**
Positive-negative	-5.9**	17.6	1.6	0.5
Panel B. Long-term ownership				
Negative	-0.7**	115.6**	3.3	-8.6**
Positive	0.8**	106.2**	4.6**	-4.1**
Positive-negative	-1.5**	9.5	-1.3	-4.5
Panel C. Short-term ownership				
Negative	-1.9**	116.9**	-0.9	-8.7**
Positive	3.6**	106.3**	5.4**	-4.3**
Positive-negative	-5.5**	10.7	-6.3*	-4.4

**Table 2.9 Institutional buying regressions (SEO sample)**

This table presents the results of regressions of changes in institutional ownership on firm characteristics in the SEO sample. The dependent variables are the changes in continuing total institutional ownership ( $\Delta$ CIO), continuing long-term institutional ownership ( $\Delta$ CLIO), and continuing short-term institutional ownership ( $\Delta$ CSIO). Leverage is (long-term debt + short-term debt)/total assets. Industry leverage ratio is the mean leverage for firms with the same 2-digit SIC code. R&D is research and development expenses / total assets. R&DD is 1 if R&D is not missing. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Age is the natural logarithm of the number of years since the time the stock first appears in CRSP. Price is the natural logarithm (1+P), where P is the stock price at the fiscal year end. Turnover is the share turnover measured as the annual share trading volume as a fraction of the shares outstanding. Dividend yield is dividends /fiscal year end share prices. Volatility is the annualized standard deviation of daily returns observed in the fiscal year. SP500 is an indicator for firms included in S&P500 stock index. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively. T-statistics reported reflect robust standard errors adjusted for clustering by firms.

	$\Delta CIO$		$\Delta CLIO$		$\Delta CSIO$	
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
Leverage	7.138**	(2.8)	2.186*	(2.1)	1.501	(0.7)
Industry leverage	-0.956	(-0.2)	-2.055	(-1.0)	3.945	(0.9)
R&D	-23.078*	(-2.5)	-4.236	(-0.8)	-2.667	(-0.3)
R&D Dummy	-1.264	(-0.8)	-0.652	(-1.3)	-0.135	(-0.1)
NOLC	0.738	(0.7)	0.589	(0.7)	0.661	(0.4)
Profitability	2.064	(0.6)	1.404	(0.9)	-2.849	(-0.8)
Tangibility	5.515	(1.4)	-0.131	(-0.1)	6.791	(1.7)
Size	1.557	(1.8)	0.361	(0.8)	0.656	(0.9)
Age	-2.236	(-1.0)	0.435	(0.5)	0.655	(0.4)
Price	0.159	(0.1)	-0.460	(-1.1)	0.335	(0.4)
Turnover	2.288**	(3.1)	0.486	(1.7)	0.942	(1.5)
Dividend yield	64.758	(1.6)	17.149	(1.1)	43.878	(1.2)
Volatility	-7.758**	(-2.7)	-2.362	(-1.6)	-5.058	(-1.8)
SP500	3.186	(1.7)	0.286	(0.5)	0.460	(0.3)
Return	-0.609	(-1.1)	0.233	(0.9)	1.098	(1.5)
MB	0.933	(1.7)	-0.290	(-0.8)	-0.531	(-1.1)
N	1590		1633		1622	
R2	0.270		0.176		0.170	

**Table 2.10 Market timing by institutional buying**

This table presents data regarding pre-issue and post-issue performance of SEO stocks. The sample of SEO firms is sorted into two groups by the continuing growth between quarters -1 and 0 relative to the offer quarter. SEO firms with positive change in the continuing ownership and negative change are categorized as positive and negative, respectively. Continuing ownership are the changes in ownership of institutional investors who own shares both at the beginning and at the end of the fiscal year examined. Column 2 reports the change in institutional holdings. Column 3 and 4 report the post-issue returns and post-issue abnormal return including the returns from the offer date through the end of the issue month. Benchmark portfolios are formed based on size, book-to-market ratio and price momentum. Panel A, B, and C report results for subgroups formed by sorting on continuing ownership of all institutional investors, long-term institutional investors and short-term institutional investors, respectively. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively.

<u>Existing Ownership</u>	Change in Ownership  (%)	Post-issue return (starting with offer price)  (%)	Post-issue abnormal return (starting with offer price)  (%)
Panel A. All ownership			
Negative	-1.7**	9.4*	-0.8
Positive	4.2**	9.3**	0.0
Positive-negative	-5.9**	0.2	-0.8
Panel B. Long-term ownership			
Negative	-0.7**	7.5**	-4.4
Positive	0.8**	9.8**	1.1
Positive-negative	-1.5**	-2.3	-5.5
Panel C. Short-term ownership			
Negative	-1.9**	4.6	-3.1
Positive	3.6**	10.3**	0.5
Positive-negative	-5.5**	-5.6	-3.7

**Table 2.11 SEO buyers' returns by institutional ownership at t-2**

This table presents mean pre- and post-issue returns for the SEO sample based on the level of institutional ownership two years prior to the SEO. The sample of SEO firms is sorted into three equal groups by institutional ownership (IO), Long-term institutional ownership (LIO) and Short-term institutional ownership (SIO) at year t-2 relative to the issue year. The lowest and highest groups are categorized as low and high institutional-ownership stocks, respectively. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively.

	-2	-1	0	1	2
Low IO	0.232	0.556	0.380	0.004	0.059
High IO	0.216	0.319	0.360	0.056	0.095
Low - High	0.015	0.237**	0.020	-0.052	-0.036
Low LIO	0.255	0.521	0.376	-0.007	0.063
High LIO	0.165	0.342	0.356	0.056	0.095
Low - High	0.090**	0.179**	0.020	-0.063	-0.032
Low SIO	0.179	0.538	0.417	0.019	0.057
High SIO	0.270	0.334	0.368	0.044	0.109
Low - High	-0.091**	0.204**	0.049	-0.025	-0.052**

**Table 2.12 SEO buyers' returns by institutional ownership at t-1**

This table presents mean pre- and post-issue returns for the SEO sample based on the level of institutional ownership one year prior to the SEO. The sample of SEO firms is sorted into three equal groups by institutional ownership (IO), Long-term institutional ownership (LIO) and Short-term institutional ownership (SIO) at year t-1 relative to the issue year. The lowest and highest groups are categorized as low and high institutional-ownership stocks, respectively. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively.

	-2	-1	0	1	2
Low IO	0.194	0.523	0.395	-0.045	0.042
High IO	0.243	0.492	0.385	0.012	0.084
Low - High	-0.050	0.031	0.010	-0.057*	-0.04
Low LIO	0.225	0.527	0.401	-0.021	0.044
High LIO	0.220	0.446	0.415	0.021	0.069
Low - High	0.004	0.080*	-0.015	-0.042	-0.025
Low SIO	0.153	0.447	0.426	-0.015	0.030
High SIO	0.291	0.568	0.379	-0.006	0.057
Low - High	-0.138**	-0.121**	0.047	-0.008	-0.027

**Table 2.13 Equity issue regressions by institutional ownership at t-2**

This table reports the results of logit regressions estimating the probability of an equity issue for a sample of firms with at least one seasoned equity issuance during the sample period. Leverage is (long-term debt + short-term debt)/total assets. Industry leverage ratio is the median leverage for firms with the same 2-digit SIC. R&D is research and development expenses / total assets. R&DD is 1 if R&D is not missing. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Column 2 reports marginal effect for the sample of firms with at least one seasoned equity issue during the sample period. Column 4, 6, 8 and 10 report results for firm with low long-term institutional holdings, firms with high long-term institutional holdings, firms with low short-term institutional holdings and firms with high short-term institutional holdings, respectively. The sample of firms with at least one seasoned equity issuance is sorted into three equal groups by long-term institutional holdings and short-term institutional holdings at year -2 relative to the issue year, respectively. The lowest and highest groups are categorized as low and high, respectively. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively. T-statistics reported reflect robust standard errors adjusted for clustering by firms.

Panel A:

	All		Lo LIO		Hi LIO		Lo SIO		Hi SIO	
	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.
Leverage	0.098**	(11.5)	0.128**	(6.6)	0.080**	(6.2)	0.108**	(6.9)	0.099**	(7.0)
Industry leverage	0.048**	(3.3)	0.055	(1.6)	0.007	(0.3)	0.024	(0.9)	0.043	(1.8)
R&D	0.095**	(3.9)	0.154**	(2.8)	0.024	(0.5)	0.153**	(3.4)	0.014	(0.3)
R&DD	-0.005	(-1.6)	-0.002	(-0.3)	-0.005	(-1.0)	-0.005	(-0.8)	-0.003	(-0.5)
NOLC	-0.008	(-1.8)	-0.027**	(-2.9)	-0.001	(-0.1)	-0.015*	(-2.2)	0.002	(0.3)
Profitability	0.066**	(5.7)	0.101**	(4.2)	-0.024	(-1.0)	0.096**	(4.7)	0.013	(0.6)
Tangibility	-0.002	(-0.2)	-0.019	(-1.1)	0.002	(0.2)	0.004	(0.3)	0.003	(0.2)
Size	-0.007**	(-7.5)	-0.005	(-1.7)	-0.001	(-1.0)	-0.004	(-1.7)	-0.010**	(-5.4)
Return <sub>t-1</sub>	0.047**	(19.2)	0.058**	(11.0)	0.038**	(9.3)	0.046**	(10.9)	0.045**	(9.9)
Market-to-book	0.012**	(8.9)	0.025**	(8.9)	0.006**	(2.7)	0.018**	(7.8)	0.007**	(2.7)
N	21264		6204		6868		6338		6852	
R2	0.148		0.135		0.143		0.163		0.138	

## Panel B:

	All		Lo LIO		Hi LIO		Lo SIO		Hi SIO	
	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.
Leverage	0.105**	(11.1)	0.140**	(6.2)	0.081**	(5.9)	0.118**	(6.6)	0.107**	(6.8)
Industry leverage	0.057**	(3.6)	0.070	(1.7)	0.011	(0.5)	0.039	(1.3)	0.052*	(2.0)
R&D	0.111**	(4.2)	0.168**	(2.8)	0.040	(0.8)	0.171**	(3.3)	0.034	(0.7)
R&D Dummy	-0.007	(-1.9)	-0.004	(-0.5)	-0.007	(-1.4)	-0.006	(-0.9)	-0.004	(-0.7)
NOLC	-0.006	(-1.2)	-0.028*	(-2.5)	-0.000	(-0.0)	-0.016*	(-2.0)	0.009	(0.8)
Profitability	0.070**	(5.5)	0.107**	(4.0)	-0.022	(-0.9)	0.105**	(4.5)	0.022	(0.9)
Tangibility	-0.001	(-0.2)	-0.016	(-0.8)	0.002	(0.2)	0.010	(0.7)	0.000	(0.0)
Size	-0.008**	(-7.4)	-0.006	(-1.9)	-0.001	(-1.0)	-0.005*	(-2.1)	-0.010**	(-5.4)
Return <sub>t-1</sub>	0.049**	(18.2)	0.061**	(10.2)	0.040**	(9.1)	0.049**	(10.2)	0.049**	(9.6)
Return <sub>t+1</sub>	-0.022**	(-6.7)	-0.039**	(-5.2)	-0.017**	(-2.8)	-0.027**	(-4.6)	-0.015*	(-2.6)
Market-to-book	0.011**	(7.8)	0.026**	(7.9)	0.005*	(2.0)	0.018**	(7.0)	0.005	(1.8)
N	18952		5407		6299		5559		6230	
R <sup>2</sup>	0.150		0.138		0.141		0.163		0.137	

**Table 2.14 Equity issue regressions by institutional ownership at t-1**

This table reports the results of logit regressions estimating the probability of an equity issue for a sample of firms with at least one seasoned equity issuance during the sample period. Leverage is (long-term debt + short-term debt)/total assets. Industry leverage ratio is the median leverage for firms with the same 2-digit SIC. R&D is research and development expenses / total assets. R&DD is 1 if R&D is not missing. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Column 2 reports marginal effect for the sample of firms with at least one seasoned equity issue during the sample period. Column 4, 6, 8 and 10 report results for firm with low long-term institutional holdings, firms with high long-term institutional holdings, firms with low short-term institutional holdings and firms with high short-term institutional holdings, respectively. The sample of firms with at least one seasoned equity issuance is sorted into three equal groups by long-term institutional holdings and short-term institutional holdings at year -1 relative to the issue year, respectively. The lowest and highest groups are categorized as low and high, respectively. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5% and 1% level are marked \* and \*\* respectively. T-statistics reported reflect robust standard errors adjusted for clustering by firms.

Panel A:

	All		Lo LIO		Hi LIO		Lo SIO		Hi SIO	
	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.
Leverage	0.098**	(11.5)	0.139**	(7.2)	0.108**	(7.5)	0.090**	(7.1)	0.110**	(6.3)
Industry leverage	0.048**	(3.3)	0.034	(1.0)	0.019	(0.8)	0.033	(1.5)	0.099**	(3.5)
R&D	0.095**	(3.9)	0.205**	(3.7)	0.162**	(3.6)	0.089*	(2.2)	0.071	(1.6)
R&DD	-0.005	(-1.6)	-0.004	(-0.5)	-0.010*	(-2.0)	-0.002	(-0.3)	0.000	(0.0)
NOLC	-0.008	(-1.8)	-0.025**	(-2.9)	0.019	(1.8)	-0.010	(-1.7)	0.010	(0.8)
Profitability	0.066**	(5.7)	0.135**	(5.4)	0.030	(1.2)	0.112**	(5.8)	0.051*	(2.2)
Tangibility	-0.002	(-0.2)	0.002	(0.1)	-0.002	(-0.2)	-0.005	(-0.4)	-0.011	(-0.7)
Size	-0.007**	(-7.5)	-0.002	(-0.8)	-0.003	(-1.8)	-0.007**	(-4.2)	-0.012**	(-5.7)
Returnt-1	0.047**	(19.2)	0.055**	(10.7)	0.042**	(10.1)	0.037**	(9.7)	0.051**	(10.9)
Market-to-book	0.012**	(8.9)	0.025**	(8.5)	0.001	(0.6)	0.014**	(7.0)	0.007*	(2.4)
N	21264		5617		7407		6460		6919	
R2	0.148		0.1580		0.1363		0.1634		0.1327	

Panel B:

	All		Lo LIO		Hi LIO		Lo SIO		Hi SIO	
	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.	Marg. Eff.	t-stat.
Leverage	0.105**	(11.1)	0.150**	(6.7)	0.117**	(7.3)	0.094**	(6.6)	0.113**	(6.0)
Industry leverage	0.057**	(3.6)	0.063	(1.6)	0.027	(1.0)	0.050*	(2.1)	0.109**	(3.6)
R&D	0.111**	(4.2)	0.240**	(3.9)	0.182**	(3.6)	0.115*	(2.5)	0.076	(1.6)
R&D Dummy	-0.007	(-1.9)	-0.006	(-0.6)	-0.011*	(-2.0)	-0.004	(-0.7)	-0.002	(-0.3)
NOLC	-0.006	(-1.2)	-0.025*	(-2.5)	0.023	(1.5)	-0.010	(-1.4)	0.015	(1.1)
Profitability	0.070**	(5.5)	0.136**	(4.8)	0.028	(1.0)	0.118**	(5.6)	0.051*	(2.0)
Tangibility	-0.001	(-0.2)	0.005	(0.3)	-0.001	(-0.1)	-0.004	(-0.3)	-0.016	(-1.0)
Size	-0.008**	(-7.4)	-0.004	(-1.3)	-0.003	(-1.9)	-0.008**	(-4.6)	-0.013**	(-5.5)
Return <sub>t-1</sub>	0.049**	(18.2)	0.057**	(9.5)	0.046**	(10.1)	0.038**	(8.9)	0.056**	(11.1)
Return <sub>t+1</sub>	-0.022**	(-6.7)	-0.027**	(-3.6)	-0.024**	(-4.0)	-0.023**	(-4.2)	-0.016*	(-2.3)
Market-to-book	0.011**	(7.8)	0.026**	(7.8)	0.000	(0.1)	0.014**	(6.4)	0.005	(1.8)
N	18952		4845		6775		5647		6286	
R <sup>2</sup>	0.150		0.1588		0.1328		0.1656		0.1342	

**Table 3.1 Summary Statistics**

This table presents the summary statistics of the entire sample. The sample consists of issuers and non-issuers from 1975 to 2009. Seasoned equity offering firms are obtained from SDC. Peak price ratio, which is defined as the ratio of the stock price to the peak price over the past 12-month, 24-month, 36-month, 48-month and 60-month. Leverage is (long-term debt + short-term debt)/ total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets.

	N	Mean	Median	SD
<b>Panel A: Peak price ratio</b>				
Price / 12_month_hi	77349	0.745	0.777	0.219
Price / 24_month_hi	77349	0.666	0.691	0.247
Price / 36_month_hi	77349	0.617	0.632	0.261
Price / 48_month_hi	77349	0.584	0.591	0.269
Price / 60_month_hi	77349	0.561	0.561	0.272
<b>Panel B: Control Variables</b>				
Leverage	77349	0.229	0.211	0.183
R&D	77349	0.0323	0	0.0867
NOLC	77349	0.125	0	0.420
Profitability	77349	0.152	0.153	0.138
Tangibility	77349	0.307	0.264	0.209
Size	77349	4.881	4.799	1.937
Return	77349	0.152	0.0732	0.532
Market-to-book	77349	1.560	1.226	1.044

**Table 3.2 Summary Statistics for issuers and non-issuers**

This table presents the summary statistics of issuers and non-issuers. The sample consists of issuers and non-issuers from 1975 to 2009. Seasoned equity offering firms are obtained from SDC. Panel A provides summary statistic for the peak price ratio, which is defined as the ratio of the stock price to the past peak price over 12-month, 24-month, 36-month and 48-month and 60-month. Panel B provides firm characteristic summary statistic. Leverage is (long-term debt + short-term debt)/ total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Panel C presents summary statistic for the ratio of the offering price to the past peak price.

	Issuers				Non- Issuers			
<b>Panel A: Ratios of the price to the past peak price</b>								
	N	Mean	Median	SD	N	Mean	Median	SD
Price / 12_month_hi	2394	0.869	0.893	0.180	74955	0.741	0.772	0.219
Price / 24_month_hi	2394	0.833	0.865	0.197	74955	0.661	0.684	0.247
Price / 36_month_hi	2394	0.811	0.846	0.207	74955	0.611	0.624	0.260
Price / 48_month_hi	2394	0.795	0.829	0.217	74955	0.578	0.582	0.267
Price / 60_month_hi	2394	0.785	0.815	0.222	74955	0.554	0.553	0.271
<b>Panel B: Firm Fundamental variables</b>								
Leverage	2394	0.269	0.264	0.183	74955	0.227	0.209	0.183
R&D	2394	0.042	0.000	0.120	74955	0.032	0.000	0.085
NOLC	2394	0.090	0.000	0.334	74955	0.126	0.000	0.422
Profitability	2394	0.200	0.196	0.148	74955	0.150	0.152	0.138
Tangibility	2394	0.337	0.281	0.231	74955	0.306	0.263	0.209
Size	2394	4.806	4.648	1.701	74955	4.883	4.805	1.944
Return	2394	0.519	0.387	0.661	74955	0.140	0.065	0.523
Market-to-book	2394	2.012	1.579	1.298	74955	1.545	1.217	1.031

Panel C: Ratios of the offering price to the past peak price

Offering price/12_month_hi	4927	0.800	0.824	0.172
Offering price/24_month_hi	4927	0.779	0.804	0.182
Offering price/36_month_hi	4927	0.766	0.789	0.189
Offering price/48_month_hi	4927	0.754	0.779	0.197
Offering price/60_month_hi	4927	0.747	0.773	0.201

**Table 3.3 Correlation table between offering prices and past peak prices**

This table displays correlation between offering prices and past peak prices. Values significantly different from zero at 5% level are marked \*\*.

	Offer Price
12_month_hi	0.823**
24_month_hi	0.796**
36_month_hi	0.651**
48_month_hi	0.392**
60_month_hi	0.295**

**Table 3.4 Regressions of offering prices on past peak prices**

This table reports the results of regressions of offering prices on past peak prices. In Panel A: each variable is scaled by the past 12-month average stock price relative to the announcement month. In Panel B: each variable is scaled by the past 12-month average stock price relative to the issue month. Values significantly different from zero at 5%, 1% and 0.1% levels are marked \*, \*\* and \*\*\* respectively. Robust t-statistics with standard errors clustered by month are in parentheses.

## Panel A

	(1)	(2)	(3)	(4)	(5)
1/12m_average_price	0.138** (3.3)	0.158** (3.8)	0.175** (4.2)	0.178*** (4.8)	0.188*** (5.2)
12_month_hi	0.373*** (21.2)				
24_month_hi		0.193*** (10.4)			
36_month_hi			0.119*** (8.2)		
48_month_hi				0.072*** (7.5)	
60_month_hi					0.051*** (6.7)
Constant	0.676*** (25.7)	0.934*** (33.2)	1.041*** (44.4)	1.114*** (76.6)	1.145*** (93.1)
Observations	4084	4084	4084	4084	4084
Adjusted R-squared	0.138	0.061	0.040	0.029	0.023

## Panel B

	(1)	(2)	(3)	(4)	(5)
1/12m_average_price	0.033** (4.0)	0.039** (4.0)	0.044** (4.3)	0.046*** (4.7)	0.049*** (5.2)
12_month_hi	0.261*** (23.8)				
24_month_hi		0.114*** (8.9)			
36_month_hi			0.060*** (5.2)		
48_month_hi				0.032*** (6.0)	
60_month_hi					0.016** (4.3)
Constant	0.786*** (49.5)	1.003*** (59.4)	1.085*** (69.9)	1.129*** (147.7)	1.156*** (230.7)
Observations	5145	5145	5145	5145	5145
Adjusted R-squared	0.130	0.044	0.021	0.013	0.007

**Table 3.5 Time series profile of the ratio of the stock price to the peak price for issuers and non-issuers**

For issuers, the following variables are the ratios of the stock price one month prior to the issue month to the historical peak price. For non-issuers, the following variables refer to the fiscal-year-end stock price to the historical peak price.

Issuers	Year						
	-3	-2	-1	0	+1	+2	+3
Price / 12_month_hi	0.769	0.765	0.850	0.874	0.703	0.732	0.720
Price / 24_month_hi	0.705	0.694	0.783	0.835	0.618	0.622	0.629
Price / 36_month_hi	0.670	0.658	0.747	0.805	0.603	0.567	0.558
Price / 48_month_hi	0.645	0.630	0.720	0.782	0.590	0.555	0.513
Price / 60_month_hi	0.630	0.616	0.702	0.767	0.579	0.545	0.504
Non-issuers							
Price / 12_month_hi	0.751	0.757	0.756	0.757	0.761	0.752	0.749
Price / 24_month_hi	0.677	0.682	0.681	0.680	0.687	0.678	0.671
Price / 36_month_hi	0.633	0.635	0.636	0.634	0.640	0.634	0.626
Price / 48_month_hi	0.602	0.601	0.600	0.600	0.606	0.600	0.594
Price / 60_month_hi	0.581	0.577	0.573	0.573	0.580	0.574	0.569

**Table 3.6 Logit regression results of seasoned equity offerings**

This table reports the results of logit regressions estimating the probability of an equity issue for a sample of firms with at least one seasoned equity offering during the sample period. Leverage is (long-term debt + short-term debt)/total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. This table reports marginal effect. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5%, 1% and 0.1% levels are marked \*, \*\* and \*\*\* respectively. Robust t-statistics with standard errors clustered by firms are in parentheses.

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	(1)	
	SEO	t-stat
Leverage	0.103***	(11.9)
R&D	0.055***	(3.3)
NOLC	-0.013*	(-2.5)
Profitability	0.104***	(8.1)
Tangibility	0.005	(0.7)
Size	-0.006***	(-4.1)
Return	0.026***	(8.4)
Market-to-book	0.013***	(9.5)
Observations	30550	
Pseudo R-squared	0.1158	

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**Table 3.7 Logit regression results of equity offerings**

This table reports the results of logit regressions estimating the probability of an equity issue for a sample of firms with at least one seasoned equity offering during the sample period. Seasoned equity offering firms are obtained from SDC. Leverage is (long-term debt + short-term debt)/total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Price/12\_month\_high is calculated by dividing the stock price at one month before the issue month for issuers (the fiscal year end stock price for non-issuers) by the historical peak price over the past 12 month time period. I do similar calculation for different time horizon, such as 24 months, 36 months, 48 months and 60 months. Price/Average Price in panel C is calculated by dividing the stock price by the past 12-month average stock price. This table reports marginal effect. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5%, 1% and 0.1% level are marked \*, \*\* and \*\*\* respectively. Robust t-statistics with standard errors clustered by firms are in parentheses.

Panel A

	(1)		(2)		(3)		(4)		(5)	
	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat
Leverage	0.101***	(12.9)	0.101***	(13.0)	0.099***	(12.7)	0.099***	(12.7)	0.098***	(12.6)
R&D	0.056***	(3.9)	0.055***	(3.7)	0.054***	(3.7)	0.053***	(3.7)	0.052***	(3.7)
NOLC	-0.007	(-1.7)	-0.005	(-1.2)	-0.003	(-0.6)	-0.001	(-0.2)	0.001	(0.1)
Profitability	0.096***	(7.6)	0.084***	(6.5)	0.076***	(5.9)	0.072***	(5.6)	0.070***	(5.4)
Tangibility	0.001	(0.2)	0.001	(0.2)	0.002	(0.2)	0.001	(0.2)	0.001	(0.2)
Size	-0.008***	(-5.2)	-0.008***	(-5.4)	-0.008***	(-5.7)	-0.008***	(-5.7)	-0.008***	(-5.7)
Return	0.016***	(5.2)	0.014***	(4.8)	0.013***	(4.7)	0.013***	(4.9)	0.014***	(5.2)
Market-to-book	0.011***	(9.1)	0.011***	(8.8)	0.010***	(8.0)	0.009***	(7.3)	0.009***	(6.8)
Price/12_month_hi	0.099***	(12.3)								
Price/24_month_hi			0.099***	(15.5)						
Price/36_month_hi					0.103***	(17.1)				
Price/48_month_hi							0.104***	(18.8)		
Price/60_month_hi									0.103***	(20.0)
Observations	30550		30550		30550		30550		30550	
Pseudo R-squared	0.1295		0.1325		0.1361		0.1378		0.1386	

## Panel B

	(1)		(2)		(3)		(4)		(5)	
	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat
Leverage	0.107***	(15.0)	0.106***	(15.0)	0.105***	(15.0)	0.105***	(15.0)	0.104***	(15.0)
R&D	0.060***	(4.8)	0.058***	(4.7)	0.057***	(4.7)	0.056***	(4.7)	0.054***	(4.6)
NOLC	-0.007	(-1.5)	-0.004	(-1.0)	-0.002	(-0.4)	0.000	(0.1)	0.002	(0.5)
Profitability	0.100***	(8.9)	0.089***	(7.9)	0.080***	(7.3)	0.077***	(7.0)	0.074***	(6.8)
Tangibility	0.001	(0.2)	0.001	(0.2)	0.001	(0.2)	0.001	(0.2)	0.001	(0.2)
Size	-0.008***	(-9.9)	-0.008***	(-10.3)	-0.008***	(-10.6)	-0.008***	(-10.6)	-0.008***	(-10.5)
Return(t-1)	0.017***	(8.4)	0.014***	(7.2)	0.014***	(7.1)	0.014***	(7.3)	0.014***	(7.5)
Return(t+1)	-0.019***	(-7.0)	-0.019***	(-6.9)	-0.019***	(-6.9)	-0.019***	(-6.8)	-0.019***	(-6.8)
Market-to-book	0.011***	(8.2)	0.010***	(8.0)	0.009***	(7.5)	0.009***	(7.0)	0.008***	(6.6)
Price/12_month_hi	0.099***	(14.0)								
Price/24_month_hi			0.101***	(15.6)						
Price/36_month_hi					0.105***	(17.3)				
Price/48_month_hi							0.104***	(17.9)		
Price/60_month_hi									0.104***	(18.2)
Observations	28056		28056		28056		28056		28056	
Pseudo R-squared	0.1344		0.1379		0.1414		0.1428		0.1435	

## Panel C

	(1)		(2)		(3)		(4)		(5)	
	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat
Leverage	0.098***	(14.8)	0.097***	(14.8)	0.097***	(14.9)	0.096***	(15.0)	0.096***	(15.0)
R&D	0.057***	(4.8)	0.056***	(4.8)	0.055***	(4.9)	0.055***	(4.9)	0.054***	(4.9)
NOLC	-0.008	(-1.8)	-0.005	(-1.3)	-0.003	(-0.8)	-0.001	(-0.3)	0.000	(0.0)
Profitability	0.096***	(8.9)	0.087***	(8.1)	0.080***	(7.5)	0.076***	(7.2)	0.074***	(7.1)
Tangibility	0.004	(0.7)	0.003	(0.5)	0.003	(0.5)	0.003	(0.5)	0.003	(0.4)
Size	-0.007***	(-8.6)	-0.007***	(-9.2)	-0.007***	(-9.7)	-0.007***	(-9.8)	-0.007***	(-9.8)
Return	0.001	(0.4)	-0.000	(-0.1)	-0.001	(-0.2)	-0.001	(-0.3)	-0.001	(-0.3)
Market-to-book	0.009***	(7.6)	0.009***	(7.6)	0.008***	(7.2)	0.008***	(6.7)	0.007***	(6.3)
Price/Average Price	0.092***	(10.2)	0.082***	(10.6)	0.077***	(10.5)	0.077***	(10.7)	0.077***	(10.8)
Price/12_month_hi	0.035***	(4.0)								
Price/24_month_hi			0.057***	(8.2)						
Price/36_month_hi					0.069***	(11.2)				
Price/48_month_hi							0.073***	(12.5)		
Price/60_month_hi									0.074***	(13.1)
Observations	30550		30550		30550		30550		30550	
Pseudo R-squared	0.1362		0.1393		0.1428		0.1447		0.1433	

Panel D

	(1)		(2)		(3)		(4)		(5)	
	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat	SEO	t-stat
Leverage	0.103***	(14.4)	0.103***	(14.5)	0.102***	(14.6)	0.101***	(14.6)	0.101***	(14.7)
R&D	0.061***	(4.9)	0.060***	(4.9)	0.058***	(4.9)	0.058***	(4.9)	0.057***	(4.9)
NOLC	-0.007	(-1.5)	-0.005	(-1.1)	-0.002	(-0.5)	-0.000	(-0.1)	0.001	(0.3)
Profitability	0.100***	(8.8)	0.091***	(8.1)	0.084***	(7.5)	0.080***	(7.2)	0.078***	(7.0)
Tangibility	0.004	(0.7)	0.003	(0.5)	0.003	(0.5)	0.002	(0.4)	0.002	(0.4)
Size	-0.007***	(-8.8)	-0.008***	(-9.4)	-0.008***	(-9.8)	-0.008***	(-9.9)	-0.008***	(-9.9)
Return(t-1)	0.001	(0.3)	-0.000	(-0.0)	-0.001	(-0.2)	-0.001	(-0.3)	-0.001	(-0.3)
Return(t+1)	-0.019***	(-7.0)	-0.019***	(-6.9)	-0.019***	(-6.9)	-0.018***	(-6.8)	-0.018***	(-6.8)
Market-to-book	0.008***	(6.4)	0.008***	(6.4)	0.008***	(6.0)	0.007***	(5.6)	0.007***	(5.2)
Price/Average Price	0.097***	(10.2)	0.084***	(10.4)	0.080***	(10.4)	0.080***	(10.6)	0.081***	(10.7)
Price/12_month_hi	0.032***	(3.5)								
Price/24_month_hi			0.057***	(7.9)						
Price/36_month_hi					0.070***	(10.9)				
Price/48_month_hi							0.073***	(11.9)		
Price/60_month_hi									0.074***	(12.5)
Observations	28056		28056		28056		28056		28056	
Pseudo R-squared	0.1417		0.1450		0.1484		0.1501		0.1512	

**Table 3.8 Logit regression results of equity offerings**

This table reports the results of logit regressions estimating the probability of an equity issue. Compustat is used to define equity issue dummy. Net equity issues are measured as the change in book equity, minus the change in retained earnings, divided by assets. I define the observations with net equity issued higher than 5% as issuers (E). Leverage is (long-term debt + short-term debt)/total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Price/12\_month\_high is calculated by dividing the stock price by the historical peak price over the past 12 month time period. This table reports marginal effect. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5%, 1% and 0.1% level are marked \*, \*\* and \*\*\* respectively. Robust t-statistics with standard errors clustered by firms are in parentheses.

Panel A

	(1)		(2)		(3)		(4)		(5)	
	E	t-stat	E	t-stat	E	t-stat	E	t-stat	E	t-stat
Leverage	0.118***	(16.9)	0.119***	(16.8)	0.120***	(16.6)	0.120***	(16.5)	0.120***	(16.6)
R&D	0.078***	(4.7)	0.078***	(4.8)	0.079***	(4.8)	0.079***	(4.8)	0.079***	(4.8)
NOLC	0.025***	(8.7)	0.025***	(8.8)	0.026***	(9.0)	0.027***	(9.2)	0.027***	(9.5)
Profitability	-0.035*	(-2.4)	-0.037**	(-2.6)	-0.040**	(-2.8)	-0.042**	(-3.0)	-0.043**	(-3.0)
Tangibility	0.012*	(2.0)	0.012*	(2.0)	0.011	(1.9)	0.011	(1.9)	0.011	(1.8)
Size	-0.012***	(-10.4)	-0.012***	(-10.6)	-0.012***	(-10.9)	-0.012***	(-11.2)	-0.012***	(-11.1)
Return	0.017***	(8.1)	0.016***	(7.7)	0.015***	(8.0)	0.015***	(8.5)	0.015***	(8.4)
Market-to-book	0.025***	(27.9)	0.025***	(27.1)	0.024***	(26.0)	0.024***	(25.7)	0.024***	(24.9)
Price/12_month_hi	0.020**	(3.2)								
Price/24_month_hi			0.025***	(4.4)						
Price/36_month_hi					0.033***	(5.5)				
Price/48_month_hi							0.037***	(6.6)		
Price/60_month_hi									0.040***	(7.1)
Observations	73102		73102		73102		73102		73102	
Pseudo R-squared	0.130		0.131		0.132		0.132		0.133	

Panel B

	(1)		(2)		(3)		(4)		(5)	
	E	t-stat	E	t-stat	E	t-stat	E	t-stat	E	t-stat
Leverage	0.12***	(21.3)	0.12***	(21.4)	0.12***	(21.5)	0.12***	(21.6)	0.12***	(21.7)
R&D	0.09***	(8.2)	0.09***	(8.2)	0.09***	(8.2)	0.09***	(8.2)	0.09***	(8.2)
NOLC	0.03***	(11.6)	0.03***	(11.8)	0.03***	(12.0)	0.03***	(12.3)	0.03***	(12.6)
Profitability	-0.03**	(-3.3)	-0.03***	(-3.6)	-0.04***	(-3.9)	-0.04***	(-4.1)	-0.04***	(-4.2)
Tangibility	0.01*	(2.0)	0.01*	(2.0)	0.01	(1.9)	0.01	(1.9)	0.01	(1.8)
Size	-0.01***	(-17.2)	-0.01***	(-17.4)	-0.01***	(-17.7)	-0.01***	(-17.9)	-0.01***	(-18.0)
Return(t-1)	0.02***	(10.0)	0.02***	(9.3)	0.02***	(9.2)	0.02***	(9.3)	0.02***	(9.3)
Return(t+1)	-0.01***	(-7.0)	-0.01***	(-7.0)	-0.01***	(-6.9)	-0.01***	(-6.9)	-0.01***	(-6.9)
Market-to-book	0.02***	(22.8)	0.02***	(22.6)	0.02***	(22.2)	0.02***	(21.9)	0.02***	(21.6)
Price/12_month_hi	0.02***	(4.4)								
Price/24_month_hi			0.03***	(5.6)						
Price/36_month_hi					0.04***	(7.4)				
Price/48_month_hi							0.04***	(8.6)		
Price/60_month_hi									0.04***	(9.4)
Observations	65022		65022		65022		65022		65022	
Pseudo R-squared	0.135		0.135		0.136		0.137		0.137	

**Table 3.9 Percentage of firms followed by equity issues**

This table provides the average fraction of firms issuing equity. For each firm-month, `12_month_high_dummy` is set to one if the current high price is equal to or higher than the past 12-month high, zero otherwise. For each month, I calculate the fraction of the firms that issue equity in 12 months for the two groups, respectively. Then the average values are obtained over the sample period from 1975 to 2009. In column (1), the entire sample is used. In Column (2), the sample with the ratio of the current month peak price to the past peak price bigger than 0.8 and smaller than 1.2 is used.

		(1)	(2)
		Entire sample	Subsample $0.8 < (1\_m\_hi/X\_m\_hi) < 1.2$
		Percentage of firm-months followed by the equity issue	Percentage of firm-months followed by the equity issue
12_month_high_dummy	0	2.78%	3.80%
	1	7.49%	6.59%
24_month_high_dummy	0	2.85%	4.39%
	1	8.67%	7.63%
36_month_high_dummy	0	2.88%	4.86%
	1	9.40%	8.27%
48_month_high_dummy	0	2.90%	5.17%
	1	9.93%	8.77%
60_month_high_dummy	0	2.91%	5.44%
	1	10.38%	9.19%

**Table 3.10 Logit regressions of equity issues**

This table reports the results of logit regressions estimating the probability of an equity issue during the following 12-month period. The dependent variable, *IssueDummy*, is a binary variable set to one if there is an equity issue over the following 12-month period. Leverage is (long-term debt + short-term debt)/total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Size is the natural logarithm of sales. Return is the stock return measured over the year. Market-to-book is (total assets – book equity + market equity)/total assets. X\_Month\_hi Dummy is a binary variable set to one if the stock hits a 12-month, 24-month, 36-month, 48-month or 60-month high. This table reports marginal effect. Panel A provides monthly regression results. Panel B displays yearly regression results in which a month is randomly chosen for each firm-year. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5%, 1% and 0.1% level are marked \*, \*\* and \*\*\* respectively. Robust t-statistics with standard errors clustered by firms are in parentheses.

Panel A: Monthly regressions

	(1)		(2)		(3)		(4)		(5)	
	Issue Dummy	t-stat	Issue Dummy	t-stat	Issue Dummy	t-stat	Issue Dummy	t-stat	Issue Dummy	t-stat
Leverage	0.033***	(14.3)	0.033***	(14.2)	0.033***	(14.2)	0.033***	(14.2)	0.033***	(14.2)
R&D	0.046***	(12.3)	0.046***	(12.4)	0.046***	(12.4)	0.046***	(12.4)	0.046***	(12.4)
NOLC	-0.005**	(-3.3)	-0.005**	(-3.2)	-0.005**	(-3.2)	-0.004**	(-3.0)	-0.004**	(-3.0)
Profitability	0.039***	(10.8)	0.038***	(10.5)	0.037***	(10.4)	0.037***	(10.3)	0.037***	(10.2)
Tangibility	0.006*	(2.3)	0.006*	(2.4)	0.006*	(2.4)	0.006*	(2.4)	0.006*	(2.4)
Size	-0.001**	(-2.7)	-0.001**	(-2.6)	-0.001*	(-2.5)	-0.001*	(-2.4)	-0.001*	(-2.3)
Return <sub>(-12,-1)</sub>	0.007***	(17.0)	0.007***	(16.5)	0.007***	(16.6)	0.007***	(16.8)	0.007***	(16.8)
Market-to-book	0.003***	(8.4)	0.003***	(8.2)	0.003***	(7.9)	0.003***	(7.8)	0.003***	(7.6)
12_Month_hi Dummy	0.016***	(29.4)								
24_Month_hi Dummy			0.017***	(27.2)						
36_Month_hi Dummy					0.018***	(26.3)				
48_Month_hi Dummy							0.018***	(26.2)		
60_Month_hi Dummy									0.019***	(26.0)
Observations	984673		984673		984673		984673		984673	
Pseudo R-squared	0.0917		0.0905		0.0901		0.0901		0.0899	

Panel B: Monthly regressions

	(1)		(2)		(3)		(4)		(5)	
	Issue Dummy	t-stat	Issue Dummy	t-stat	Issue Dummy	t-stat	Issue Dummy	t-stat	Issue Dummy	t-stat
Leverage	0.034***	(14.50)	0.034***	(14.45)	0.034***	(14.40)	0.034***	(14.39)	0.034***	(14.40)
R&D	0.045***	(11.61)	0.045***	(11.70)	0.045***	(11.71)	0.045***	(11.73)	0.045***	(11.73)
NOLC	-0.005**	(-3.04)	-0.004**	(-3.00)	-0.004**	(-2.95)	-0.004**	(-2.87)	-0.004**	(-2.82)
Profitability	0.038***	(10.21)	0.037***	(9.99)	0.036***	(9.85)	0.036***	(9.78)	0.036***	(9.72)
Tangibility	0.007**	(2.69)	0.007**	(2.74)	0.007**	(2.79)	0.007**	(2.80)	0.007**	(2.80)
Size	-0.000	(-1.46)	-0.000	(-1.32)	-0.000	(-1.21)	-0.000	(-1.13)	-0.000	(-1.05)
Return <sub>(-12,-1)</sub>	0.008***	(18.03)	0.008***	(17.71)	0.008***	(17.82)	0.008***	(17.94)	0.008***	(17.99)
Return <sub>(1,12)</sub>	0.009***	(17.57)	0.009***	(17.60)	0.009***	(17.59)	0.009***	(17.60)	0.009***	(17.60)
Market-to-book	0.003***	(9.23)	0.003***	(9.06)	0.003***	(8.87)	0.003***	(8.74)	0.003***	(8.63)
12_Month_hi Dummy	0.015***	(27.25)								
24_Month_hi Dummy			0.016***	(24.81)						
36_Month_hi Dummy					0.016***	(23.99)				
48_Month_hi Dummy							0.017***	(23.94)		
60_Month_hi Dummy									0.017***	(23.76)
Observations	927049		927049		927049		927049		927049	
Pseudo R-squared	0.107		0.106		0.105		0.105		0.105	

Panel C: Yearly regressions

	(1)		(2)		(3)		(4)		(5)	
	Issue	t-stat	Issue	t-stat	Issue	t-stat	Issue	t-stat	Issue	t-stat
	Dummy		Dummy		Dummy		Dummy		Dummy	
Leverage	0.033***	(12.1)	0.033***	(12.1)	0.033***	(12.1)	0.033***	(12.0)	0.033***	(12.1)
R&D	0.045***	(10.5)	0.045***	(10.7)	0.045***	(10.7)	0.045***	(10.7)	0.046***	(10.7)
NOLC	-0.005**	(-2.9)	-0.005**	(-2.8)	-0.005**	(-2.8)	-0.004**	(-2.6)	-0.004*	(-2.6)
Profitability	0.038***	(9.0)	0.038***	(8.8)	0.037***	(8.7)	0.037***	(8.6)	0.037***	(8.6)
Tangibility	0.004	(1.6)	0.005	(1.6)	0.005	(1.7)	0.005	(1.7)	0.005	(1.7)
Size	-0.001	(-1.8)	-0.001	(-1.7)	-0.000	(-1.6)	-0.000	(-1.5)	-0.000	(-1.4)
Return <sub>(-12, -1)</sub>	0.007***	(10.8)	0.007***	(10.3)	0.007***	(10.5)	0.007***	(10.6)	0.007***	(10.7)
Market-to-book	0.003***	(6.8)	0.003***	(6.7)	0.003***	(6.5)	0.003***	(6.4)	0.003***	(6.3)
12_Month_hi Dummy	0.016***	(16.1)								
24_Month_hi Dummy			0.017***	(15.6)						
36_Month_hi Dummy					0.017***	(14.9)				
48_Month_hi Dummy							0.018***	(14.9)		
60_Month_hi Dummy									0.018***	(14.6)
Observations	82081		82081		82081		82081		82081	
Pseudo R-squared	0.0905		0.0899		0.0891		0.0892		0.0888	

**Table 3.11 Logit regressions of equity issues (subsample)**

This table reports the results of logit regressions estimating the probability of an equity issue during the following 12-month period. The dependent variable, *IssueDummy*, is a binary variable set to one if there is an equity issue over the following 12-month period. Leverage is (long-term debt + short-term debt)/total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. X\_Month\_hi Dummy is a binary variable set to one if the stock hits a 12-month, 24-month, 36-month, 48-month or 60-month high. The first set of results is for entire sample. The second set of results is for observations with current month high price lower than historical high. The third set of results is for observations with current month high price higher than but not more than 20% higher than the historical high. The fourth sets of results are for observations with current month high more than 20% higher than the historical high. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5%, 1% and 0.1% level are marked \*, \*\* and \*\*\* respectively. Robust t-statistics with standard errors clustered by firms are in parentheses.

Panel A: 12-month high

	(1)	(2)	(3)	(4)
	Entire sample	1_m_Hi/12_m_hi<1	1<=1_m_Hi/12_m_hi <1.2	1_m_Hi/12_m_hi >=1.2
	Issue Dummy	Issue Dummy	Issue Dummy	Issue Dummy
Leverage	0.033*** (15.3)	0.027*** (14.1)	0.073*** (13.8)	0.104*** (6.9)
R&D	0.044*** (12.4)	0.037*** (12.3)	0.093*** (9.0)	0.170*** (6.3)
NOLC	-0.004** (-2.7)	-0.002 (-1.9)	-0.013*** (-3.3)	-0.023* (-2.5)
Profitability	0.035*** (10.2)	0.031*** (10.1)	0.067*** (7.4)	0.100*** (4.2)
Tangibility	0.005* (2.1)	0.005* (2.3)	0.008 (1.5)	0.004 (0.2)
Size	-0.001*** (-3.9)	-0.000 (-1.9)	-0.004*** (-6.9)	0.003 (1.9)
Return <sub>(-12,-1)</sub>	0.005*** (14.7)	0.005*** (14.9)	0.009*** (10.0)	0.012*** (5.8)
Market-to-book	0.003*** (9.7)	0.003*** (10.1)	0.005*** (5.1)	0.015*** (5.9)
1_m_hi/12_m_hi	0.047*** (27.8)	0.032*** (17.1)	0.170*** (18.0)	-0.089* (-2.0)
Constant	-0.158*** (26.59)	-0.110*** (-26.64)	-0.386*** (-17.29)	-0.252*** (-3.13)
Observations	959161	790858	154030	14156
Pseudo R-squared	0.0975	0.0813	0.0807	0.0748

Panel B: 24-month high

	(1)	(2)	(3)	(4)
	Entire sample	1_m_Hi/24_m_hi<1	1<=1_m_Hi/24_m_hi <1.2	1_m_Hi/24_m_hi >=1.2
	Issue Dummy	Issue Dummy	Issue Dummy	Issue Dummy
Leverage	0.034*** (15.4)	0.028*** (14.0)	0.089*** (13.3)	0.154*** (7.2)
R&D	0.045*** (12.5)	0.039*** (12.7)	0.101*** (7.7)	0.205*** (4.9)
NOLC	-0.003* (-2.3)	-0.002 (-1.6)	-0.017** (-3.3)	-0.019 (-1.4)
Profitability	0.031*** (9.0)	0.028*** (8.8)	0.071*** (6.3)	0.098** (3.0)
Tangibility	0.005* (2.1)	0.005* (2.5)	0.003 (0.5)	-0.011 (-0.5)
Size	-0.001*** (-4.4)	-0.001* (-2.4)	-0.005*** (-7.7)	-0.001 (-0.4)
Return <sub>(-12,-1)</sub>	0.005*** (12.7)	0.005*** (13.4)	0.008*** (7.9)	0.009*** (3.7)
Market-to-book	0.003*** (9.2)	0.003*** (9.7)	0.004*** (3.9)	0.014*** (4.2)
1_m_hi/24_m_hi	0.043*** (25.9)	0.031*** (18.3)	0.193*** (16.0)	0.043 (0.5)
Observations	959161	841990	108122	8641
Pseudo R-squared	0.0984	0.0826	0.0799	0.0712

Panel C: 36-month high

	(1)	(2)	(3)	(4)
	Entire sample	1_m_Hi/36_m_hi<1	1<=1_m_Hi/36_m_hi <1.2	1_m_Hi/36_m_hi >=1.2
	Issue Dummy	Issue Dummy	Issue Dummy	Issue Dummy
Leverage	0.033*** (15.5)	0.028*** (14.1)	0.100*** (13.2)	0.186*** (7.5)
R&D	0.044*** (12.4)	0.040*** (12.5)	0.102*** (6.8)	0.210*** (4.0)
NOLC	-0.002 (-1.8)	-0.001 (-1.2)	-0.018** (-2.8)	-0.025 (-1.3)
Profitability	0.028*** (8.2)	0.025*** (7.9)	0.072*** (5.7)	0.089* (2.4)
Tangibility	0.005* (2.1)	0.006** (2.7)	-0.003 (-0.3)	-0.006 (-0.2)
Size	-0.001*** (-4.7)	-0.001** (-2.7)	-0.007*** (-8.2)	-0.005 (-1.7)
Return <sub>(-12,-1)</sub>	0.005*** (12.3)	0.005*** (13.3)	0.008*** (6.9)	0.009** (3.0)
Market-to-book	0.003*** (8.5)	0.003*** (9.1)	0.004** (3.0)	0.012** (3.3)
1_m_hi/36_m_hi	0.042*** (26.1)	0.033*** (19.9)	0.201*** (14.6)	0.037 (0.3)
Observations	959161	863121	89019	6736
Pseudo R-squared	0.1007	0.0848	0.0810	0.0707

Panel D: 48-month high

	(1)	(2)	(3)	(4)
	Entire sample	1_m_Hi/48_m_hi<1	1<=1_m_Hi/48_m_hi <1.2	1_m_Hi/48_m_hi >=1.2
	Issue Dummy	Issue Dummy	Issue Dummy	Issue Dummy
Leverage	0.033*** (15.5)	0.028*** (14.2)	0.106*** (12.9)	0.203*** (7.5)
R&D	0.044*** (12.5)	0.040*** (12.6)	0.101*** (6.0)	0.224*** (3.7)
NOLC	-0.001 (-1.1)	-0.001 (-0.8)	-0.015* (-2.3)	-0.026 (-1.4)
Profitability	0.026*** (7.8)	0.023*** (7.5)	0.071*** (5.3)	0.086* (2.1)
Tangibility	0.005* (2.1)	0.006** (2.8)	-0.006 (-0.7)	-0.018 (-0.6)
Size	-0.001*** (-4.7)	-0.001** (-2.7)	-0.008*** (-8.7)	-0.005 (-1.7)
Return <sub>(-12,-1)</sub>	0.005*** (12.3)	0.005*** (13.4)	0.008*** (6.2)	0.010** (3.0)
Market-to-book	0.003*** (7.8)	0.002*** (8.3)	0.004** (2.9)	0.012** (2.9)
1_m_hi/48_m_hi	0.041*** (26.2)	0.033*** (20.6)	0.223*** (14.9)	0.111 (0.8)
Observations	959161	874687	78464	5783
Pseudo R-squared	0.1022	0.0859	0.0832	0.0727

Panel E: 60-month high

	(1)	(2)	(3)	(4)
	Entire sample	1_m_Hi/60_m_hi<1	1<=1_m_Hi/60_m_hi <1.2	1_m_Hi/60_m_hi >=1.2
	Issue Dummy	Issue Dummy	Issue Dummy	Issue Dummy
Leverage	0.033*** (15.5)	0.029*** (14.2)	0.112*** (12.5)	0.220*** (7.6)
R&D	0.043*** (12.4)	0.040*** (12.6)	0.096*** (5.2)	0.237*** (3.7)
NOLC	-0.001 (-0.7)	-0.000 (-0.3)	-0.015* (-2.1)	-0.029 (-1.2)
Profitability	0.025*** (7.6)	0.023*** (7.2)	0.070*** (4.9)	0.087* (2.0)
Tangibility	0.005* (2.1)	0.006** (2.8)	-0.008 (-0.9)	-0.018 (-0.6)
Size	-0.001*** (-4.6)	-0.001** (-2.7)	-0.009*** (-9.0)	-0.007* (-2.0)
Return <sub>(-12,-1)</sub>	0.005*** (12.2)	0.005*** (13.4)	0.008*** (5.9)	0.010** (2.8)
Market-to-book	0.002*** (7.3)	0.002*** (7.8)	0.004** (2.6)	0.011* (2.4)
1_m_hi/60_m_hi	0.041*** (26.3)	0.034*** (21.0)	0.230*** (14.4)	0.097 (0.7)
Observations	959161	882675	71066	5215
Pseudo R-squared	0.1032	0.0866	0.0842	0.0711

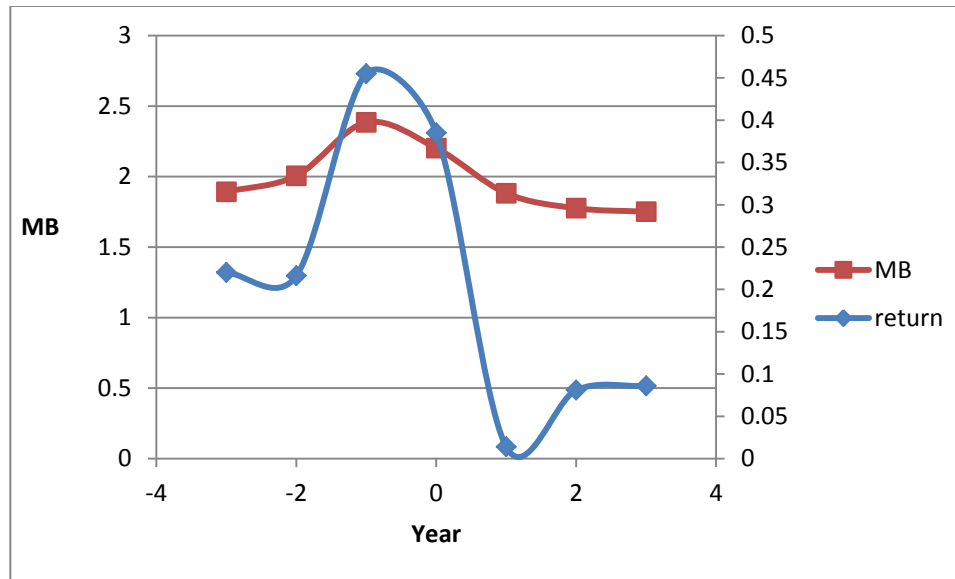
**Table 3.12 Logit regression results of share repurchasing**

This table reports the results of logit regressions estimating the probability of an equity repurchase. I use Compustat to define equity repurchase dummy (ER). Net equity issues are measured as the change in book equity, minus the change in retained earnings, divided by assets. I define the observations with net equity repurchased higher than 5% as repurchasers. Leverage is (long-term debt + short-term debt)/total assets. Tangible assets ratio is measured as net property, plant, and equipment /total assets. R&D is research and development expenses/sales. NOLC is net operating loss carry forwards/total assets. Profitability is operating income / total assets. Size is the natural logarithm of sales. Return is the stock return measured over the fiscal year. Market-to-book is (total assets – book equity + market equity)/total assets. Price/X\_month\_low is defined as the ratio of the price to the low price over the past 12-month, 24-month, 36-month, 48-month and 60-month. This table reports marginal effect. Regressions include year dummies, which are not reported below. Values significantly different from zero at 5%, 1% and 0.1% level are marked \*, \*\* and \*\*\* respectively. Robust t-statistics with standard errors clustered by firms are in parentheses.

	(1)		(2)		(3)		(4)		(5)	
	ER	t-stat	ER	t-stat	ER	t-stat	ER	t-stat	ER	t-stat
Leverage	-0.062***	(-13.5)	-0.063***	(-14.1)	-0.065***	(-13.8)	-0.065***	(-13.8)	-0.066***	(-13.9)
R&D	0.015	(1.5)	0.012	(1.1)	0.010	(1.0)	0.010	(0.9)	0.010	(0.9)
NOLC	-0.015***	(-4.3)	-0.015***	(-4.3)	-0.016***	(-4.6)	-0.017***	(-4.7)	-0.017***	(-4.9)
Profitability	0.067***	(12.4)	0.078***	(13.8)	0.078***	(12.8)	0.078***	(12.6)	0.076***	(12.3)
Tangibility	-0.022***	(-6.5)	-0.022***	(-6.7)	-0.022***	(-6.4)	-0.021***	(-6.1)	-0.021***	(-5.9)
Size	0.005***	(10.1)	0.006***	(10.2)	0.006***	(10.6)	0.006***	(10.8)	0.006***	(10.8)
Return <sub>(t-1)</sub>	0.014***	(5.7)	0.004**	(2.8)	-0.001	(-0.8)	-0.003*	(-2.0)	-0.004**	(-3.2)
Market-to-book	0.004***	(6.5)	0.004***	(6.3)	0.004***	(5.8)	0.004***	(5.8)	0.004***	(5.6)
Price/12_month_low	-0.022***	(-8.9)								
Price/24_month_low			-0.007***	(-7.7)						
Price/36_month_low					-0.003***	(-4.4)				
Price/48_month_low							-0.002***	(-3.6)		
Price/60_month_low									-0.001*	(-2.5)
Observations	72542		72542		72542		72542		72542	
Pseudo R-squared	0.133		0.131		0.130		0.129		0.129	

### Figure 2.1 Market timing of equity issues

This figure presents mean market-to-book ratios and returns of equity issuers from Year -3 to +3 relative to the issue years. Market-to-book is  $(\text{total assets} - \text{book equity} + \text{market equity}) / \text{total assets}$ . Return is the stock return measured over the fiscal year. Issue years are defined from SDC.



**Figure 2.2 Institutional ownership around equity issues**

This figure depicts the mean annual (quarterly) institutional holdings around seasoned equity offerings between 1983 and 2009. Time 0 is the issue year (quarter).

Figure 2. 2A

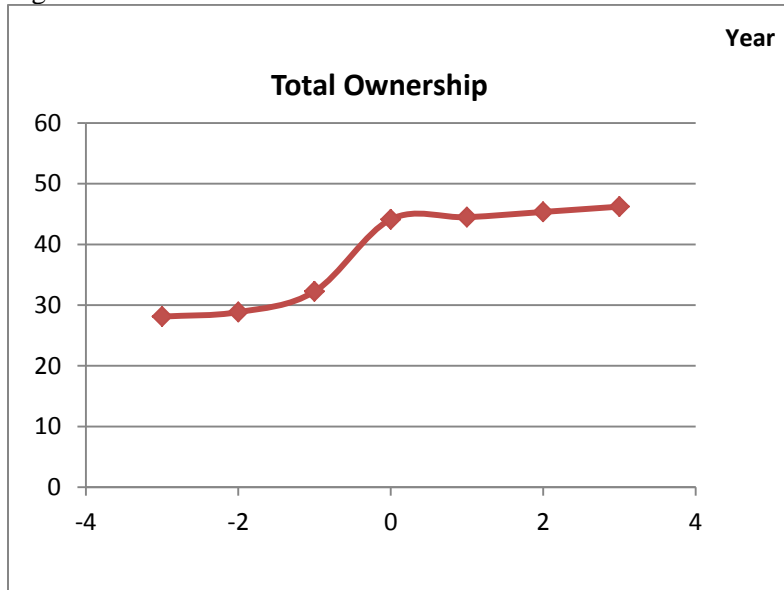
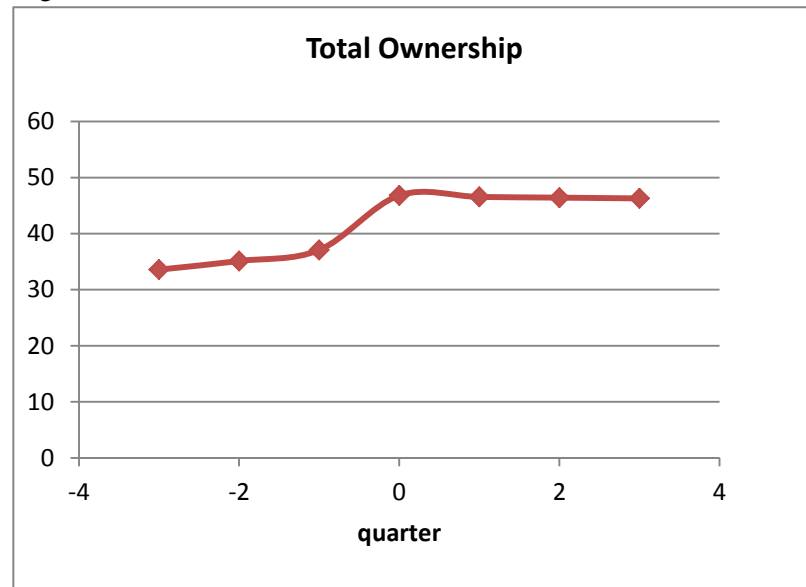


Figure 2.2B



### Figure 2.3 Long- and short- term institutional ownership around equity issues

This figure depicts the mean annual (quarterly) holdings of long- term (LT) and short-term (ST) institutional investors around seasoned equity offerings between 1983 and 2009. Time 0 is the issue year (quarter).

Figure 2.3 A

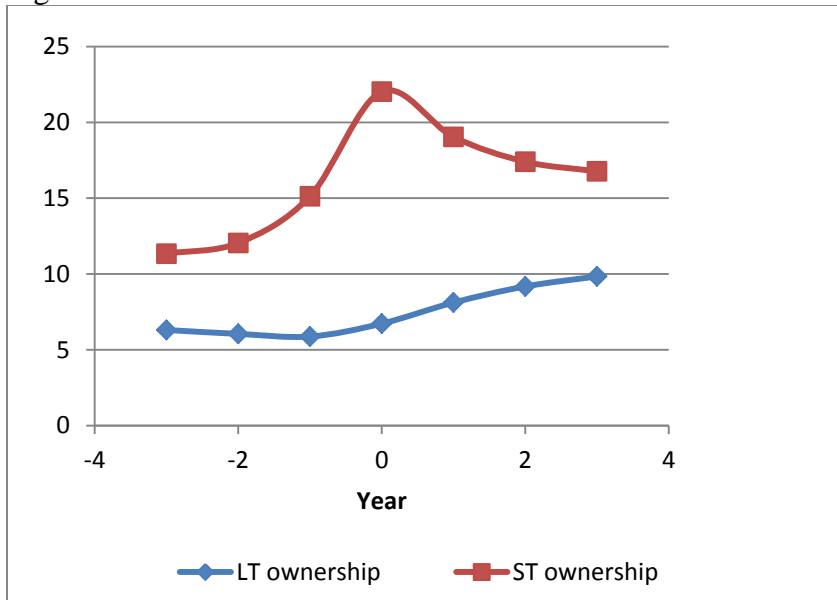
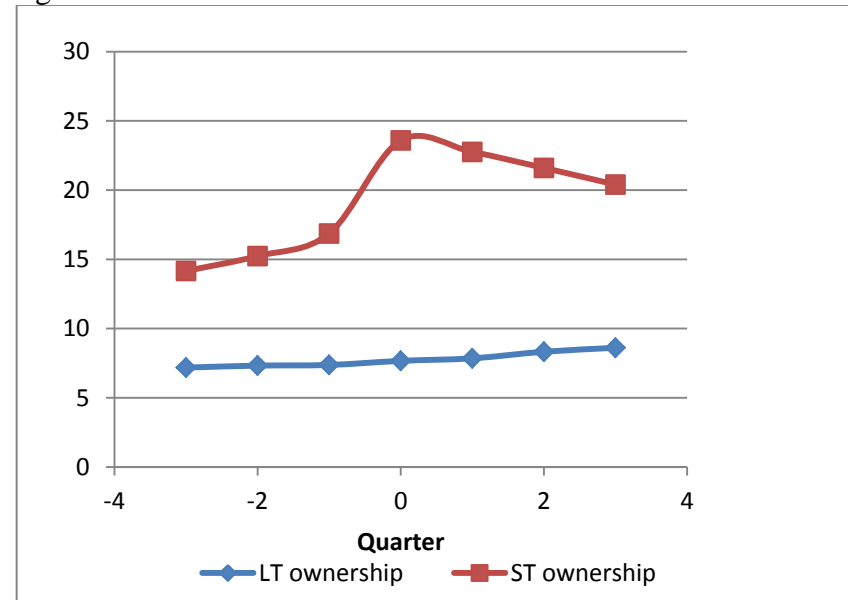


Figure 2.3 B



**Figure 2.4 Institutional trading-based SEO portfolio returns**

This table presents SEO portfolio return by change in continuing ownership. The sample of SEO firms is sorted into two groups by the continuing growth between quarters -1 and 0 relative to the offer quarter. SEO firms with positive change in the continuing ownership and negative change are categorized as positive and negative, respectively. Continuing ownership are the changes in ownership of institutional investors who own shares both at the beginning and at the end of the fiscal year examined. Panel A presents pre- and post-issue returns by changes in continuing ownership at the issue quarters. Panel B presents pre- and post-issue returns by changes in long-term continuing ownership at the issue quarters. Panel A presents pre- and post-issue returns by changes in short-term continuing ownership at the issue quarters.

Figure 2.4A: SEO portfolio returns by changes in continuing ownership at the issue quarters

Figure 2.4B: SEO portfolio returns by changes in LT continuing ownership at the issue quarters

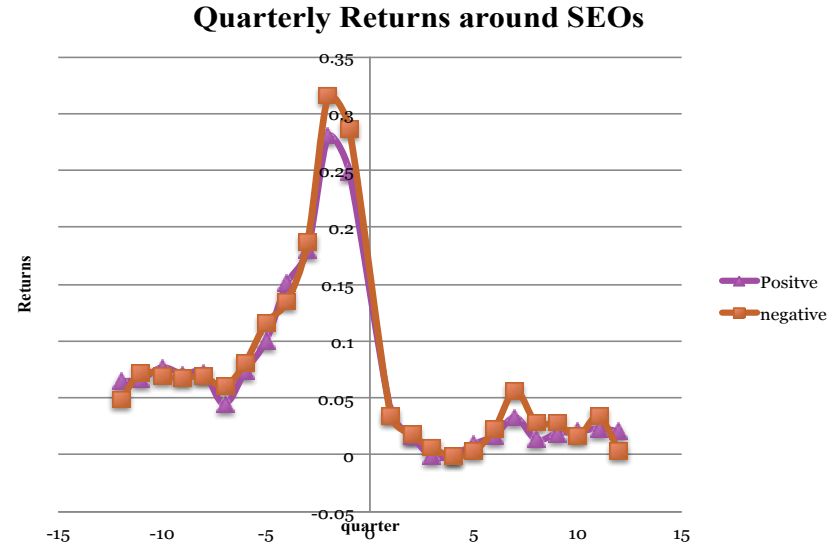
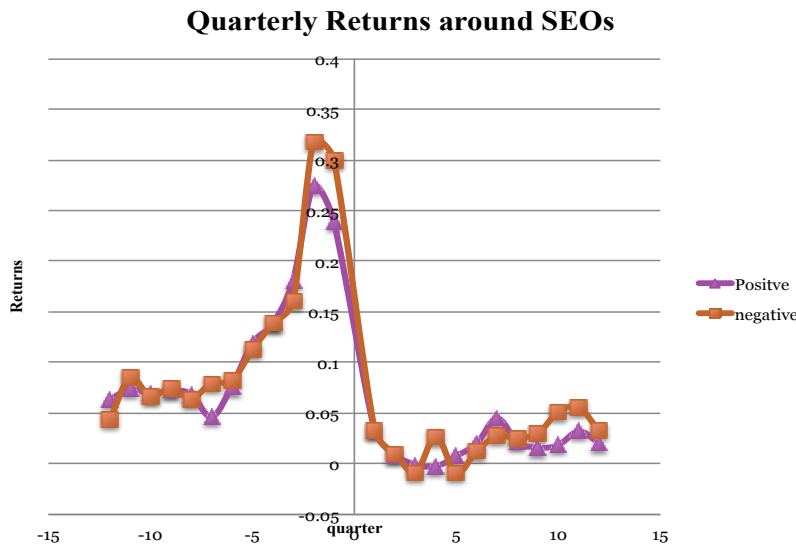
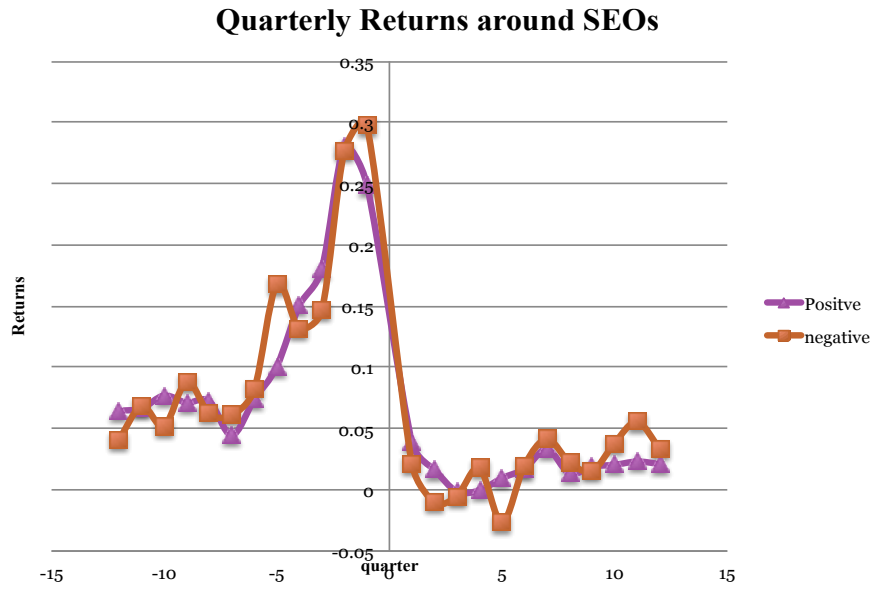
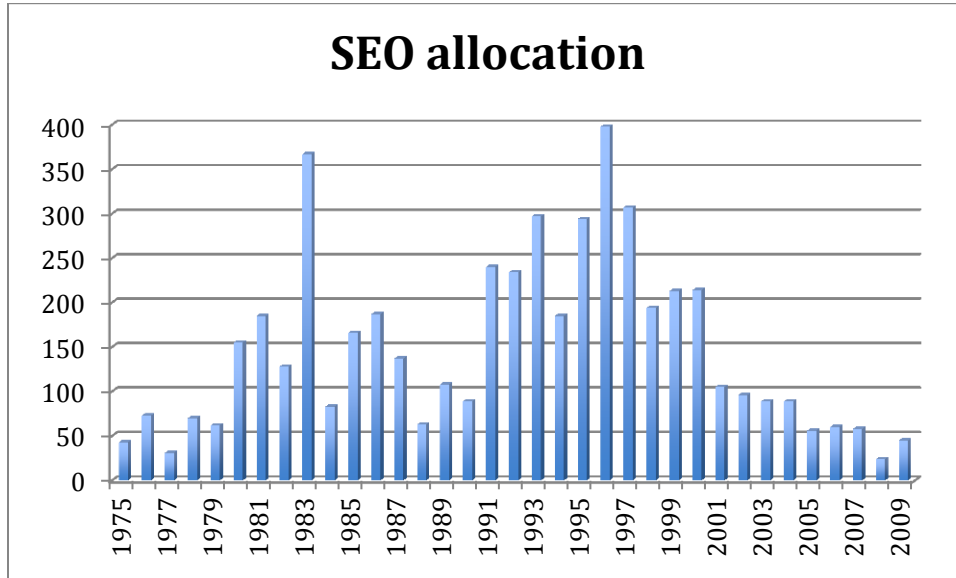


Figure 2.4C: SEO portfolio returns by changes in ST continuing ownership at the issue quarters



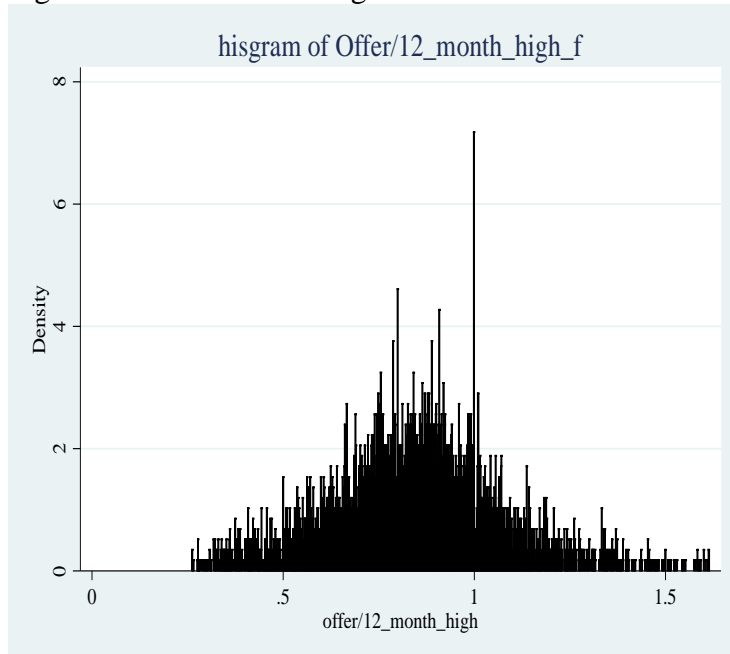
**Figure 3.1 Seasoned equity offerings allocation from 1975 to 2009**



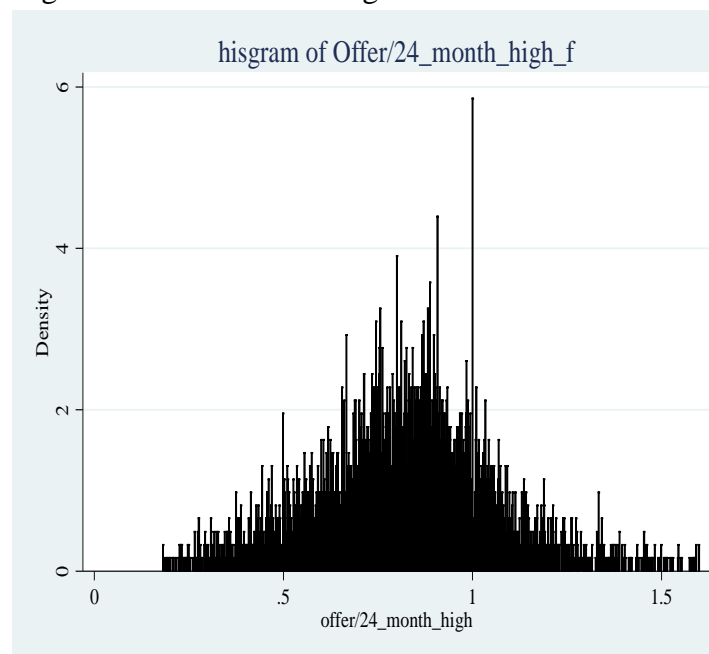
### Figures 3.2 Offering price density

The following figures display histogram of the ratio of the offering price to the high stock price over the 52-week, 24-month, 36-month, 48-month and 60-month ending 1 month prior to announcement month.

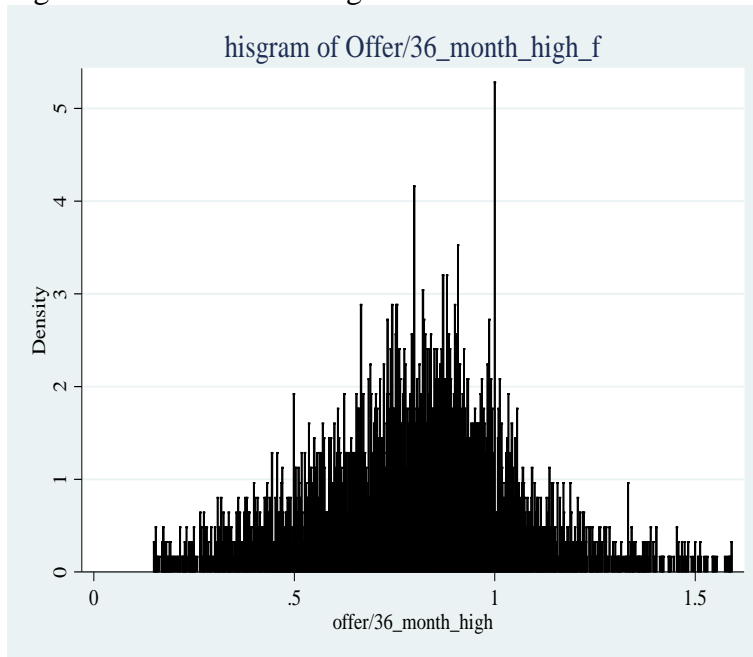
Figures 3.2 A: 52-week high



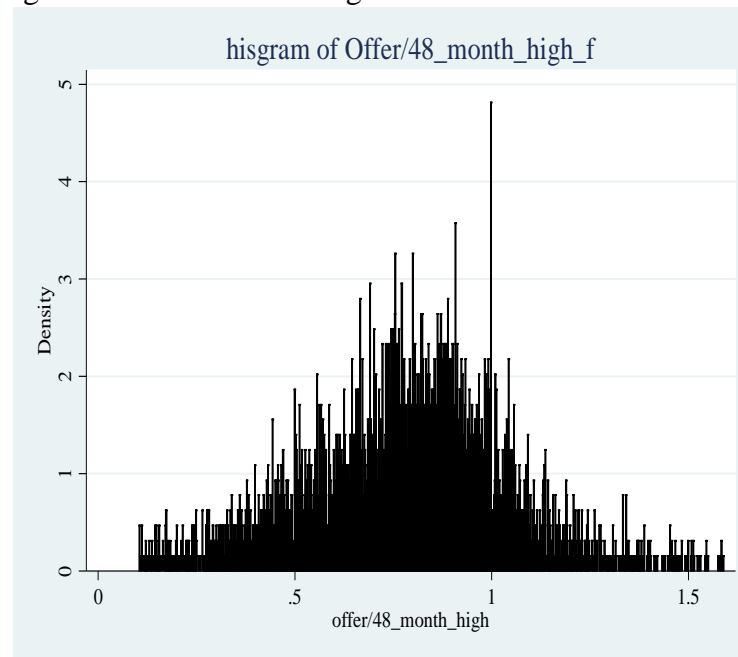
Figures 3.2 B: 24-month high



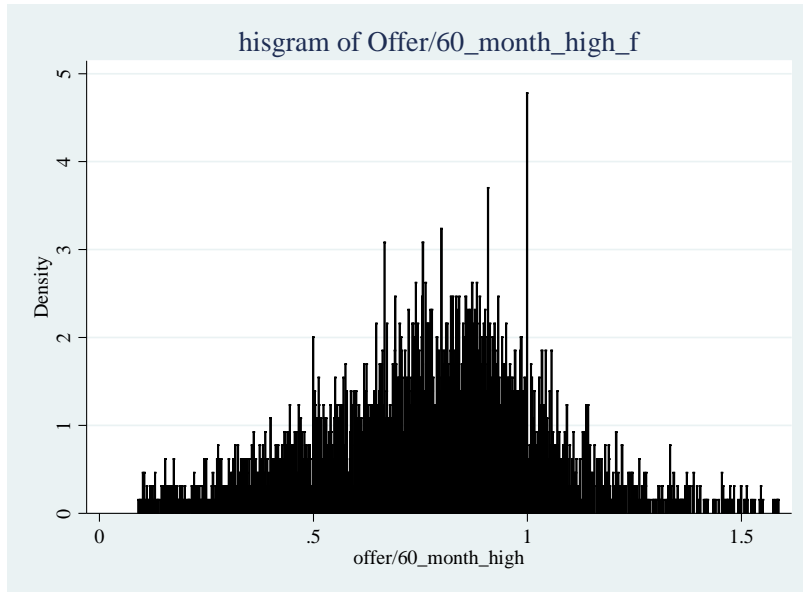
Figures 3.2C: 36-month high



Figures 3.2 D: 48-month high



Figures 3.2E: 60-month high



### Figures 3.3 Distribution of the ratio of the stock price to the historical peak price

For issuers, I use stock prices one month prior to the announcement month and peak prices over the time horizon ending two month prior to the announcement month. For non-issuers, fiscal year end stock prices and past peak prices over the time horizon (52-week, 24-month, 36-month, 48-month, and 60-month) ending one month prior to the fiscal year end are used.

Figure 3.3A: 52-week high price

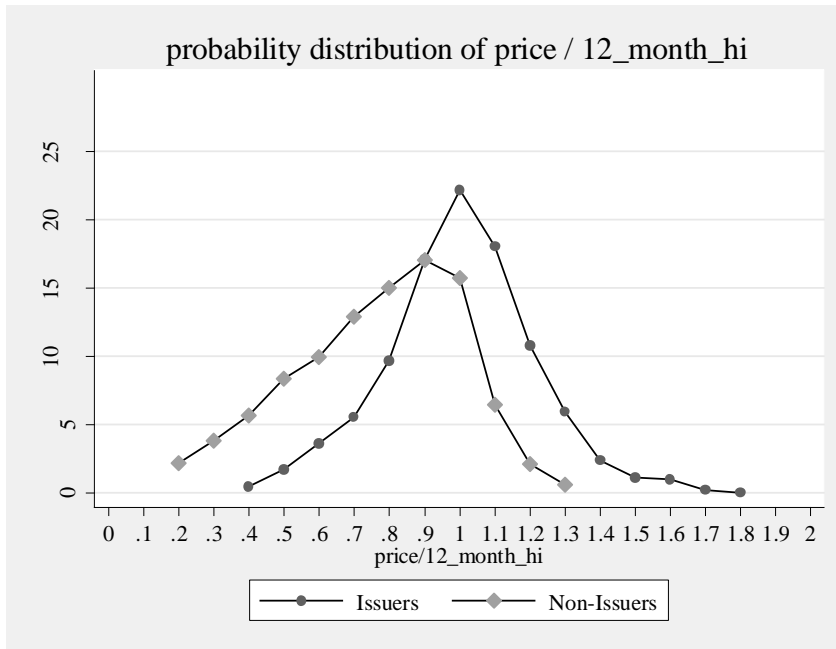


Figure 3.3B: 24-month high price



Figure 3.3C: 36-month high price

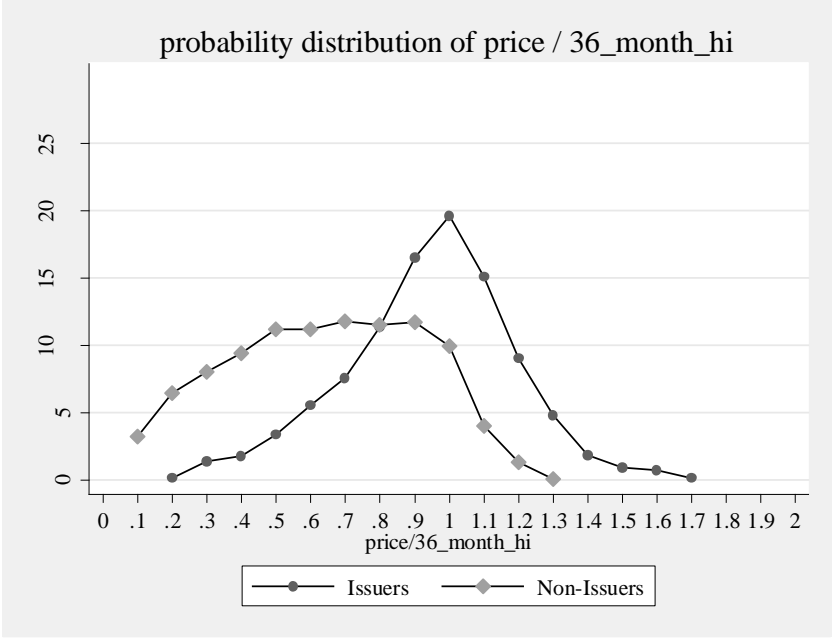


Figure 3.4D: 48-month high price

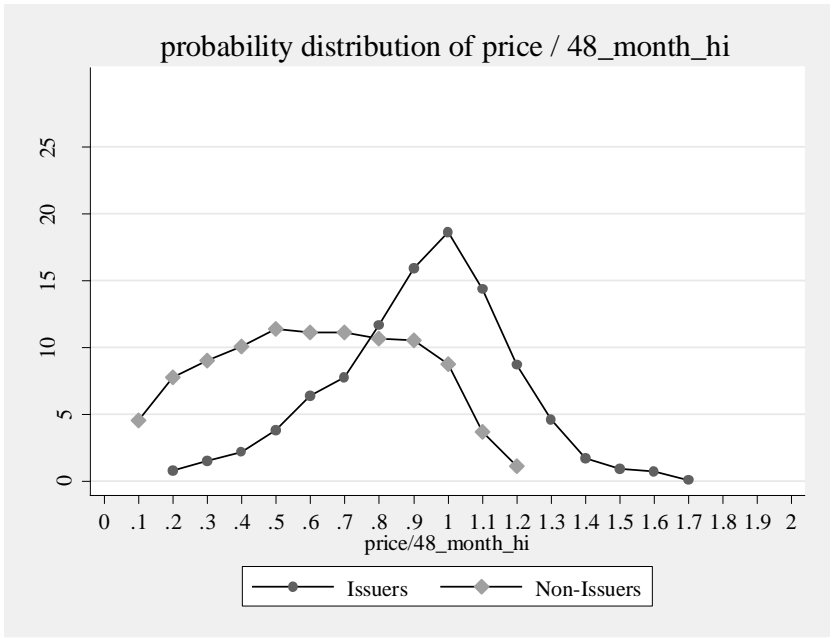
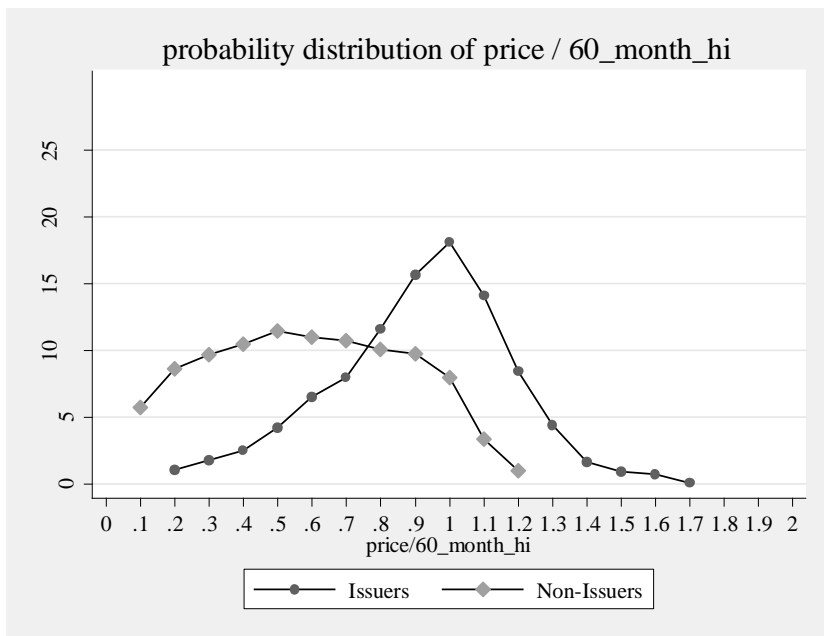
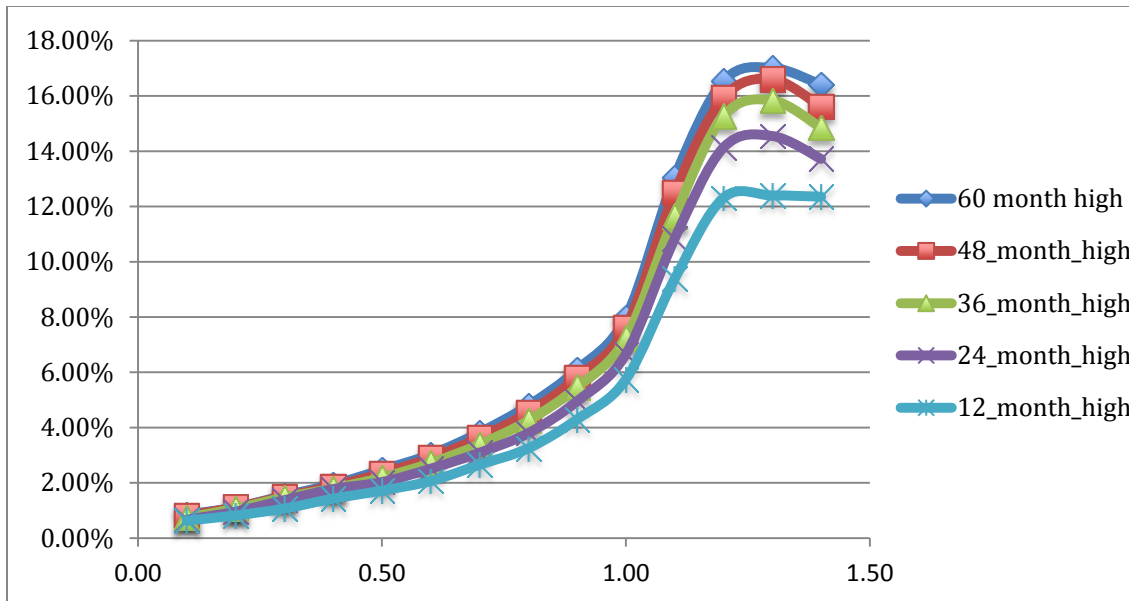


Figure 3.3E: 60-month high price



**Figure 3.4 Probability of equity issues (subsample)**

This figure provides the average percent of firms issuing equity for different groups. The entire firm-months are split into 14 groups according to the ratio of the current-month high to the historical High. The highest bin includes firm-months in which the ratio is higher than 1.4. The lowest group includes the firm-months in which the ratio is lower than 0.2. The rest of the months are sorted into 12 groups with equal bandwidth of 0.1. For each group, the average fraction of firm-months that are followed by equity issues in 12 months is obtained.



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