The Impact of Cost of Equity on Seasoned Equity Offerings

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Keywords: SEO, cost of equity, forward-looking, announcement, long run, distress

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1. INTRODUCTION

The motivation for seasoned equity offerings (SEO) has been an important yet unresolved topic. One common reason for a firm to issue SEOs is to raise capital for investments (Masulis and Korwar 1986; Eckbo, Masulis, and Norli 2007). Supporting evidences include the incremental spending on R&D and capital expenditures (Kim and Weisbach 2008), among others. Another prominent reason advocated by Graham and Harvey (2001) and others is that managers time the market to take advantage of over-valuation of their publicly traded securities. Supporting evidences include the clustering of equity issues together (Bayless and Chaplinsky 1996). Moreover, prior literature usually views the negative market reaction at SEO announcement time (Asquith and Mullins 1986; Masulis and Korwar 1986), and the long run post-SEO underperformance (Loughran and Ritter 1995; Spiess and Affleck-Graves 1995) as the support for market timing explanation.

Meanwhile, both investment and market timing motives suggest that there exists a negative relationship between equity issuance likelihood and the expected cost of equity. Pastor and Veronesi (2005) developed a model of optimal timing, in which equity issuances during IPOs relate to the declining cost of equity. Li, Livdan, and Zhang (2009) built a *q*-theory model, in which they explain the empirical anomalies during equity issuances using the negative investment-return relationship.

This paper provides an empirical link between the expected cost of equity and the SEO activities. By simultaneously studying the impact of expected cost of equity on SEO likelihood, SEO announcement reaction and post-SEO return, this paper tries to disentangle the investment and market timing hypotheses through the different implications on the stock market during SEO announcements, SEO issuances and after SEO issuances.

An important issue to conduct such empirical study is to obtain a sensible measure of the expected cost of equity. One common way is to estimate the expected return is to use historical average of realized returns. However, the historical approach does not capture the forward-looking nature of the expected cost of equity, while the SEO decisions are obviously forward-looking. Another approach uses analyst forecast data and fit them into an earning or dividend discount model to obtain an implied cost of equity (e.g. Gebhardt, Lee, and Swaminathan 2001; Gordon and Gordon 1997). However, the estimated cost of equity using this approach depends very much on the model used and the predictive power of the analyst forecast data. Furthermore, to the extent that analysts have biases (Easton and Sommer 2007), this approach leads to biased estimates in the forward-looking cost of equity capital. These biases are compounded by the fact that analyst coverage correlates with firms' issuance decisions (Chang, Dasgupta, and Hilary 2006).

This paper uses a novel measure of forward-looking cost of equity, based on the work of Duan and Zhang (2013). This measure relies solely on market data, so that it does not suffer from biases as the implied cost of equity measures based on analyst forecasts. Specifically, the methodology developed in Duan and Zhang (2013) derives a closed form formula for the market forward-looking risk premium (henceforth, MFLRP), which is a function of investors' risk aversion and forward-looking volatility, skewness, and kurtosis. Using the above, one can also compute a firm specific forward-looking risk premium (henceforth, FFLRP), that is simply the product of the market forward-looking risk premium and firm beta.

This paper first provide empirical evidence on the negative impact of market forward-looking risk premium on aggregate fraction of SEO issuances, defined as the number of SEOs in a given month divided by the number of traded firms at the end of the previous month (in thousands). From 1970 to 2009, an increase in the MFLRP by 1% reduces the SEO issuance fraction by about 1%. These results include controls for well-known variables that may influence equity offering decisions, such as macroeconomic conditions and other market-specific variables. A similar negative relationship also exists at firm level, for both the SEO likelihood and the amount of SEO proceeds.

Next, I disentangle the investment and market-timing hypothesis by studying their different implications on how the forward-looking cost of equity affects the stock market reactions during SEO announcements and after SEO issuances.

Prior studies document a negative stock market reaction during SEO announcements (Asquith and Mullins 1986, Marsulis and Korwar 1986). If the negative reaction is a result of the adverse selection effect from market timing, where rational investors lower their assessment of stock value due to the expected overvaluation, investors should react more negatively when the firm is more likely to time the market (i.e. when their cost of equity is low). In contrast, if the main reason for the equity issuances is to finance investment, the firms announcing their seasoned equity offerings when their cost of equity is higher should receive a more negative market reaction, as the firm's issuance purpose is unlikely to be investment related when the cost of equity is high. The empirical findings are consistent with investment hypothesis. The difference in two days abnormal announcement return for firms issuing at top 30% of FFLRP and bottom 30% of FFLRP is -0.71% and statistically significant. This finding is also consistent with Jung et al. (1996), who documents that the firms without valuable growth opportunities experience a more negative stock price reaction to equity issues than do firms with better investment opportunities.

The long run post-SEO stock market underperformance is another well-documented phenomenon (Spiess and Affleck-Graves 1995, Loughran and Ritter 1995). Market timing theory commonly interprets such underperformance as the ex-post adjustment from the initial high price (Ritter 1991; Loughran and Ritter, 1995, 1997; Spiess and Affleck-Graves, 1995; Baker and Wurgler 2002). Using a calendar-time regression, I find that there is a significant negative long run post-SEO returns to the firms issuing SEO when their expected cost of equity is high. There is no abnormal long run returns for firms issuing SEO when their expected cost of equity is low. The results are difficult to reconcile with market timing theory. Nevertheless, the result can be interpreted as a negative realization of firm' non-investment issuance motive. Since firms usually have unclear investment objectives when their cost of equity is high, their SEO motivation is likely to be driven by other urgent cash needs, especially for firms having cash-flow problems or under distress. In consequence, the post-SEO underperformance could be an ex-post realization of the worse performance of distressed firms (Campbell et al. 2008). In line with this interpretation, DeAngelo et al. (2010) find that an important motive for firms' issuance decision is to "meet near-term cash need".

To test this explanation, I use the probability of default measure computed from Vassalou and Xing (2004) and a negative earnings indicator to capture firms' distress likelihood. I find that firms issuing SEOs at higher cost of equity have higher probabilities of default and larger percentages of negative earnings. In a cross-sectional setting, firms with higher probability of default and negative earnings are more likely to issue SEO when their cost of equity is higher. Moreover, firms that have a higher probability of default and announce their SEO when their cost of equity is high, receive larger negative returns during their announcement. Furthermore, firms issuing SEO when their cost of equity is higher engage in more debt reduction one year after issuance.

The principal contribution of this study lies in using a direct measure of forward-looking cost of equity, bridging the gap between the research in SEOs and the expected cost of equity. By using such a forward-looking cost of equity, this paper disentangles the alternative explanations on the SEO announcement effect and the long run post-SEO underperformance. Moreover, this paper proposes a non-investment motive for firms issuing SEOs when their cost of equity are high, and links such motivation with the announcement and post-issuance bad stock market performance. Notwithstanding, my results do not preclude the market timing explanation. While market timing could still be one of the SEO motives, the empirical results in this paper suggest that investment motive probably drives the announcement and post-issue stock return pattern.

The remainder of the paper is as follows. After a brief discussion of related literature in section 2, section 3 describes the Seasoned Equity Offering sample and the methodology to compute forward-looking risk premium. Section 4 presents the empirical results of the impact of cost of equity on SEO issuance, announcement, and long run post-SEO returns. Section 5 presents the distress based hypothesis and the supporting empirical results. Section 6 concludes.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1 SEO issuances and the cost of equity

Past literature has yet to reach a consensus for the primary reason of the seasoned equity offerings. One reason for SEOs is to raise capital for capital expenditure and investment projects (Masulis and Korwar 1986). Since the net present value (NPV) of an investment project is negatively related to the expected cost of equity, there should exist a negative relationship between SEO activities and the expected cost of equity. From this perspective, Li, Livdan, and Zhang (2009) point out that the negative relationship of investments and expected cost of equity are crucial in equity offerings, and they use a Q theory of investment to explain the equity offering rationales. Consistent with the investment motive, Loughran and Ritter's (1997) find that issuers have a larger percentage of capital expenditures and R&D expenses compared to non-issuers.

Among other motives for equity offerings, market timing has received considerable attention. In a world of asymmetric information, managers could issue equities to exploit private information about securities intrinsic value, and to exploit periods with low cost of equity. In line with market timing, Baker and Wurgler (2002) document that timed equity offerings cause persistent capital structure changes, and attribute such changes as the cumulative outcome of past attempts to time the market.

Both investment and market timing motives imply a negative relationship between the expected cost of equity and the SEO issuances. To verify the negative relationship, I test a set of hypotheses:

Hypothesis 1a (H1a). *There are more SEOs when the market cost of equity is lower.*
Hypothesis 1b (H1b). *Firms are more likely to issue SEOs when their respective cost of equity is lower.*
Hypothesis 1c (H1c). *Firms obtain larger amount of proceeds from SEOs when their respective cost of equity is lower.*

2.2 SEO announcement effect and the cost of equity

There exists a negative stock market reaction of about -2% during the SEO announcement (e.g. Asquith and Mullins 1986, Masulis and Korwar 1986). A plausible interpretation for this negative reaction is adverse selection (Myers and Majluf 1984), i.e. investors discount the stock price in anticipating the negative information revealed from equity issuance when they are not sure about the real issuance motive due to asymmetric information.

Market timing theory suggests that the issuance motive for managers is to pin down the "window of opportunity", when they use their superior information to benefit existing shareholders at the expense of new shareholders. The negative reaction is therefore a manifestation of investors' adverse selection for the initial overvaluation. The theory implies a stronger negative reaction if managers are more likely to time the market, i.e. when the cost of equity is low.

In contrast, investment hypothesis suggests that the issuance motive is to finance investments. Since firms usually receive more investment opportunities when their cost of equity is low, investors would react more negatively to the equity issuances when the cost of equity is high, because of the higher information asymmetry and higher adverse selection cost associated with the potentially non-investment driven issuance motives when the cost of equity is high. A related study by Choe, Masulis, and Nanda (1993) documented that during economic expansions, when investment opportunities are more profitable, managers are likely to issue equities to take advantage of the lower adverse selection cost. Bayless and Chaplinsky (1996) found that equity offerings tend to cluster together during periods with lower announcement effect, and they interpret this phenomenon as rational timing. Furthermore, Jung et al. (1996) documents that firm without valuable growth opportunities experiences a more negative stock price reaction to equity issues than do firm with better investment opportunities.

Hence, competing hypotheses of the relationship between SEO announcement effect and the cost of equity come naturally as follows:

Hypothesis 2a (H2a): *The stock market reaction during SEO announcement is more negative if the cost of equity is* ***lower****.* (Market timing)

Hypothesis 2b (H2b): *The stock market reaction during SEO announcement is more negative if the cost of equity is* ***higher****.* (Investment)

2.3 Post-SEO long run returns and the cost of equity

SEO firms underperform the non-issuing firms for a long period of time (at least 5 years) after the issuance (Loughran and Ritter 1995, Spiess and Affleck-Graves 1995). Although the proper interpretation of the low long-run returns remains an unsettled issue (Eckbo et al. 2007), the long run evidence motivates the behavior interpretation, such as market timing.

While the behavioral market timing interprets the long run underperformance as the ex-post long-term adjustment for the initial over-valuation, Schultz (2003) proposes a pseudo market-timing theory to rationalize the long run abnormal negative returns after equity issues. He argues that the observed long run underperformance is merely a statistical phenomenon. He shows that if managers issue equities as stock price increases, on average the issues will be mechanically followed by underperformance. Therefore, the long run underperformance is irrelevant with managers' forecasting ability. Overall, both behavioral and rational market timing suggest a link between timing and long run returns, i.e. the more likely that managers time the market (issue SEO when prices are high, cost of equity is low), the lower the long run return should be.

More recently, DeAngelo, Deangelo and Stulz (2010) propose another motive for seasoned equity offerings: near-term cash needs. They document that 62.6% of issuers will run out of cash without the offer proceeds – even after adjusting for capital expenditure – and conclude that the near-term cash needs is the primary reason for SEO issuances, with market-timing exerting only ancillary influence. The cash needs driven SEO motive reconciles well with the investment hypothesis. If a firm issues SEO to finance investment, which creates long-term value for shareholders, the value should eventually be reflected in the share price. However, if a firm is in trouble and need urgent cash to stay solvent, the issuance decision may reflect bad cash management, or bad status of the firms, which eventually lead to poor long run returns. In line with this interpretation, Campbell et al. (2008) document that distress firms have abnormal low stock returns. Autore et al. (2009) find that issuers stating recapitalization or general corporate purposes experience abnormally poor performance, but issuers stating investment display little or no subsequent underperformance.

As previously discussed, firms usually have more investment opportunities and thus more likely to issue for investment when their cost of equity is lower. Bring together the discussions of urgent cash need, the relationship between long run post-SEO returns and the cost of equity are different from the one predicted by market timing hypothesis. When the cost of equity is higher, firms are more likely to use SEO for non-investment related reasons such as urgent cash needs, so the long run post-SEO return should be more negative.

Hypothesis 3a (H3a): *The post-SEO long run abnormal return is more negative when the cost of equity during SEO issuance is* ***lower***. (Market timing)

Hypothesis 3b (H3b): *The post-SEO long run abnormal return is more negative when the cost of equity during SEO issuance is* ***higher***. (Investment)

3. DATA AND METHODOLOGY

3.1. Seasoned equity offerings data

The seasoned equity offerings of common stocks in the U.S from 1970 to 2009 are obtained from SDC platinum. SEOs are offers involving new shares directly from the company, so that pure primary stocks offerings and combination primary-secondary stock offerings are included but pure secondary offers are excluded. The sample only includes the firms that are listed on NYSE, AMEX, and NASDAQ and with share code 10 and 11. Utility firms (with beginning SIC code 49) and financial firms (with beginning SIC code 6) are removed from the sample. These restrictions result in a base sample of 7536 SEOs. Figure 1 plots the times series of SEO offerings on a monthly basis. As shown in the figure, the number of SEOs varies from zero issuance to 71 issuances per month. There are more issuances during the early 1980s and the 1990s. Substantially less issuance is observed at the financial crisis period in 1987, 1998, 2002-2003, and 2008.

The summary statistics for the SEO issuance numbers and amounts are provided in Table 1. The number of SEOs are time varying, and so does the number of public listed firms. The total number of listed firms in the 1970s is substantially lower relative to later periods. Given that CRSP started to record NASDAQ prices from 1973, the substantially fewer SEOs in the 1970s could be because fewer firms were listed during the period. The fraction of monthly SEO issuance is measured as the number of SEOs deflated by the total number of public firms (in thousands) at the end of prior month in CRSP. This measure accounts for the differences in number of listed firms across times.

3.2. Forward-looking cost of equity

A common practice to estimate the expected cost of equity for an individual firm relies on the Capital Asset Pricing Model (CAPM). The model expresses the expected firms' risk premium as the product of firms' risk loading (beta) and the expected market risk premium (Bruner et al. 1998). However, several issues make empirical analysis of the forward-looking cost of equity difficult.

We usually estimate the expected market risk premium by averaging the historical realized market excess returns. Elton (1999) points out that this historical measure has very poor performance and numerous limitations, not only is it backward looking, but also that it fails to account for the time varying market conditions (Merton 1980). Thus, it is difficult to apply the historical estimates on the Seasoned Equity Offerings study.

We may also derive the expected cost of equity from the dividend/earning discount models. Accounting literature has proposed different discount models to estimate the implied cost of equity (Gebhardt, Lee and Swaminathan 2001; Gordon and Gordon 1997), and the empirical inputs are the analyst forecasted dividend or earning(s), and their growth rate. Nevertheless, Easton and Sommer (1997) point out that the analyst forecasts are subject to analysts' psychological biases, and the biases may lead to erroneous conclusions on the implied cost of equity. Moreover, different firms have different analyst coverage, which endogenously correlated with firms' seasoned equity offerings decisions (Chang, Dasgupta, and Hilary 2006). This endogenous association may create unwanted interference on the tests of the relationship between Seasoned Equity Offerings and the implied cost of equity computed from analyst forecasts.

Duan and Zhang (2013) propose a new method to estimate forward-looking market risk premium. They express the market forward-looking risk premium as a function of investors' risk aversion and forward-looking volatility, skewness, and kurtosis. They estimate the investors' risk aversion from a volatility spread formula using forward-looking option data and the forward-looking higher moments from a GARCH model.

In this paper, I use Duan and Zhang (2013) method to estimate the forward-looking market risk premium. Denote the market portfolio's cumulative return over the time period t to $t + \tau$ by $R_t(\tau)$. Assuming the stochastic discount factor of the form $\exp(-\gamma R_t(\tau))$, their paper derives the market forward-looking risk premium as follows,

$$\mu_{Pt}(\tau) + \delta_t(\tau) - r_t(\tau) \approx \left(\gamma - \frac{1}{2}\right)\sigma_{Pt}^2(\tau) - \frac{3\gamma^2 - 3\gamma + 1}{6}\sigma_{Pt}^3(\tau)\theta_{Pt}(\tau) + \frac{4\gamma^3 - 6\gamma^2 + 4\gamma - 1}{24}\sigma_{Pt}^4(\tau)[\kappa_{Pt}(\tau) - 3] \quad (1)$$

Where $\mu_{pt}(\tau)$ is the mean forward-looking return of market portfolio at time t with forward-looking period of τ days; $\delta_t(\tau)$ is the dividend yield of market portfolio; $r_t(\tau)$ is the risk free rate. The forward-looking risk premium ($\mu_{pt}(\tau)$ + $\delta_t(\tau)$ - $r_t(\tau)$) is expressed as a function of market portfolio's volatility $\sigma_{Pt}(\tau)$, skewness $\theta_{Pt}(\tau)$, kurtosis $\kappa_{Pt}(\tau)$ and investors risk aversion (γ). The subscript P is to emphasize the measures are under the probability measure of the physical world (as opposite to the risk neutral measures).

While the conventional understanding of risk premium under log normality is $\mu_{Pt}(\tau) + \delta_t(\tau) - r_t(\tau) = \left(\gamma - \frac{1}{2}\right)\sigma_{Pt}^2(\tau)$, the risk premium derived from Duan and Zhang (2013) incorporates skewness and kurtosis in estimating market risk premium. Skewness and kurtosis are important because the observed market returns are negatively skewed with fat tails. The above equation (1) implies negative skewness and leptokurtosis (fat tails) will generally increase the risk premium.

Following Duan and Zhang (2013), the market portfolio's volatility, skewness, and kurtosis are estimated from an NGARCH (1, 1) model with a moving window of five years using daily S&P500 index returns obtained from CRSP. The details for estimating the physical moments are provided in Appendix A.1. The investors' risk aversion (γ) is estimated from the volatility spread formula in Bakshi and Madan (2006) using the generalized method of moments (GMM). Since the same volatility spread formula prevails in Duan and Zhang (2013), the GMM estimation method used is consistent with the forward-looking risk premium framework. The option implied risk neutral volatility is estimated under a model free approach (Britten-Jones and Neuberger 2000; Jiang and Tian 2005), using S&P500 index option data from OptionMetrics. The details of the estimation are provided in Appendix A.2.

Specifically, the forward-looking market risk premium is computed at each month end with a forward-looking period of one month (the subsequent month). The forward-looking market risk premium (MFLRP) is estimated at monthly frequency from January 1970 to December 2009. The forward-looking risk premium for individual firms (FFLRP) is estimated by the product of individual firm's beta and the forward-looking market risk premium, where the firm's beta is the loading on market factor of the regression on Fama and French three factors using the firm's prior five years monthly returns. The plot of the forward-looking market risk premium is shown in Figure 2. Consistent with the notion of market risk premium, the MFLRP is higher during volatile market periods (such as 1987, 1998, 2002-2003, 2008) and is lower when the market is calm. More importantly, the measure of forward-looking risk premium is positive throughout the sample period, which is consistent with the view that risk premium is a compensation for investors to take future risks / uncertainties. The forward-looking market risk premiums from 1970 to 2009 have a median of 7.77% and mean of 13.76%. The median of risk premium is close to the magnitude of market risk premium estimated by a survey of professors of 6.3% (Fernandez 2009a) and within the 3% to 10% range of equity premium used in textbooks (Fernandez 2009b). The higher mean of the MFLRP reflects the positive skewness of this measure, which is mainly driven by crisis periods when investors require a much higher risk premium.

4. SEASONED EQUITY OFFERING AND THE FORWARD LOOKING COST OF EQUITY

4.1. Aggregate SEO issuance and the forward-looking cost of equity

Using the forward-looking market risk premium (MFLRP) as a measure of the market cost of equity, I examine the time series relationship between fraction of SEO issuance and the cost of equity at monthly frequency. In the following regression model, I control for variables that may affect equity issuances.

$$\begin{aligned}\frac{numSEO_t}{numTotal_{t-1}} = {} & \alpha_0 + \alpha_1 MFLRP_{t-1}(\tau) + \alpha_2 GDPGrowth_{t-1} + \alpha_3 IPGrowth_{t-1} \\ & + \alpha_4 \left(\frac{P}{E}\right)_{t-1} + \alpha_5 \left(\frac{M}{B}\right)_{t-1} + \alpha_6 R_{t-1} + \alpha_7 Sentiment_{t-1} \\ & + \alpha_8 \Delta EarnDispersion_{t-13\ to\ t-1} \\ & + \alpha_9 \Delta AnalystDispersion_{t-13\ to\ t-1} + \varepsilon_t \end{aligned} \tag{2}$$

The dependent variable is the monthly number of SEO issuance divided by the number of total firms (in thousands) at the end of previous month. The explanatory variable of interest is market forward-looking risk premium (MFLRP). Both market timing and investment hypothesis imply α_1 to be negative. Similar to Lowry (2003), I controlled for aggregate capital demand using the growth rate of quarterly real gross domestic product (*GDPGrowth*), the monthly growth rate of industrial production (*IPGrowth*). The possible market overvaluation and price run-up are controlled using market price-to-earnings ratio (*P/E*), market-to-book ratio (*M/B*), past stock market return (R_{t-1}), and investor sentiment (*Sentiment*). Two information asymmetry proxies are included, the change in dispersion of abnormal returns around earnings announcements ($\Delta EarnDispersion_{t-13\ to\ t-1}$) and change in the dispersion of analyst earnings forecast ($\Delta AnalystDispersion_{t-13\ to\ t-1}$).

The inclusion of GDP growth and industrial production growth controls for macroeconomic condition and firms' aggregate capital demand. Firms' issuance decisions are likely to be affected by its demand for capital, such as the needs of more working capital for investments in booms. The quarterly GDP growth rates are obtained from the web site of the Bureau of Economic Analysis, the USA. The regression uses the GDP growth rate from the most recent quarter. Monthly industrial production indices are obtained from the web site of the Board of Governors of the Federal Reserve System. The monthly growth rate of industrial production (*IPGrowth*) is calculated as the percentage change in industrial production from prior month.

The inclusion of price-to-earnings ratio, market-to-book ratio, and past market returns controls for market overvaluation and stock price run-up. Market level price-to-earnings ratio is measured from S&P500 index, using its month-end close price divided by its past 12 month average earnings per share, obtained from Compustat. Market-to-book ratio of S&P500 is computed using its month-end close price divided by its most recent book value per share, obtained from Compustat. S&P500 return for the prior month is used as past market returns. The behavior market-timing theory suggests that managers issue equities to exploit overvaluation when the market values are higher relative to book value, so that the issuances benefit existing shareholders at the expense of the entering ones (Baker and Wurgler 2002). Controlling for P/E, M/B, and R_{t-1} are to make sure the market forward-looking risk premium does not merely reflect the market wide overvaluation. Moreover, as P/E ratio also captures cost of equity information, the inclusion of P/E ratio also tests whether the forward-looking risk premium captures cost of equity information beyond that is captured by the P/E ratio.

The inclusion of investors' sentiment controls for the possibility that managers choose to issue equities when investors are over-optimistic and willing to pay more than the firms' value. Investors' sentiment index is constructed from University of Michigan's Consumer Sentiment Index, using the methodology described in Lemmon and Portniaguina (2006) and used in Hrnjić and Sankaraguruswamy (2011). The sentiment index is a residual from the regression of the Consumer Sentiment Index on several macro-economic variables[1].

[1] I thank Emir Hrnjić for providing the data.

Lastly, the information asymmetry proxies control for the time varying adverse-selection cost of issuing equities. When information asymmetry is high, fewer firms would like to issue equities because of the greater adverse selection cost. Two proxies of information asymmetry are adopted from Lowry (2003), the change in earning announcement dispersion and change in analyst forecast dispersion. The dispersion of abnormal returns around earnings announcements is measured at monthly frequency, as the standard deviations of abnormal returns over the three days (-1, 1) announcement period, across all firms that have earnings announcements in the past three months. Analyst forecast dispersion is measured at monthly frequency, as the standard deviations of analyst earnings forecasts for each company in the past three months, across all companies that are in the last quarter of their fiscal year and have analyst forecasts listed on IBES.

The results are presented in Table 2. Consistent with Hypothesis 1a, the market forward-looking risk premium negatively affects the fraction of SEO issuance while controlling for other factors. An increase in the MFLRP by 1% reduces the SEO fraction by 0.4% to 1%. This negative relationship is consistent with the view that more firms are likely to issue securities when the perceived market cost of equity is lower, irrespective whether it is market timing or investment driven motive. The price-to-earnings ratio of the market and past market returns positively affects the issuance fractions, which support the view that managers tend to issue SEOs at a higher price. Changes in analyst forecast dispersion negatively affect the issuance fraction, consistent with the adverse-selection costs explanation. Other variables have little impact on the SEO fraction.

4.2. Firm's likelihood of issuance and cost of equity

To examine the cross sectional relationship between firms' SEO decisions and their respective cost of equity, I use firm-level forward-looking risk premium (FFLRP) which is constructed as the product of the market forward-looking risk premium and firm's beta (the loading on the market factor of the Fama-French three factor regression[2] using firms' past 60 month returns). The cross sectional relationship

[2] Similar results were obtained using CAPM beta.

between SEO decisions and firms' characteristics are examined through logistic regressions using panel data on monthly basis.

$$\begin{aligned} SEOIssue_{t,i} = \alpha_0 + \alpha_1 FFLRP_{t-1}(\tau) + \alpha_2 Size + \alpha_3 \log\left(\frac{M}{B}\right) + \alpha_4 Beta + \alpha_5 Cash \\ + \alpha_6 Age + \alpha_7 OIBD + \alpha_8 Capex + \alpha_9 RD + \alpha_{10} RDD \\ + \alpha_{11} R_{t-4,t-1} + \alpha_{12} IPGrowth_{t-1} + Industry\ FE + \varepsilon_{t,i} \end{aligned} \tag{3}$$

The logistic regressions use the firm-month SEO issuance indicator as the dependent variable. The dependent variable is equal to one when there is SEO issuance in a particular firm-month and equal to zero otherwise. Stock returns and listings are obtained from CRSP and firms' accounting data are obtained from Compustat. All common stocks (share code 10 or 11) that are listed on NYSE, AMEX, and NASDAQ are included.

The explanatory variables include the market and firm forward-looking risk premium and three sets of control variables.

The first set of control variables are firms' characteristics, i.e. firms' size, log market-to-book ratio and firm's beta. Firm size is measured as the nature logarithm of its market capitalization at the end of prior month. Firms' market-to-book ratio is the logarithm of firms' market value divided by its book value in the most recent quarter. Firms' betas are calculated by regressing their past 60 month returns on Fama-French three factors that are obtained from Kenneth French's website. Observations with less than 12 months return data in their prior 60 months are excluded.

The second set of controlling variables are firm's financial slack (cash and short-term investment, *Cash*), profitability (operating income before depreciation, *OIBD*), research and development expenditures (*RD*, where *RDD* is a dummy indicating missing *RD*), capital expenditures and firms' age. Firm age is defined as the number of years listed in the CRSP. Since it is common for firms not to have research and development (R&D) expenditures, firms with missing R&D expenditure are set with zero R&D and are identified by a dummy variable (RDD) that indicate their R&D is missing (follows Fama and French 2002). For other quarterly variables, namely cash, book value, operating income before depreciation and total assets, I replace missing values with the values from the most recent quarter within last year. If these values are also missing, I use the values from the annual report in the last fiscal year. The capital expenditure is only available at annual frequency, so annual data are used.

Lastly, firms' past three month returns ($R_{t-4,t-1}$) are included to control for the pre-issuance stock run-up effect. Industrial production growth ($IPGrowth_{t-1}$) controls for the macroeconomic conditions that affect the aggregate capital demand. Industry dummies (defined using Fama-French 48 industries) are included in all logistic regressions to control for industry fixed effect. Regression results are presented for both the overall sample and the subsample excluding crisis period, where the crisis period is defined as the months with extreme observations of forward-looking risk premium (October 1987, August 1998, September to November 2008, January and February 2009).

Table 3 presents the results from the logistic regression without and with interaction effects, respectively. The reported Z-scores (in bracket) are computed from robust standard errors. Consistent with Hypothesis 1b, firms are more likely to raise equity capital when their cost of equity is low. The firm's forward-looking risk premium ($FFLRP_{t-1}(\tau)$) negatively affects the SEO issuance likelihood. The results persist even if using the market forward-looking risk premium ($MFLRP_{t-1}(\tau)$).

The coefficients for size are positively significant, suggesting that larger firms are more likely to issue SEOs. One reason suggested by prior literature is that small firms have constraints that preclude them from accessing to equity financing (Pettit and Singer 1985; Binks, Ennew, and Reed 1992), because small firms are usually subject to high information asymmetry that impedes the managers from conveying positive information about investment opportunities to outside investors.

The positive coefficients for log(M/B) in the regressions suggest that firms are more likely to issue SEOs when their market-to-book ratio is higher. This result is consistent with the findings that the SEO firms usually have higher market-to-book ratio (Baker and Wurgler 2002; DeAngelo et al. 2010). Firm's market-to-book ratio, which is closely related to Tobin's q, is often interpreted as firm's growth potential. The positive relationship thus implies that firms with more growth potential are more likely to raise capital to support their growth opportunities. Alternatively, the higher likelihood of SEO issuance at higher market-to-book value can also be interpreted as managers taking advantage of the overvaluations, if the higher market value relative to book value represents overvaluation (Baker and Wurgler, 2002)

The coefficients for firms' beta are positively significant. Carlson, Fisher, and Giammarino (2010) propose two explanations for the higher beta prior to issuances. The first one is that firms are intrinsically riskier prior to issuance because they have more growth options. The higher pre-SEO beta incorporates firms' risky growth options, and beta decreases after the issuance as firms convert the growth options to assets in place. The other interpretation is related to investor sentiment. If individual firms' sentiment co-varies with the market-wide sentiment, and sentiment also drives firms' issuance decision, issuing firms' pre-issuance beta will be higher due to the systematic sentiment.

Table 3 also presents the relationship between the SEO likelihood and other variables. The coefficient for cash and short-term investment is negative, indicating that firms are more likely to issue SEOs when they have less cash. The negative relationship is consistent with DeAngelo et al. (2010) finding that a near term cash need is an important motive for SEOs. Firm age negatively affects the likelihood of SEOs, consistent with prior findings that younger firms are more likely to issue SEOs (Huang and Ritter 2009; DeAngelo et al. 2010). The coefficients for capital expenditures (Capex) and R&D expenditures are positive, suggesting that firms with more investment and research expenses are more likely to raise equity capital. The results are consistent with Masulis and Korwar (1986)'s argument that SEO proceeds are usually used to finance capital expenditures; they are also consistent with Loughran and Ritter (1997)'s findings that issuers have larger capital expenditures and R&D expenditures compared with non-issuers. The coefficient for lagged three-month firm's stock return is positive and significant, suggesting a stock price run-up prior to equity issuances. The marginally significant coefficient for industrial production growth suggests that macroeconomic conditions have some positive impact on the likelihood of issuance, after controlling for other effects.

4.3. SEO proceeds and the cost of equity

Previous sections document that SEO issuance likelihood is affected by the market and firms' forward-looking cost of equity. In this section, I explore whether the amount of proceeds from SEOs is also affected by the forward-looking cost of equity by using the following regression.

$$\frac{SEO\ proceeds}{A_{preSEO}} = \alpha + \beta_1 FLRP_{preSEO}(\tau) + \beta_2 \left(\frac{M}{B}\right)_{preSEO} + \beta_3 \left(\frac{PPE}{A}\right)_{preSEO} + \beta_4 \left(\frac{EBITDA}{A}\right)_{preSEO} + \beta_5 \log(S)_{preSEO} + \varepsilon_t \quad (4)$$

The dependent variable is equal to the SEO primary proceeds divided by the firms' total assets prior to the issuance. The explanatory variables include the market or firms' forward-looking risk premium prior to SEO. The control variables are adopted from Baker and Wurgler (2002), and they are market-to-book ratio, asset tangibility, profitability, and firm size. Market-to-book ratio is book debt plus market equity then divided by total assets, and it is used as the proxy for market timing or firms' growth opportunities. Asset tangibility is measured by net plant, property and equipment divided by total assets. Firms with more tangible assets may more likely use debt rather than equity since tangible assets can be used as collaterals. Profitability is measured using earnings before interest, taxes and depreciation divided by total assets. Profitable firms may have more internal funds so they have less need for external capital. Size is measured as the log of net sales. Industry dummies (defined using Fama-French 48 industries) are included in all regressions to control for industry fixed effect.

The results are presented in Table 4. Both the firms' and market forward-looking risk premium negatively affect SEO proceeds, consistent with Hypothesis 1c that firms raise more capital when the cost of equity is lower. This result suggests that not only are firms more likely to issue at lower cost of equity, but they also tend to acquire more capital from the issuances when the cost of equity is lower. The result is consistent with both investment and market timing explanations. When the cost of equity is low, firms have more investment opportunities or more likely to time the market thus demand for more capital.

The coefficient on the market-to-book ratio is positive, suggesting that firms with more growth opportunities tend to raise more capital. It could also indicate that higher overvaluation induces larger amount of equity issuance. The negative significant coefficient on firms profitability suggest profitable firms are less likely to issue SEOs, consistent with the interpretation that these firms are likely to use internal capital. Firm size has a negative impact on the SEO proceeds, indicating that larger firms obtain less capital proportion relative to small firms. The effect is likely to be driven by the normalization of SEO proceeds by firm assets, so that larger firms' SEO proceeds are lower as a proportion of their already large asset base. Asset tangibility does not have any significant impact on the amount of SEO proceeds.

4.4. SEO announcement effect and cost of equity

Here I explore whether investors' reactions to SEO announcements differ by the firms' cost of equity at announcement. The analyses begin with comparing the firms' cumulative abnormal returns (CAR) around SEO announcement time. All SEO firms' in the sample are separated into three portfolios by the firms' forward-looking risk premium at the month-end prior to SEO announcements. The SEOs firms with their forward-looking risk premium below 30 percentile, from 30 to 70 percentile and above 70 percentile are denoted as low, median, and high cost of equity, respectively. The average cumulative abnormal returns over announcement days (-1, +1) and (0, +1) are reported in Table 5. The abnormal returns for individual firms are obtained from Carhart's (1997) four-factor model and the reported T-value is computed using Crude dependence adjustment method that adjust for cross sectional dependence (Brown and Warner 1980, 1985).

Table 5 documents negative CARs of lower than -2% during the SEO announcement period. The results are consistent with prior findings of negative stock price reactions to SEO announcements. The CARs for the announcements at low cost of equity is less negative (-2.14% and -2.07%) as compared to the CARs at high cost of equity (-2.71% and -2.78%). The difference between CARs for the announcements at high and low cost of equity are statistically significant and of magnitude of 0.57% and 0.71%. These results suggest that investors react more negatively for the SEO announcements at higher cost of equity, which is consistent with Hypothesis 2b, the investment hypothesis.

To further test the impact of cost of equity on SEO announcements CARs while controlling for other variables, a regression approach that is similar to Choe, Masulis, and Nanda (1993) is used as following:

$$CAR = \alpha_0 + \alpha_1 FFLRP_{t-1}(\tau) + \alpha_2 \Delta SHR + \alpha_3 \Delta LEV + \alpha_4 CON + \alpha_5 RUNUP + \alpha_6 \Delta Bret + \alpha_7 IPgrowth + \varepsilon \quad (5)$$

Firms' CARs during SEO announcement days (-1, +1) and (0, +1) are the dependent variables. The explanatory variable of interest is the firms' forward-looking risk premium (FFLRP). The control variables are adopted from Choe et al. (1993). They are: 1) percentage change in share outstanding (ΔSHR), measured by the logarithm of shares issued divided by shares outstanding. This variable captures the effect that large percentage change in shares outstanding signals overvaluation and causes higher adverse selection (Krasker 1986). 2) The change in firms' financial leverage (ΔLEV), measured by the change in debt equity ratio due to the offerings, where debt is measured as the book value and equity is measured as the market value of common stocks. This variable is included as the decrease in leverage reduces firm's default risk and is a shift of wealth from stockholders to bondholders. 3) Shareholders concentration (*CON*), measured as the logarithm of market value of stock divided by number of shareholders. The variable is included because higher concentration encourages closer monitoring and lowers asymmetric information. 4) Stock price run-up prior to SEO announcement (*RUNUP*), measured as the cumulative stock return over three-month period prior to the offering month. The SEO announcements after a stock price run-up is more likely to indicate managers are timing the market. 5) $\Delta Bret$ is the three-month bond return calculated from 10 years bond index prior to the offering month. It is included to capture the effect of fallen interest rate, when bond issuances are preferred than stock issuances. 6) Lastly, the growth rate of industrial production over the three months prior to the offering month (*IPgrowth*) is included to capture the business cycle effect.

Table 6 presents the results from the CAR regressions. The coefficient for firms' forward-looking risk premium is significantly negative. The result suggests that investors react more negatively to SEO announcements at higher cost of equity (support H2b), after controlling for other variables that may affect investors' adverse selection. The insignificants of control variables are consistent with Kim and Purnanandam (2011) recent SEO study.

The results from SEO announcement effect are intuitively appealing and consistent with the investment hypothesis. The results are also consistent with Jung, Kim and Stulz (1996)'s finding that that firms without valuable investment opportunities and with large debt capacity are subject to more negative announcement returns. Similarly, Pilotte (1992) find that stock prices decline more for mature firms than growth firms at the time of security offering announcements.

4.5. The long run post-SEO effect and cost of equity

The previous section documents the evidence that investors react more negatively to the SEO announcements when the cost of equity is higher. Several questions inherited from the previous section are, if the stronger negative reaction to SEO announcement at higher cost of equity is an effect of the firms' non-productive use of proceeds, how do these firms perform after SEO issuance? Do investors react correctly and sufficiently to the SEO announcements? Does the long run performance relate more to the investment hypothesis or market-timing hypothesis? To address these questions, this section studies the long run post-SEO performance for the issuances when the firms' cost of equity is different.

The SEO sample is separated into three portfolios by the firm's forward-looking risk premium at the month-end prior to SEO issuances. The issuances with firm's forward-looking risk premium below 30 percentile, from 30 to 70 percentile and above 70 percentile are denoted as low, median, and high cost of equity issuances. The portfolios are formed using Fama's (1998) monthly calendar-time approach. Each month, a stock is included in the portfolio if the firm issues a SEO within the past five years. Such approach generates value-weighted[3] portfolios returns for each month. The portfolio abnormal returns are calculated from regressing portfolio returns on Fama-French three factors and Carhart four factors.

The regression results are presented in Table 7. The post-issuance abnormal returns are more negative for the SEO issuances when the cost of equity is higher, supporting Hypothesis 3b, the investment hypothesis. The abnormal return is about -4.2% (= -0.352%*12) per year for the SEOs at high firms' forward-looking cost of equity, while the abnormal return is marginally significant at -2.2% (= -0.186%*12) for the SEOs at median cost of equity, and insignificant for the SEOs at low cost of equity.

Although the aggregate long run post-SEO negative abnormal returns are not new (Ritter 1991, Loughran and Ritter 1995), I documented the monotonic abnormal return across issuers groups separated by their cost of equity for the first time. The result is particularly interesting because the post-SEO abnormal long-run performance follows the same direction as the SEO announcement effect, and both abnormal returns are more negative when the cost of equity is higher. If investors' concerns of the firms' non-productive use of proceeds drive the stronger negative announcement returns when the cost of equity is high, the long run post-issuance returns could be driven by the realized bad performance after these issuances. In particular, investors may further discount the value for the stocks after realization of subsequent bad earning announcements (Denis and Sarin 2001).

On the other hand, there is no abnormal return for firms issuing SEOs when their cost of equity is low. This result is opposite with what one would expect if the forward-looking cost of equity simply captures market timing. The market timing theory argues that the long run post-issuance underperformance is a correction from the initial stock market overvaluation. As stock prices are inversely related to cost of equity, the market timing theory would suggest the long run negative abnormal return to be more pronounced at lower cost of equity (higher stock price). Therefore, it is unlikely that the post-SEO negative abnormal returns when the cost of equity is high are driven by market timing.

[3] Using equal weighted portfolios produces similar results.

5. WHY DO FIRMS ISSUE WHEN THEIR COST OF EQUITY IS HIGH?

5.1. The distress likelihood and SEO issuance likelihood

Previous explanations imply that firms issuing SEOs when their cost of equity is higher are likely to be the firms without much growth opportunities and use the proceeds for non-investment reasons. Naturally, distressed firms are more likely to issue for urgent cash needs, such as debt repayment. DeAngelo et al. (2010) argue that a near-term cash need is one of the most important SEO motives. In this section, I directly study the interaction effect of firms' distress likelihood and their level of cost of equity when the firms issue SEOs. Specifically, I use one-year forward-looking default probability and negative net income as proxies for firms' distress likelihood, and test how the firms' SEOs issuances likelihood are affected by the interaction of firms' distress likelihood and their cost of equity.

Firms' default probability is computed using Vassalou and Xing (2004)'s method, and the details of the estimation are provided in Appendix B. The default probability is measured at the month-end prior to SEO announcement time. Firms' net income data for the nearest fiscal year prior to the SEO issuance are obtained from Compustat.

Table 8 Panel A presents the average default probabilities and percentage of firms with negative net income. The average probability of default is significantly higher for the firms issuing at high cost of equity (12.44%) compared to the firms issuing at low cost of equity (3.64%). Meanwhile, there are a larger percentage of firms with negative net income when the cost of equity is high (44.6%) than low cost of equity (29.8%). The difference in percentage is statistically significant (14.8%). The substantially higher probability of default and larger percentage of firms with negative net income is consistent with the explanation that firms issuing at high cost of equity are more likely to be distressed.

To test the interaction effect while controlling for other effects, I add the distress likelihood variables and their interactions with firms' cost of equity to the logistic regressions that study SEO issuance likelihood (in section 4.2). In particular, the regressions include firms' probability of default (PD), a dummy variable that is equal to one when the firm has negative net income (NegNI), and their interaction terms with firms' forward-looking risk premium (FFLRP) in addition to the control variables in section 4.2. Please refer to section 4.2 for details of the control variables.

$$SEOIssue_{t,i} = \alpha_0 + \alpha_1 FFLRP_{t-1}(\tau) + \alpha_2 FFLRP_{t-1}(\tau) \times PD + \alpha_3 PD + \alpha_4 FFLRP_{t-1}(\tau) \times NegNI + \alpha_5 NegNI + \alpha_6 Size + \alpha_7 \log\left(\frac{M}{B}\right) + \alpha_8 Beta + \alpha_9 Cash + \alpha_{10} Age + \alpha_{11} OIBD + \alpha_{12} Capex + \alpha_{13} RD + \alpha_{14} RDD + \alpha_{15} R_{t-4,t-1} + \alpha_{16} IPGrowth_{t-1} + Industry\ FE + \varepsilon_{t,i}$$

Table 8 panel B presents the results. The Z-scores in the brackets are computed from the robust standard errors. The coefficients for default probability and negative net income indicator are both negatively significant. The negatively significant coefficients suggest that firms with higher distress likelihood are less likely to issue equities. The results are consistent with Fama and French's (2005) finding that firms under duress are less likely to issue equities.

Interestingly, both the interaction terms (*FFLRP×PD* and *FFLRP×NegNI*) are positively significant, although the effect for *FFLRP×NegNI* is weaken upon excluding the crisis periods. The positive coefficients from the interaction terms suggest that the SEO issuances for firms with higher distress likelihood are less sensitive to the fluctuations of their cost of equity. This result also implies that firms with higher distress likelihood are more likely to issue SEOs when their cost of equity is higher, compared to other firms. Although the effect of *FFLRP×NegNI* weaken after excluding the crisis periods, the disappearing of significance does not contradict with the interpretation. The disappeared significance suggests that the impact of *FFLRP×NegNI* on SEO issuance is particularly important during a crisis period. As firms are more likely to face cash shortfall during a crisis period, the results are thus consistent with the distress-based interpretation.

5.2. The distress likelihood and SEO announcement

Section 4.4 document that the negative announcement returns for firms issuing SEOs are more pronounced when their cost of equity is high. If investors are aware of the non-investment based issuance motive for distressed firms, they should penalize the distressed firms even more when they conduct SEOs when their cost of equity is high. This section tests whether the announcement returns are more negative for the distressed firms announcing SEOs when their cost of equity is high. SEO announcement time CAR regressions are used as following:

$$CAR = \alpha_0 + \alpha_1 FFLRP_{t-1}(\tau) + \alpha_2 FFLRP_{t-1}(\tau) \times PD + \alpha_3 PD + \alpha_4 \Delta SHR + \alpha_5 \Delta LEV + \alpha_6 CON + \alpha_7 RUNUP + \alpha_8 \Delta Bret + \alpha_9 IPgrowth + \varepsilon \quad (6)$$

$$CAR = \alpha_0 + \alpha_1 FFLRP_{t-1}(\tau) + \alpha_2 FFLRP_{t-1}(\tau) \times NegNI + \alpha_3 NegNI + \alpha_4 \Delta SHR + \alpha_5 \Delta LEV + \alpha_6 CON + \alpha_7 RUNUP + \alpha_8 \Delta Bret + \alpha_9 IPgrowth + \varepsilon \quad (7)$$

The regressions include the probability of default (*PD*), negative net income (*NegNI*) and their interactions with firms' forward-looking risk premium as the explanatory variables. The dependent variable is the three-day cumulative announcement returns from day -1 to day +1, where day 0 is the SEO announcement day. The control variables are the same as equation (5) in section 4.4. Please refer to section 4.4 for details of the control variables.

The results are reported in Table 9. Consistent with the results in table 6, firms' cost of equity negatively affects the SEO announcement returns. In addition to that, the interaction term *FFLRP×PD* is significantly negative. The negative coefficient suggests that the investors penalize SEO announcements for firms that have higher default probability and announce SEOs when their cost of equity is high. This result is consistent with the prior distress-based interpretation.

However, the interaction term for *FFLRP×NegNI* is not significant. The insignificant interaction term suggests that investors do not penalize the firms with negative income and announce SEOs at higher cost of equity. Moreover, the different results for *FFLRP×PD* and *FFLRP×NegNI* imply that investors treat firms with higher default probability and negative net income differently. Investors may perceive firms with negative net income to be younger, rapid growing firms. Therefore, it is difficult for investors to distinguish the distress-based or growth-needs SEO motives. On average, they do not penalize or reward the firms announcing SEOs when their cost of equity is high.

5.3. Post-SEO change of debt

If a firm's SEO motive is to resolve their urgent cash needs, the firm might engage in activities such as debt repayment after the SEO. This section explores issuers' change of debt in the year following the issuances. The non-investment motive implies that for the firms that carry out SEOs when their cost of equity is high, they should reduce more debt after the SEO. To study this hypothesis, I conduct a regression using a similar setting as Baker and Wurgler (2002).

$$\frac{D_{t+1} - D_t}{A_t} = \alpha + \beta_1 FLRP_{preSEO}(\tau) + \beta_2 \left(\frac{M}{B}\right)_t + \beta_3 \left(\frac{PPE}{A}\right)_t + \beta_4 \left(\frac{EBITDA}{A}\right)_t + \beta_5 \log(S)_t + \beta_6 \left(\frac{D}{A}\right)_t + \varepsilon_t \quad (8)$$

In the above regression, *t* denotes the quarter-end immediately follows SEO issuance. The dependent variable is change in debt, which is measured from the end of SEO quarter (*t*) to one year after the SEO quarter (*t+1*) divided by total assets at time *t*. Book debt is defined as total assets minus book equity, where book equity is defined as total assets less liabilities and preferred stock plus deferred taxes. The forward-looking cost of equity is measured at the month-end prior to the SEO issuance (*preSEO*). The control variables are measured at the end of SEO quarter. Please refer to section 4.3 for the details of the control variables.

Table 10 reports the regression results. The coefficients for both the firms' and market forward-looking risk premium are negatively significant, indicating that firms issuing SEOs at higher cost of equity reduces more debt one year after issuance than those firms issuing at low cost of equity. The result is consistent with the non-investment motive hypothesis.

The coefficient for the market-to-book ratio is marginally positive. This is different from Baker and Wurlger (2002)'s finding that market-to-book continues to affect firms' book leverage after equity issuance. There are two possible reasons. First, the dependent variable in (8) is change in debt, while Baker and Wurgler (2002) use book leverage. Un-tabulated results using book leverage as the dependent variable justify a negative significant coefficient for the market-to-book ratio. Second, this paper controls for industry fixed effect. Different industries have different growth opportunities and different needs to raise capital. Estimating the regressions without industry fixed effect produces insignificant coefficients. Therefore, I refrain from drawing any conclusions from this marginally positive coefficient. Other control variables (asset tangibility, profitability, and firm size) are not significant.

The result is particularly interesting when it is compared to the results in Table 4. The forward-looking risk premiums have the same sign for results in Table 4 and Table 10, while the two dependent variables are economically opposite to each other. Putting them together, the negative coefficients for the forward-looking risk premium suggest that when firms' cost of equity is high, the SEO firms obtain less capital from the SEOs but reduce more debt afterwards. The result is consistent with the investment-based hypothesis that firms issuing SEOs at high cost of equity are likely to issue for non-productive purpose, with debt repayment as one particular case.

6. CONCLUSION

This paper studies the impact of cost of equity on SEO activities, using a novel measure of forward-looking risk premium as a direct measure of forward-looking cost of equity. By using such forward-looking cost of equity, this paper disentangles the investment-based and market timing hypothesis by studying the stock market reaction during the SEO announcement and in a longer period after the SEO.

The paper documents a negative relationship between SEO issuance likelihood and the forward-looking cost of equity, and examines the SEO announcement returns and the long run post-SEO return for firms that carry out SEOs when their cost of equity is at different levels. Firms announcing SEOs when their cost of equity is higher receive larger negative SEO announcement returns. Moreover, firms issuing SEOs when their cost of equity is higher experience more negative long run post-SEO abnormal returns. These results are consistent with the investment-based hypothesis.

I further investigate the non-investment motive by looking into the interaction between issuing firms' distress likelihood and firms' cost of equity. Firms issuing SEOs when their cost of equity is high have higher default probability and larger percentage of negative net income. Moreover, firms with higher default probability experience larger negative abnormal returns during SEO announcements when their cost of equity is high. Furthermore, firms issuing SEOs when their cost of equity is high reduce more debt in the year following the issuance. These empirical evidences further support the investment-based hypothesis.

The relationship between the cost of equity and SEOs issuances leads to interesting future research questions. In particular, this paper documented that the long run post-SEO negative returns pertain to the firms issuing SEOs when their cost of equity is high. These firms are likely to be distressed firms issuing for non-investment motives, so that their bad performance might be related to Campbell et al. (2008)'s distress risk puzzle, which documents that distressed firms have negative abnormal returns. The empirical evidence motivates further explorations of the underlying driven factor for the low return of the distressed firms, and the relationship between distress risk puzzle and SEOs. Notwithstanding, this paper does not preclude other explanations. The negative returns during SEO announcements and long run post-SEO negative returns when firms carry out SEOs at high cost of equity could also be related to other interpretations, such as the adverse selection theory or the real option theory. It is worth further investigation to consolidate the empirical results with these alternative interpretations.

REFERENCES

Asquith P. and D.W. Mullins, 1986, Equity Issues and Offering Dilution, *Journal of Financial Economics*, 15, 61-89.

Autore D.M, David Bray, and David Peterson, 2009, Intended Use of Proceeds and the Long-Run Performance of Seasoned Equity Issuers, *Journal of Corporate Finance*, 15, 358-367.

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

Bakshi, G. and D. Madan, 2006, A Theory of Volatility Spread, *Management Science,* 52, 1945-1956.

Bayless M. and S. Chaplinsky, 1996, Is There a Window of Opportunity for Seasoned Equity Issuance? *Journal of Finance*, 51, 253-278.

Binks M.R., C.T. Ennew, and G.V. Reed, 1992, Information Asymmetry and the Provision of Finance to Small Firms, *International Small Business Journal*, 11, 35-46.

Britten-Jones, M. and A. Neuberger, 2000, Option Price, Implied Price Processes, and Stochastic Volatility, *Journal of Finance,* 55, 839-866.

Brown, S.J. and J.B. Warner, 1980, Measuring Security Price Performance, *Journal of Financial Economics*, 8, 205-258.

Brown, S.J. and J.B. Warner, 1985, Using Daily Stock Returns: The Case of Event Studies, *Journal of Financial Economics*, 14, 3-31.

Bruner, R. F., K. Eades, R. Harris and R. Higgins, 1998, Best Practices in Estimating the Cost of Capital: Survey and Synthesis. *Financial Practice and Education*, 8, 13-28.

Campbell J.Y. and R.J. Shiller, 1988, The Dividend-Price Ratio and Expectations of Future Dividends and Discount Factors, *Review of Financial Studies*, 1, 195-228.

Campbell, J. Y., 2008, Viewpoint: Estimating the equity premium. *Canadian Journal of Economics/Revue canadienne d'économique*, 41, 1–21

Campbell J.Y., J. Hilscher, and J. Szilagyi, 2008, In Search of Distress Risk, *Journal of Finance,* 63, 2899-2939.

Carhart M. M. 1997, On Persistence in Mutual Fund Performance*, Journal of Finance*, 52, 57-82.

Carlson M., A. Fisher and R. Giammarino, 2006, Corporate Investment and Asset Price Dynamics: Implications for SEO Event Studies and Long-Run Performance, *Journal of Finance*, 61, 1009-1034.

Carlson M., A. Fisher and R. Giammarino, 2010, SEO Risk Dynamics, *Review of Financial Studies*, 23, 4026-4077.

Carr, P. and D. Madan, 2001, Optimal Positioning in Derivative Securities, *Quantitative Finance* 1, 19-37.

Chang. X, S. Dasgupta, and G. Hilary, 2006, Analyst Coverage and Financing Decisions, *Journal of Finance*, 61, 3009-3048.

Choe, H, R.W. Masulis and V. Nanda, 1993, Common Stock Offerings across the Business Cycle, *Journal of Empirical Finance*, 1, 3-31.

DeAngelo H., L. DeAngelo and R.M. Stulz, 2010, Seasoned Equity Offerings, Market Timing, and the Corporate Lifecycle, *Journal of Financial Economics*, 95, 275-295.

Denis D. J. and A Sarin, 2001, Is the Market Surprised by Poor Earnings Realizations following Seasoned Equity Offerings? *Journal of Financial and Quantitative Analysis*, 36, 169-193.

Duan J.C. and W.Q. Zhang, 2013, Forward-Looking Market Risk Premium, *Management Science,* Forthcoming

Easton P.D. and G.A. Sommer, 2007, Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts, *Journal of Accounting Research*, 45, 983-1015.

Ecobo B.E., R.W. Masulis and O. Norli, 2007, Security Offerings, *Handbook of Corporate Finance*, Empirical Corporate Finance Vol. 1, Elsevier.

Elton, Edwin J., 1999, Expected Return, Realized Return, and Asset Pricing Tests, *Journal of Finance*, 54, 1199-1220.

Fama E.F., 1998, Market Efficiency, Long-term Returns, and Behavioral Finance. *Journal of Financial Economics,* 49, 283-306.

Fama E. F. and K. R. French, 1993, Common Risk Factors in the Returns On Stocks and Bonds, *Journal of Financial Economics*, 33, 3-56.

Fama E. F. and K. R. French, 2002, Testing Trade-off and Pecking Order Predictions About Dividend and Debt, *Review of Financial Studies*, 15, 1-33.

Fernandez P., 2009a, Market Risk Premium Used in 2008 by Professors: A Survey with 1,400 Answers, University of Navarra working paper.

Fernandez P., 2009b, The Equity Premium in 100 Textbooks, University of Navarra working paper.

Gebhardt W., C.M.C. Lee and B. Swaminathan, 2001, Toward an Implied Cost of Capital, *Journal of Accounting Research*, 39, 135-176.

Graham, J.R., Harvey, C.R., 2001. The Theory and Practice of Corporate Finance: Evidence From the Field. *Journal of Financial Economics*, 60, 187–243.

Gordon Joseph R. and Myron J. Gordon, 1997, *Financial Analysts Journal*, Vol.53, Issue 3, pp. 52-61

Huang, R., Ritter, J., 2009. Testing Theories of Capital Structure and Estimating the Speed of Adjustment, *Journal of Financial and Quantitative Analysis*, 44, 237–271.

Hrnjić, E and S. Sankaraguruswamy, 2011, Market-Wide Sentiment, Firm-Level Sentiment, and IPO Pricing Process, National University of Singapore working paper.

Jiang, G. and Y. Tian, 2005, The Model-Free Implied Volatility and its Information Content, *Review of Financial Studies,* 18, 1305-1342.

Jung, K., Y. Kim, and Stulz R.M, 1996, Timing, Investment Opportunities, Managerial Discretion, and the Security Issue Decision, *Journal of Financial Economics*, 42, 159-185.

Kim E. H. and A. Purnanandam, 2011, Seasoned Equity Offerings and Investments, University of Michigan working paper.

Kim W. and M. S. Weisbach, 2008, Motivations for Public Equity Offers: An International Perspective, *Journal of Financial Economics*, 87, 281-307

Lemmon M. and E. Portniaguina, 2006, Consumer Confidence and Asset Prices: Some Empirical Evidence, *Review of Financial Studies*, 19, 1499-1529.

Li E.X.N, D. Livdan and L. Zhang, 2009, Anomalies, *Review of Financial Studies*, 22, 4301-4334.

Loughran, T., and J. Ritter, 1995, The New Issues Puzzle. *Journal of Finance*, 50, 23–51.

Loughran, T., and J. Ritter, 1997, The Operating Performance of Firms Conducting Seasoned Equity Offerings, *Journal of Finance*, 52, 1823–1850.

Lowry, M., 2003, Why Does IPO Volume Fluctuate So Much, *Journal of Financial Economics*, 67, 3-40.

Masulis, R., and A. Korwar, 1986, Seasoned Equity Offerings: An Empirical Investigation, *Journal of Financial Economics*, 15, 91–118.

Merton, Robert C., 1974, On the pricing of corporate debt: The risk structure of interest rates, *Journal of Finance*, 29, 449-470.

Merton, Robert C., 1980, On Estimating the Expected Return on the Market: An Exploratory Investigation, *Journal of Financial Economics*, 8, 323-361.

Myers, S., and N. Majluf, 1984. Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have, *Journal of Financial Economics*, 12, 187–221.

McConnell J. J. and C. J. Muscarella, 1985, Corporate Capital Expenditure Decisions and the Market Value of the Firm, *Journal of Financial Economics*, 14, 399-422.

Pastor L. and P. Veronesi, 2005, Rational IPO Waves, *Journal of Finance*, 60, 1713-1757.

Pettit R. R. and R. F. Singer, 1985, Small Business Finance: A Research Agenda, *Financial Management*, 14, 47-60.

Pitt, M., 2002, Smooth Particle Filters for Likelihood Evaluation and Maximisation, University of Warwick working paper.

Ritter, J., 1991, The Long-Run Performance of Initial Public Offerings, *Journal of Finance*, 46, 3-27.

Spiess D.K. and J. Affleck-Graves, 1995, Underperformance in Long-Run Stock Returns Following Seasoned Equity Offerings, *Journal of Financial Economics*, 38, 243-267.

Schultz, P., 2003, Pseudo Market Timing and the Long-Run Underperformance of IPOs, *Journal of Finance*, 58, 483-518.

Vassalou, M. and Y. Xing, 2004, Default Risk in Equity Returns, *Journal of Finance*, 59, 831-868.

Vermaelen, Theo. 1981, Common Stock Repurchases and Market Signaling: An empirical study, *Journal of Financial Economics,* 9, 139-183.

APPENDIX A

A.1 The estimation of market portfolio's volatility, skewness, and kurtosis

Consider the nonlinear asymmetric GARCH(1,1) model of Engle and Ng (1993), hereafter NGARCH(1,1), for the market portfolio's return dynamic under the physical probability *P*:

$$ln\frac{S_{t+1}}{S_t} = \mu + \sigma_{t+1}\varepsilon_{t+1} \qquad for \quad t = 0,1, \ldots \tag{A1}$$

$$\sigma_{t+1}^2 = \beta_0 + \beta_1\sigma_t^2 + \beta_2\sigma_t^2(\varepsilon_t - \eta) \tag{A2}$$

$$\varepsilon_t \sim i.i.d. \qquad E^P(\varepsilon_t) = 0 \quad \& \quad E^P(\varepsilon_t^2) = 0$$

For each month-end day, the parameters for the above specification are estimated by the quasi-maximum likelihood method using a moving window of 5 years of daily S&P500 index returns. The estimations also produce σ_{t+1} and 5 years of standardized residuals.

The one-month forward-looking period is 20 trading days (corresponding to 28 calendar days). Accordingly, the forward-looking physical return volatility can be analytically computed as

$$\sigma_{Pt}^2(\tau) = \frac{1-\lambda^\tau}{1-\lambda}\sigma_{t+1}^2 + \frac{(\tau-1)\beta_0}{1-\lambda} - \frac{\lambda(1-\lambda^{\tau-1})\beta_0}{(1-\lambda)^2} \tag{A3}$$

$$where \quad \lambda = \beta_1 + \beta_2(1+\eta^2)\,.$$

The forward-looking skewness and kurtosis are computed by the smooth stratified bootstrap method of Pitt (2002). A bootstrapped sample size of 100,000 is used to advance the system one trading day at a time until reaching the 20-trading day maturity. Please refer to Duan and Zhang (2013) for the detailed method description.

A.2 The estimation of investors risk aversion

Similar as Bakshi and Madan (2006), the volatility spread equation forms the basis of the estimation of investors risk aversion (γ). Let I_t be some set of instruments whose values are known at time t. The GMM estimation can be conducted using the following orthogonality condition:

$$E\left\{\frac{\sigma_{Qt}^2(\tau)-\sigma_{Pt}^2(\tau)}{\sigma_{Pt}^2(\tau)}+\gamma\sigma_{Pt}(\tau)\theta_{Pt}(\tau)-\frac{\gamma^2}{2}\sigma_{Pt}^2(\tau)[\kappa_{Pt}(\tau)-3]\middle| I_t\right\} \qquad \text{(A4)}$$

In order to implement the above expression, we need a time series of risk-neutral return variance and three time series of physical return moments (variance, skewness, and kurtosis). The estimation of the physical return moments are discussed in Appendix A2. The risk-neutral return variance is computed from a model free approach by forming appropriate portfolios of broad-based market index options (e.g. Carr and Madan 2001). Please refer to Carr and Madan (2001) or Appendix C of Duan and Zhang (2013) for the derivations. Specifically, let $C(K; S_t; \tau)$ and $P(K; S_t; \tau)$ are the time-t European call and put option prices with strike price K and maturity τ. The risk neutral variance can be derived as

$$\sigma_{Qt}^2(\tau)=E_t^Q[R_t^2(\tau)]-\left(E_t^Q[R_t(\tau)]\right)^2$$

Where

$$E_t^Q[R_t(\tau)]=\ln\left(\frac{K_t}{S_t}\right)+\frac{F_t(\tau)-K_t}{K_t}-e^{r_t(\tau)\tau}\int_{K_t}^{\infty}\frac{C(K;S_t,\tau)}{K^2}dK-e^{r_t(\tau)\tau}\int_0^{K_t}\frac{P(K;S_t,\tau)}{K^2}dK$$

$$E_t^Q[R_t^2(\tau)]=\left[ln\left(\frac{K_t}{S_t}\right)\right]^2+2\left(\frac{F_t(\tau)-K_t}{K_t}\right)\ln\left(\frac{K_t}{S_t}\right)+e^{r_t(\tau)\tau}\int_{K_t}^{\infty}\frac{2\left[1-\ln\left(\frac{K_t}{S_t}\right)\right]}{K^2}C(K;S_t,\tau)dK$$

$$-e^{r_t(\tau)\tau}\int_0^{K_t}\frac{2\left[1-\ln\left(\frac{K_t}{S_t}\right)\right]}{K^2}P(K;S_t,\tau)dK$$

The option prices for monthly S&P500 index options are obtained from OptionMetrics from January 1996 to October 2009. The risk neutral variance is computed from these option prices at 28 days before each option expiration date. The respective physical moments are also computed at these date. GMM method is used to estimate γ. The estimation uses Newey-West adjusted covariance matrix with instrument set contains a constant, $\sigma^2_{Q,t-1}(\tau)$, $\sigma^2_{Q,t-2}(\tau)$, and $\sigma^2_{Q,t-3}(\tau)$. In this paper, investors risk aversion estimated using data from January 1996 to October 2009. The estimated γ is equal to 4.38.

APPENDIX B

B.1 The estimation of probability of default

The default probability is estimated from the structural approach of Vassalou and Xing (2004). Specifically, the distance to default is estimated as:

$$DD_t = \frac{\ln\left(\frac{V_{A,t}}{X_t}\right) + \left(\mu - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}}$$

Using the normal distribution implied by Merton's model, the probability of default is given by:

$$P_{def} = N(-DD) = N\left(-\frac{\ln\left(\frac{V_{A,t}}{X_t}\right) + \left(\mu - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}}\right)$$

Where $V_{A,t}$ is the firm's asset value at time t, with drift μ and volatility σ_A. . X_t denotes the book value of debt at time *t*.

Following the conventions in the literature, the forward-looking period *T* is set to one year, and book debt is computed as short term plus half long-term book debt. T-bill rate is used as risk free rate. The initial asset value for each trading day is computed as market value of equity plus book debt. An iterative procedure that is similar to Vassalou and Xing (2004) is used to calculate σ_A and back out V_A for each firm at each month-end. The drift μ is calculated from the mean of change in $\ln(V_A)$. . Default probabilities are obtained for each firm-month.

Table 1: Summary Statistics for Seasoned Equity Offerings

This table presents the summary statistics of the SEO sample from 1970 to 2009. The SEO data are from SDC and only include the firms with some primary shares offered. Only firms listed on NYSE, AMEX, and NASDAQ are included. Utility and financial firms are excluded from the sample. The # of SEOs presents the number of offerings for each decade and the whole sample. Total proceeds are the total value offered for these SEOs and represented in millions of dollars. The numbers of listed firms are obtained from CRSP database.

Period	Mean # of monthly SEOs	Mean proceeds (millions)	Mean # of listed firms
1970 - 1979	5.17	136.04	4279
1980 - 1989	15.89	514.91	6105
1990 - 1999	24.72	1951.15	7917
2000 - 2009	17.07	2616.16	6972
1970 - 2009	15.70	1326.09	6358

Table 2: SEO Intensity and Market Cost of Equity

This table presents the relationship between SEO intensity and the market forward-looking risk premium from 1970 to 2009. The monthly SEO intensity is measured by the number of monthly SEO issues deflated by the total number of firms (in thousands) in the prior month. The $MFLRP_{t-1}(\tau)$ measures the one month forward-looking market risk premium at the end of the prior month (t-1). See section 2.2 for details on the computation of this measure. $GDPGrowth_t$ and are the quarterly percentage change in GDP obtained from BEA. $IPGrowth_t$ is the percentage change in industrial production obtained from Federal Reserve System. P/E is the price to earnings ratio for S&P500 index, using 12 month moving earnings per share. M/B is the market-to-book ratio for S&P500 index obtained from Compustat. Sentiment index is constructed from University of Michigan index following Lemmon and Portniaguina (2006). R_{t-1} is the past market return from S&P500 index. The dispersion of abnormal returns around earnings announcements at month t (EarnDispersion) equals the standard deviation of announcement abnormal returns across all firms in the past three months. Analyst dispersion in month t is the standard deviation of analyst earnings forecasts for each company in the past three months, across companies that are in the last quarter of their fiscal year and have analyst forecasts listed on IBES. T-statistics are computed from robust standard errors. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	SEO Fraction													
$MFLRP_{t-1}(\tau)$	-0.733	***	-0.659	***	-1.008	***	-0.885	***	-0.670	**	-0.351	*	-0.614	**
	(-4.65)		(-4.00)		(-3.65)		(-4.62)		(-2.55)		(-1.82)		(-2.20)	
$GDPGrowth_{t-1}$			0.0257		0.0554	**	-0.0143		0.0358		-0.00426		-0.00744	
			(0.87)		(2.13)		(-0.40)		(1.18)		(-0.12)		(-0.16)	
$IPGrowth_{t-1}$			0.0422		0.0340		0.0474		0.0543		0.0647		0.0456	
			(1.20)		(1.05)		(1.14)		(1.41)		(1.57)		(1.18)	
$(P/E)_{t-1}$					0.0517	***			0.0377	***			0.0509	***
					(8.49)				(4.99)				(7.55)	
$(M/B)_{t-1}$							0.0647				0.0414			
							(0.70)				(0.44)			
R_{t-1}									6.637	***	8.784	***	4.038	**
									(3.03)		(3.81)		(1.99)	
$Sentiment_{t-1}$									-0.0111		-0.00559		-0.0152	
									(-0.86)		(-0.39)		(-1.56)	
Δ $EarnDispersion_{t-13 \text{ to } t-1}$													0.151	
													(0.23)	
Δ $AnalystDispersion_{t-13 \text{ to } t-1}$													-14.17	***
													(-3.13)	
Const.	2.544	***	2.453	***	1.419	***	2.693	***	1.839	***	2.553	***	1.531	***
	(27.52)		(18.84)		(8.52)		(9.15)		(9.09)		(8.80)		(5.94)	
Adj. R-sq	1.10%		1.10%		15.20%		1.50%		12.70%		4.60%		24.20%	
Nobs	480		480		479		383		381		381		308	

Table 3: Logistic Regression of SEO Issuance

This table presents the logistic regression results of monthly SEO issuance from 1970 to 2009. The dependent variable is firm-month SEO issuance. It is equal to 1 if a specific firm-month issues SEO, and equals to 0 otherwise. MFLRP is the one-month forward-looking market risk premium at the end of month t-1. See section 2.2 for details on the computation of this measure. FFLRP is the one-month firm forward-looking risk premium that is equal to the product of market forward-looking risk premium and firms beta. Size is defined as the natural logarithm of the firm's market value at the end of prior month. Log(M/B) is the natural logarithm of the most recent market-to-book ratio. Beta is individual firms' beta estimated from prior 5 years returns. Firm age is equal to the number of years that the firms are listed in CRSP. Cash, research and development expenditure (RD), operating income before depreciation (OIBD) are obtained from the most recent quarterly reported and deflated by total assets. RD is set to zero if R&D expenditure is missing. RDD is a dummy variable that equals one if R&D is missing. Capex is the capital expenditures in the fiscal year prior to SEO. $R_{t-3,t-1}$ is the stock return for the prior three months. IPGrowth is the monthly growth rate of industrial production. All regressions include industry fix effect. Industry classification is based on Fama-French 48 industries. Crisis period are defined as the month with extreme value of forward-looking risk premium. The Z values under the coefficient are computed from the robust standard errors. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	SEO Issuance (=1)							
	All Sample				Exclude Crisis Period			
	(1)		(2)		(3)		(4)	
$FFLRP_{t-1}(\tau)$	-0.168	***			-0.128	**		
	(-3.56)				(-2.17)			
$MFLRP_{t-1}(\tau)$			-0.428	***			-0.537	***
			(-5.63)				(-4.55)	
Size	0.191	***	0.193	***	0.19	***	0.192	***
	(33.87)		(34.14)		(33.68)		(34.00)	
log(M/B)	0.717	***	0.716	***	0.72	***	0.719	***
	(50.93)		(50.76)		(51.07)		(50.83)	
Beta	0.131	***	0.111	***	0.125	***	0.11	***
	(11.61)		(10.50)		(10.60)		(10.36)	
Cash	-0.942	***	-0.941	***	-0.949	***	-0.943	***
	(-12.99)		(-12.96)		(-13.03)		(-12.96)	
Age	-0.0256	***	-0.0257	***	-0.0258	***	-0.0258	***
	(-18.46)		(-18.46)		(-18.45)		(-18.48)	
OIBD	0.0613		0.0384		0.0933		0.0667	
	(0.47)		(0.30)		(0.71)		(0.51)	
Capex	1.294	***	1.294	***	1.286	***	1.287	***
	(13.83)		(13.74)		(13.67)		(13.57)	
RD	1.890	***	1.896	***	1.899	***	1.908	***
	(9.86)		(9.77)		(9.90)		(9.76)	
RDD	0.243	***	0.238	***	0.249	***	0.241	***
	(7.77)		(7.62)		(7.94)		(7.69)	
$R_{t-4,t-1}$	0.352	***	0.355	***	0.351	***	0.355	***
	(18.86)		(18.84)		(18.81)		(18.82)	
$IPGrowth_{t-1}$	0.0102	*	0.00962		0.0122	*	0.011	*
	(1.65)		(1.55)		(1.94)		(1.75)	
Industry fixed effect	Yes		Yes		Yes		Yes	
Log likelihood	-40,503		-40,488		-40,246		-40,235	
Nobs	2,059,484		2,059,484		2,033,642		2,033,642	
Nobs SEO	6,526		6,526		6,495		6,495	
Pseudo R-sq	8.14%		8.17%		8.13%		8.16%	

Table 4: SEO Proceeds and Cost of Equity

This table presents the cross section regression of SEO proceeds on forward-looking cost of equity and control variables. The sample period is from 1970 to 2009. The dependent variable is the proceeds of SEOs divided by the firms' total assets. MFLRP is the one-month forward-looking market risk premium prior to issuing month. See section 2.2 for details on the computation of this measure. FFLRP is the one-month firm forward-looking risk premium that is equal to the product of market forward-looking risk premium and firms beta. The construction of other variables follows Baker and Wurgler (2002). Accounting data are obtained from the nearest quarterly financial statement prior to SEO. The market-to-book ratio (M/B) is equal to assets minus book equity plus market equity and divided by assets. Fixed assets intensity (PPE/A) is defined as net property, plants and equipment divided by total assets. Profitability (EBITDA/A) is defined as operating income before depreciation, divided by assets. Firm size is defined as the log of net sales. T-statistics are computed from robust standard errors. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	SEO Proceeds/A_{preSEO}					
$FFLRP_{preSEO}(\tau)$			-0.0824	***		
			(-2.84)			
$MFLRP_{preSEO}(\tau)$					-0.134	***
					(-3.18)	
$(M/B)_{preSEO}$	0.0953	***	0.0954	***	0.0954	***
	(10.91)		(10.91)		(10.94)	
$(PPE/A)_{preSEO}$	0.0000490		-0.000124		-0.00449	
	(0.00)		(-0.00)		(-0.11)	
$(EBITDA/A)_{preSEO}$	-1.306	***	-1.337	***	-1.339	***
	(-3.86)		(-3.95)		(-3.94)	
$\log(S)_{preSEO}$	-0.0725	***	-0.0711	***	-0.0707	***
	(-11.12)		(-10.79)		(-10.92)	
Const.	0.368	***	0.375	***	0.377	***
	(5.91)		(6.00)		(6.02)	
Industry fixed effect	Yes		Yes		Yes	
Adj. R-sq	54.00%		54.10%		54.10%	
Nobs	5,075		5,075		5,075	

Table 5: Abnormal Returns of Seasoned Equity Offering Announcements

This table presents the mean cumulative abnormal return for the announcement of SEO. Abnormal returns for individual firms are measured using Carhart (1997) four factor model. All issuances are separated into low (<= 30%), median (30% to 70%) and high(>70%) firm forward-looking risk premium. T-Values for CAR are computed using crude dependence adjustment method and are presented in the parentheses. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Days	Mean Cumulative Abnormal Return			
	Low FFLRP	Median FFLRP	High FFLRP	Diff(High - Low)
(-1, +1)	-2.14% ***	-2.09% ***	-2.71% ***	-0.57% **
	(-11.57)	(-12.48)	(-11.64)	(-2.01)
(0, +1)	-2.07% ***	-2.07% ***	-2.78% ***	-0.71% ***
	(-13.71)	(-15.17)	(-14.64)	(-2.92)

Table 6: Regression Estimates for Announcement Period Stock Returns

This table presents regression of SEO announcement period cumulative abnormal return on explanatory variables. Abnormal returns for individual firms are measured using Carhart (1997) four factor model. FFLRP is the firms' one-month forward-looking risk premium at the month-end prior to the SEO announcement month. ΔSHR is proportional change in outstanding shares of common stock, measured as the logarithm of number of shares issued over outstanding shares. ΔLEV is the change in debt equity ratio due to the offering, where debt is measured as the book value and equity is measured as the market value of common stock. CON is shareholder concentration, which is measured as the logarithm of total market value of stocks, divided by total number of shareholders. RUNUP is cumulative stock returns over the three-month period prior to the announcement month. ΔBret is the three-month bond return calculated from 10 years bond index prior to the announcement month. IPGrowth is the growth rate of industrial production for the three months prior to the announcement month. T-statistics are computed from robust standard errors. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	CAR(-1,+1)		CAR(0,+1)	
$FFLRP_{t-1}(\tau)$	-1.500	**	-1.208	**
	(-2.29)		(-1.96)	
ΔSHR	0.00845		-0.0279	
	(0.06)		(-0.22)	
ΔLEV	-0.221		-0.162	
	(-0.96)		(-0.80)	
CON	0.0221		0.0313	
	(0.37)		(0.61)	
RUNUP	-0.0541		0.0283	
	(-0.16)		(0.09)	
ΔBret	-1.688		0.655	
	(-0.64)		(0.30)	
Ipgrowth	2.711		1.916	
	(0.52)		(0.42)	
Const.	-2.325	***	-2.534	***
	(-3.04)		(-3.98)	
Adj. R-sq	0.60%		0.50%	
Nobs	4,069		4,069	

Table 7: Abnormal Return of Portfolio Formed By 5 years Post-issuance Return

This table presents the post-issuance long run performance of portfolios separate by the firm forward-looking risk premium at SEO issuance. See section 2.2 for details on the computation of the forward-looking risk premium. All issuances are separated into low (<= 30%), median (30% to 70%) and high (>70%) firm forward-looking risk premium. The portfolios are constructed by value weighting post-issuances return for the SEO companies if the return in a month is within five years of their issuance. The portfolio returns are regressed on Fama-French three factors and Carhart four factors. ***, **, * denote statistical significance at the 1%, 5%,and 10% levels, respectively.

	Low $FFLRP_{t-1}(\tau)$				Median $FFLRP_{t-1}(\tau)$				High $FFLRP_{t-1}(\tau)$			
Abnormal Ret	0.032		0.134		-0.211	*	-0.186		-0.321	**	-0.352	**
	(0.19)		(0.77)		(-1.73)		(-1.5)		(-2.12)		(-2.28)	
Rm-Rf	0.912	***	0.890	***	1.109	***	1.104	***	1.266	***	1.272	***
	(22.96)		(22.28)		(39.39)		(38.58)		(36.25)		(35.85)	
smb	0.156	***	0.166	***	0.210	***	0.212	***	0.426	***	0.423	***
	(2.75)		(2.97)		(5.24)		(5.29)		(8.57)		(8.49)	
hml	-0.227	***	-0.265	***	-0.257	***	-0.266	***	-0.194	***	-0.183	***
	(-3.79)		(-4.37)		(-6.06)		(-6.13)		(-3.70)		(-3.40)	
umd			-0.112	***			-0.027				0.034	
			(-3.00)				(-1.00)				(1.02)	
Adjusted R-sq	64.29%		64.97%		84.04%		84.04%		82.24%		82.24%	
Nobs	416		416		417		417		416		416	

Table 8: SEO Issuance Choice and Distress Likelihood

Panel A presents the mean one-year probability of default and percentage of negative net income for SEO firms. Probability of default (PD) is calculated from Vassalou and Xing (2004) model and measured at announcement month. Net income (NI) is obtained from the financial statement prior to SEO issuance month. All issuances are separated into low (<= 30%), median (30% to 70%) and high (>70%) firm forward-looking risk premium. T-values are reported in the parentheses.

Panel B presents the interaction of cost of equity with probability of default and negative net income in the logistic regression of SEO likelihood. The dependent variable is firm-month SEO issuance. It is equal to 1 if a specific firm-month issues SEO, and equals to 0 otherwise. MFLRP is the one-month forward-looking market risk premium at the end of month t-1. See section 2.2 for details on the computation of this measure. FFLRP is the one-month firm forward-looking risk premium that is equal to the product of market forward-looking risk premium and firms beta. PD is the probability of default calculated from Vassalou and Xing (2004) model. NegNI is a dummy variable set to 1 if the firms have a negative income prior to SEO. Size is defined as the natural logarithm of the firm's market value at the end of prior month. Log(M/B) is the natural logarithm of the most recent market-to-book ratio. Beta is individual firms' beta estimated from prior 5 years returns. Firm age is equal to the number of years that the firm is listed in CRSP. Cash, research and development expenditure (RD), operating income before depreciation (OIBD) are obtained from the most recent quarterly reported and deflated by total assets. RD is set to zero if R&D expenditure is missing. RDD is a dummy variable that equals one if R&D is missing. Capex is the capital expenditures in the fiscal year prior to SEO. $R_{t-4,t-1}$ is the stock return for the prior three months. IPGrowth is the monthly growth rate of industrial production. All regressions include industry fix effect. Industry classification is based on Fama-French 48 industries. Crisis period are defined as the month with extreme value of forward-looking risk premium. The z values in the brackets are computed from the robust standard errors. ***, **, * denote statistical significance at the 1%, 5%,and 10% levels, respectively.

Panel A: Probability of default and firms with negative net income

	Low FFLRP	Median FFLRP	High FFLRP	Diff(High - Low)	
Mean PD	3.64	4.25	12.44	8.80	***
T-value				(9.89)	
% Negative NI	29.80%	27.30%	44.60%	14.80%	***
T-value				(9.23)	

Panel B: Cross sectional Interactions:

	SEO Issuance (=1)							
	All Sample				Exclude Crisis Period			
	(1)		(2)		(3)		(4)	
$FFLRP_{t-1}(\tau)$	-0.296	***	-0.765	***	-0.0338		-0.202	
	(-5.09)		(-2.92)		(-0.33)		(-1.57)	
$FFLRP_{t-1}(\tau) \times PD$	0.00699	***			0.0107	***		
	(9.59)				(5.19)			
PD	-0.0192	***			-0.0212	***		
	(-16.04)				(-16.38)			
$FFLRP_{t-1}(\tau) \times NegNI$			0.225	**			0.232	
			(2.20)				(1.59)	
NegNI			-0.155	***			-0.161	***
			(-3.67)				(-3.61)	
Size	0.150	***	0.180	***	0.144	***	0.178	***
	(21.87)		(26.08)		(21.12)		(25.72)	
log(M/B)	0.663	***	0.719	***	0.665	***	0.723	***
	(40.10)		(44.42)		(40.07)		(44.57)	
Beta	0.146	***	0.127	***	0.114	***	0.118	***
	(11.53)		(9.93)		(7.51)		(7.83)	
Cash	-0.897	***	-0.700	***	-0.914	***	-0.703	***
	(-9.70)		(-7.73)		(-9.83)		(-7.73)	
Age	-0.0245	***	-0.0246	***	-0.0246	***	-0.0247	***
	(-16.73)		(-17.08)		(-16.68)		(-17.05)	
OIBD	-0.0776		0.273		-0.0412		0.311	*
	(-0.51)		(1.58)		(-0.27)		(1.78)	
Capex	1.499	***	1.456	***	1.491	***	1.443	***
	(11.09)		(11.01)		(10.97)		(10.86)	
RD	2.044	***	2.109	***	2.064	***	2.123	***
	(11.35)		(11.23)		(11.41)		(11.23)	
RDD	0.194	***	0.230	***	0.202	***	0.237	***
	(5.66)		(6.68)		(5.86)		(6.85)	
$R_{t-4,t-1}$	0.356	***	0.351	***	0.356	***	0.351	***
	(16.71)		(16.29)		(16.61)		(16.22)	
$IPGrowth_{t-1}$	0.0143	**	0.0180	***	0.0175	**	0.0208	***
	(2.07)		(2.60)		(2.48)		(2.95)	
Industry fixed effect	Yes		Yes		Yes		Yes	
Log likelihood	-32,714		-32,908		-32,443		-32,650	
Nobs	1,637,927		1,636,987		1,606,799		1,611,158	
Nobs SEO	5,321		5,316		5,286		5,281	
Pseudo R-sq	8.62%		8.00%		8.65%		7.98%	

Table 9: SEO Announcement Returns and Distress Likelihood

This table presents the announcement period cumulative abnormal return, including the interaction terms of cost of equity with probability of default and negative net income. Abnormal returns for individual firms are measured using Carhart (1997) four factor model. FFLRP is the firms' one-month forward-looking risk premium at the month-end prior to the announcement month. Probability of default (PD) is calculated from Vassalou and Xing (2004) model and measured prior to announcement month. NegNI is a dummy variable set to 1 if the firms have a negative income prior to SEO. ΔSHR is proportional change in outstanding shares of common stock, measured as logarithm of number of shares issued over outstanding shares. ΔLEV is the change in debt equity ratio due to the offering, where debt is measured as the book value and equity is measured as the market value of common stock. CON is shareholder concentration, which is measured as the logarithm of total market value of stocks, divided by the total number of shareholders. RUNUP is cumulative stock return over the three-month period prior to the offering month. ΔBret is the three-month bond return calculated from 10 years bond index prior to the offering month. IPGrowth is the growth rate of industrial production for the three months prior to the offering month. T-statistics are computed from robust standard errors. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	CAR(-1,+1)			
$FFLRP_{t-1}(\tau)$	-0.684	*	-2.178	**
	(-1.66)		(-2.52)	
$FFLRP_{t-1}(\tau) \times PD$	-0.0246	***		
	(-2.82)			
PD	0.0173			
	(1.40)			
$FFLRP_{t-1}(\tau) \times NegNI$			1.445	
			(1.52)	
NegNI			0.429	
			(1.58)	
ΔSHR	0.0731		-0.0187	
	(0.46)		(-0.13)	
ΔLEV	-0.183		-0.192	
	(-0.73)		(-0.83)	
CON	0.0638		0.0255	
	(1.00)		(0.42)	
RUNUP	-0.119		-0.131	
	(-0.36)		(-0.39)	
ΔBret	-2.692		-1.289	
	(-0.93)		(-0.49)	
Ipgrowth	6.902		3.863	
	(1.22)		(0.73)	
Const.	-2.847	***	-2.538	***
	(-3.50)		(-3.36)	
Adj. R-sq	1.30%		0.90%	
Nobs	3,366		4,058	

Table 10: Post-SEO Change of Debt

This table presents the regression of changes in book debts for SEO firms in the year after the SEO issuance on the forward-looking cost of equity and control variables. The change in book debt is measured as the change in book debt in the year after SEO divided by the total assets right after SEO issuance. MFLRP and FFLRP are the market and firms' forward-looking risk premium, measured prior to the SEO month. Other explanatory variables are measured at the quarter-end immediately following SEO issuance. The market-to-book ratio (M/B) is assets minus book equity plus market equity all divided by assets. Fixed assets intensity (PPE/A) is defined as net property, plants and equipment divided by assets. Profitability (EBITDA/A) is defined as operating income before depreciation, divided by assets. Firm size is defined as the log of net sales. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$((D)_{t+1} - (D)_t)/A_t$					
$FFLRP_{preSEO}(\tau)$			-0.0601	***		
			(-3.26)			
$MFLRP_{preSEO}(\tau)$					-0.111	***
					(-4.80)	
$(M/B)_t$	0.0121	*	0.0124	*	0.0126	*
	(1.74)		(1.78)		(1.80)	
$(PPE/A)_t$	-0.0510		-0.0495		-0.0527	
	(-0.96)		(-0.93)		(-0.99)	
$(EBITDA/A)_t$	0.137		0.104		0.101	
	(0.76)		(0.58)		(0.57)	
$\log(S)_t$	-0.00740		-0.00626		-0.00592	
	(-1.40)		(-1.18)		(-1.11)	
D_t/A	-0.0450		-0.0450		-0.0440	
	(-1.07)		(-1.07)		(-1.04)	
Const.	0.204	***	0.207	***	0.210	***
	(3.45)		(3.52)		(3.56)	
Industry fixed effect	Yes		Yes		Yes	
Adj. R-sq	7.30%		7.30%		7.40%	
Nobs	4290		4290		4290	

Figure 1: Number of SEOs

This figure plots the number of monthly SEOs from 1970 to 2009. The SEO sample is obtained from SDC database. The sample only includes SEOs with some primary offerings, and listed in NYSE, AMEX, and NASDAQ. Financial and utility companies are excluded.

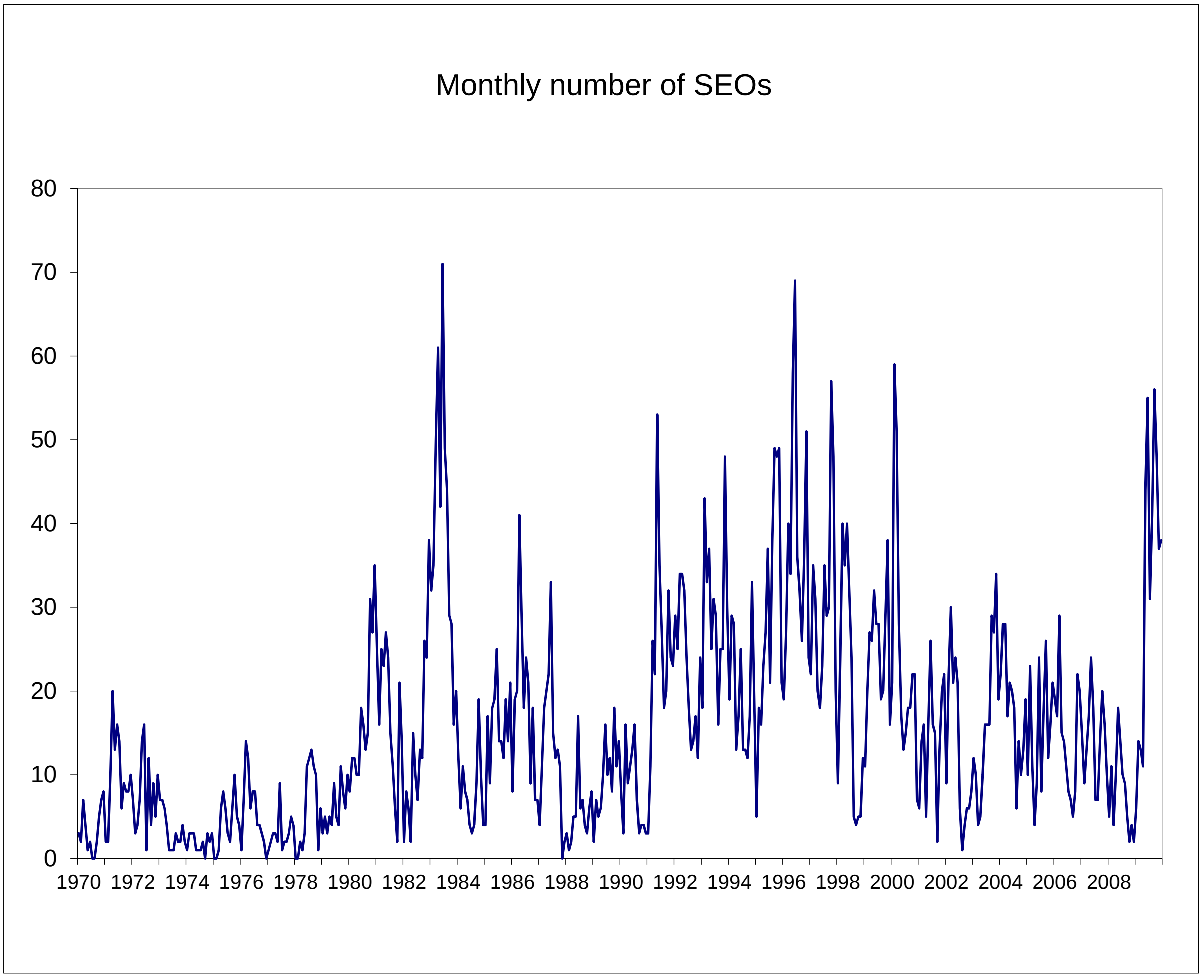

Figure 2: The Forward-looking Market Risk Premium

This figure plots the monthly forward-looking market risk premium from 1970 to 2009. The method to compute the forward-looking market risk premium is based on Duan and Zhang (2013). The forward-looking market risk premium is computed at each month-end with the forward-looking period of one month.