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Illiquidity, Stock Return and Corporate Capital Structure: Evidence from Seasoned Equity Offering

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Abstract

The post-issue underperformance of seasoned equity offering (SEO) is generally explained by asymmetric information and deteriorating operating performance. We complement these traditional explanations with a new parameter, the liquidity, which results from the change of capital structure due to equity offering. The new issuing of equity lowers the debt to asset ratio, lowers the information asymmetry, thus increasing stock liquidity, which is in accordance with the hypotheses presented by Kyle(1985)'s model; Evidence that stocks become more liquid after SEO, thus lower the expected return, resulting to underperformance, combined with the high stock illiquidity before SEO, which coincides the high return, proving that Amihud's (2002) hypothesis about the relation between liquidity and stock is applicable in explaining the stock return puzzle during SEO period.

Keywords: illiquidity, seasoned equity offering, capital structure

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Chapter 1

Introduction

Many studies have documented that firms conducting seasoned equity offerings have abnormally low stock returns during the five years after the offering, following a sharp run-up in the year prior to the offering. Loughran and Ritter (1997) report that the average raw return for issuing firms is only 7 percent per year during the five years after the offering, compared to 15 percent per year for non-issuing firms of the same market capitalization. These low post-issue returns follow extremely high returns in the year prior to the offering, 72 percent on average. And the magnitude of the SEO underperformance is economically important according to Loughran and Ritter (1995). They find, based upon the realized returns, an investor would have had to invest 44 percent more money in the issuers than in nonissuers of the same size to have the same wealth five years after the SEO date, using the data from 1970 to 1990.

There are abundant literatures trying to capture the SEO underperformance puzzle in terms of signaling, issue timing and the price elasticity of demand for new shares et al. Factors such as investor behavior, price pressure, accounting performance and demand-supply changes have been studied intensively. A primary explanation for the long-term post SEO underperformance is the issue timing hypothesis, which also purposes that the issue timing is related to earnings and dividend announcements.

Most asset pricing researches testing the post-offering performance are somehow related to liquidity. The issue size, price pressure, and demand-supply can all be attributed to the liquidity. Thus, I try to explore the linkage between the SEO underperformance and liquidity.

In this article, we try to look into the SEO underperformance in the aspect of liquidity change. As the hypothesis on the relationship between stock return and stock liquidity is that return increases in illiquidity, as proposed by Amihud and Mendelson (1986), we assume that, the liquidity change is one of the causes of the post SEO underperformance and pre SEO overperformance.

Desirable characteristics for a security market include price discovery without excess volatility and the provision of liquidity at low cost. The New York Stock Exchange's (NYSE) specialist-auction market and the NASDAQ dealer market each provide price discovery and liquidity services for equity shares, but differ substantially in design. Execution costs, as measured by the quoted spread, the effective spread (which accounts for trades inside the quotes), the realized spread (which measures revenues of suppliers of immediacy), the Roll (1984) implied spread, and the post-trade variability, are twice as large for a sample of NASDAQ stocks as they are for a matched sample of NYSE stocks.(Huang and Stoll, 1996).

Despite the long-standing debate over the relative merits of auction and dealer markets, very few studies directly compare the efficiency of the two systems. In this article, we test the liquidity around the SEO period separately on the three exchanges.

From our result using Amihud liquidity measure, on average, the illiquidity drops about 55% from the level of 12 month before SEO for the offering on NYSE, 70% for the Nasdaq and 63% for the AMEX.

We find that during the SEO period (a five year period before and after SEO), the illiquidity has a positive relation with the stock return. The illiquidity is high before the SEO period and drop drastically after the SEO announcement. This is the evidence that, the individual stock level liquidity, do play an important role in explaining the SEO underperformance.

We also divided the illiquidity factor into expected illiquidity and unexpected illiquidity. Generally, big companies suffer more from the unexpected illiquidity across the three exchanges, and they are less vulnerable to the expected illiquidity, which is significant for the NYSE samples. Big firms on NASDAQ still suffer more from expected illiquidity, compared with those on NYSE. We also find that the more stock issuing, relative to the previous capitalization, the more price impact will be caused by expected illiquidity, while less by unexpected illiquidity. This implies that, the large volume of new issuance conduct more information to the investor, thus decreasing the information asymmetry, making the illiquidity impact more predictable.

Furthermore, we test the theoretical source the illiquidity. We believe the capital structure change caused by the SEO makes the liquidity change. Therefore, we regress the illiquidity on the corporate leverage. We find the positive relation between the leverage and the stock illiquidity, that the decreased leverage makes the stock more liquid, and the large stocks are less affected by the leverage changes. We also find the marginal illiquidity cost of leverage is big when the company deleveraging quite a lot. The corporate operating performance is positively related to the stock liquidity. And there is no evidence that the offer premium, the offer price relative to the stock price around the SEO period, convey any information to the investors.

Chapter 2

Literature Review

2.1 The puzzle of seasoned equity offering

As Kahneman and Tversky (1982) proposed the widespread tendencies for humans to overweight recent experience at the expense of long-term averages, a similar comment is given by Loughran and Ritter (1997) that, market is in general too optimistic about the prospects of issuing firms. This overreaction may be an explanation of the significant negative return of SEO, while whether or not there are tendencies for the stock market to overextrapolate recent growth is controversial.

In corporate finance theory, the negative underpricing of SEO can be explained by "uncertainty and asymmetric information" of the corporate governance. In the Myers and Majluf (1984) adverse selection model, rational investors presume that on average managers approve stock offerings when, based on their superior information, they believe the stock is overvalued. This follows from the assumption that manager decisions are made on behalf of existing shareholders, who gain if additional stock is sold when it is overvalued and lose when undervalued. In order to compensate the adverse selections that, informed investors will participate only in good issues, leaving uninformed investors with a disproportionate share of bad issues, the underpricing can be derived as the penalty.

The Leland and Pyle (1977) signaling model predicts that changes in management stockholdings cause like changes in firm value. Investors assume correctly that management is better informed about the expected future cash flows and that from a diversification standpoint, it is costly for managers to hold a significant fraction of firm stock. Thus, managers have incentives to hold large stock positions only if they expect the future cash flows to be high relative to the firm's current value. Rational investors will consider managers' fractional stock ownership to be a credible signal of firm value. Thus, a decrease in managements' fractional shareholdings, induced by a stock offering to outside investors, is a negative signal about firm value. This prediction is empirically supported in a study of initial public offerings of stock by Downs and Heinkel(1982).

Agency theory models as developed by Jensen and Meckling (1976) predict that larger percentage shareholdings by management decrease the potential conflicts of interest between managers seeking to maximize their own utility and outside shareholders seeking to have share value maximized. Thus, any increase in outstanding shares, which decreases management percentage shareholdings, is predicted to have a negative impact on firm value and stock price. The larger the proportional size of the stock offering, the larger the predicted negative effect on the firm (assuming management does not subscribe to the offering).

The underpricing of seasoned offers may also be related to either permanent or temporary price pressures, (Corwin, S. A. (2003)). If we view a seasoned offer as a permanent shift in the supply of existing shares, the aggregate demand curve for the firm's shares is downward sloping, then this increase in supply will result in a permanent decrease in stock price. Alternatively, if one views a seasoned offer as a temporary liquidity shock that must be absorbed by the market, then a discounted offer price may be necessary to compensate investors for absorbing the additional shares.

However, arguments about the date that such price pressure or illiquidity problem is controversial, while evidence of price pressure on the announcement date is mixed. Both Asquith and Mullins (1986) and Mikkelson and Partch (1985) find a significant relation between announcement day returns and issue size, but Mikkelson and Partch find no evidence that this effect is related to hypothesized determinants of demand elasticity. Further, Mikkelson and Partch (1986) and Barclay find no evidence of a significant relation between issue size and announcement effects, while Shane A. Corwin (2003) finds a positively relation between the offer size and the securities with relatively inelastic demand.

Previous studies test underpricing using the issue size, trade volume (block trade), and the elasticity of the security demand. This provides the reasons that seasonal equity offering are related to liquidity. In fact, issue size, trade volume and security demand-supply are all liquidity variables. Whether the increase in the supply of the stock can be absorbed by the market smoothly depends on the market liquidity and the stock liquidity. Such price pressure is the liquidity pressure or the unexpected illiquidity caused by the sudden increase in the stock supply.

2.2 Liquidity and exchange mechanism

In testing the liquidity, we must differentiate the exchange factor. Several studies report that trade execution costs are larger on the NASDAQ market than on the NYSE. Huang and Stoll (1996), for example, examine a matched sample of large capitalization firms and find that trade execution costs during 1991 were more than twice as large on NASDAQ. Bessembinder and Kaufman (1997) use data from 1994 and extend the comparison to smaller firms, finding that the NYSE advantage in trade execution costs is most notable for smaller firms and for small trades. Barclay (1997), Christie and Huang (1994), and Bessembinder (1997) examine companies that move from NASDAQ to NYSE, each reporting substantial decreases in trade execution costs upon exchange listing.

Moreover, On January 20, 1997, the Securities and Exchange Commission began implementing a new set of regulations that have drastically changed the way the Nasdaq handles orders. These regulations were formulated in response to evidence of imperfect competition under the Nasdaq's previous trading rules, due to the avoidance of odd-eighth quotes documented by Christie and Schultz (1994) and the large difference in trading costs compared to the NYSE, reported by Huang and Stoll (1996), which have led some researchers and policymakers to question the efficiency of the Nasdaq's dealer market structure.

There is evidence that, the new regulations have increased competitive pressure on Nasdaq market makers in two primary ways. First, they require that public limit orders be allowed to compete with Nasdaq market makers. Second, market makers who post orders on proprietary trading systems are now obligated to make those orders available to the public as well. (Weston, 2000).

The size effect, i.e. the company's market capitalization, is also important across the exchange. It is worthwhile to examining small and medium capitalization firms along with large capitalization firms, since overall market-making costs and the relative significance of various cost components potentially vary across firm size groups and across exchanges. Kleidon and Willig (1996) argue that the structure of the NASDAQ market, where each dealer sees only a portion of the total order flow, leaves dealers more vulnerable to adverse selection costs arising from losses on trades with better informed agents. Easley, Kiefer, O'Hara, and Paperman (1996) report that, the probability of informed trading is greater for less actively traded stocks. Since less actively traded stocks tend to be smaller firms, greater adverse selection costs may justify higher execution costs on NASDAQ, particularly for small firms. The inventory costs of market-making are also likely to be greater for small firms, due to greater return volatility and more difficulty in unwinding inventory imbalances in thin markets. The presence of multiple dealers on NASDAQ allows for inter-dealer trades and may facilitate inventory rebalancing. Chan and Lakonishok (1993) have ventured that the NASDAQ market structure may provide a comparative advantage in executing trades for smaller firms, while the NYSE has a comparative advantage in executing large firm trades.

Thus, this article provides direct comparisons of illiquidity impact on stock return in small and large firms on each exchange, both before and after the seasoned equity offering.

2.3 Liquidity and corporate capital structure

For the relation between capital structure and liquidity, since Modigliani and Miller's (MM) (1958) proposition that leverage (the proportion of debt financing) does not affect firm value in a perfect world, there have been a number of theories explaining how debt can affect firm value[1]. A common synthesis of these theories implies that firms should trade-off the costs and benefits of leverage, by choosing the optimal amount of debt financing that maximizes firm value. A possible mitigating factor in debt usage is the ancillary effect on the costs of equity trading. Increasing debt in the capital structure using pure leverage recapitalizations results in increased information asymmetry in the remaining equity. The consequent effect is increasing equity liquidity costs that affect the firm's cost of capital (Amihud and Mendelson, 1989). Examining the interaction between debt usage and equity trading costs is important to better understanding the possible costs of debt financing thus adding to our understanding of the determinants of optimal capital structure. Models of price formation in securities markets suggest that privately informed investors create significant illiquidity costs (Kyle, 1985), implying that the corporate cost of equity capital should be higher for illiquid securities. Amihud and Mendelson (1986) argue that

[1]For example, leverage can affect firm value through the effect of taxes (MM (1963), Dammon and Senbet (1988), Ross (1985)), incentive effects (Jensen and Meckling (1976), Myers (1977)), incomplete contracting (Townsend (1977)), market completion (Allen and Gate (1991)) and information asymmetry (Myers and Majluf (1984)). Harris and Raviv (1991) summarize these leverage theories.

stocks include a significant risk premium for the quoted spread, because investors require compensation for higher expected trading costs. Brennan and Subrahmanyam (1996) find a significant relation between required rates of return and measures of illiquidity after adjusting for price level and risk factors[2]. Using pure leverage recapitalizations, we argue that privately informed traders increase their information advantage, because debt financing concentrates their information advantage in the remaining equity. The increased information asymmetry is reflected in increased equity trading costs. We find that firms that undergo a pure substitution of debt for equity (or equity for debt) experience economically relevant and statistically significant liquidity cost changes around the leverage recapitalization, and interpret this as caused by increases (decreases) in information asymmetry.

A related empirical literature links capital structure and equity liquidity. Bharath, Pasquariello and Wu (2008) show firms that use a higher percentage of debt financing have lower equity liquidity, and claim that this relationship confirms the pecking order theory. They attribute equity illiquidity to exogenous information asymmetry, and argue that higher information asymmetry leads to larger use of debt, to avoid information asymmetry costs. However, the results in this paper show that using debt itself causes the lower liquidity of equity and the companies tend to use equity-financing when the stock liquidity is low. The marginal cost of leverage is large for the companies deleverage quite a lot.

Therefore, it is probably that firms with higher debt to equity ratios simply have higher asymmetry information because larger debt financing is causing the higher information asymmetry. However, our explanation is different from that proposed by Weston, Butler, and Grullon (2005) who suggest that the firm's equity liquidity affects the ease with which a company can raise external capital. Our paper posits

[2]Supporting evidence concerning liquidity is provided by Amihud, Mendelson, and Lauterbach (1998), Amihud, (2000), Datar, Naik, and Radcliff (1998), and Brennan, Chordia, and Subrahmanyam (1998).

leverage choice affecting equity liquidity rather than equity liquidity affecting leverage choice.

Chapter 3

Empirical Methodology

There are 11551 samples of the seasoned equity offering in the NYSE, NASDQ and AMEX from 1980 to 2006 from the SDC (Securities Data Company). Several data restrictions are present in this study: the issuing firms must be present on the COMPUSTAT (primary industrial, supplementary industrial, tertiary, full coverage, and industrial research) dataset for the fiscal year of the offering, and they must be on the University of Chicago Center for Research in Security Prices (CRSP) dataset on the issue date to be included in the sample. The offer must be a cash offer of common stock. This follows Healy and Palepu's (1990) procedure and excludes SEOs by the same firm during the five years after an SEO that is in our sample, for these offerings cause the dependence for the statistical tests. Thus, once a firm has a seasoned equity offering, that firm cannot reenter the SEO sample until five years from the issue date have passed. I also require that the book value of assets at the end of the fiscal year of issuing be at least $20 million[1], and the utility offering[2] is also excluded. Finally we have a sample of 7344 SEO during 1980 to 2006.

[1]This follows Loughran and Ritter (1997) criteria. They require that the book value of assets at the end of the fiscal year of issuing be at least $20 million, measured in terms of dollars of 1993 purchasing power.

[2]Because utility offerings tend to be different from those of other operating companies, we exclude all utility offerings (standard industrial classification (SIC) codes 491 to 494) from our sample.

The data restriction for the cross-section liquidity model also follows Amihud (2002) method:

Within the test window from month $m = -60$ to $m = 60$, in the daily data in that period,

1. The stock has return and volume data for more than 24 month before the issue month $m = 0$; also, the stock must have been listed at least two years, i.e. before the month $m = -24$[3];

2. The stock monthly average price is greater than \$5 at the issue month, $m = 0$;

3. The stock has data on market capitalization during the test period in the CRSP database;

4. Outliers that, the highest or lowest 1% tails of the distribution of estimated liquidity indices (after satisfying criteria) are eliminated.

3.1 The illiquidity and stock return

3.1.1 Cross-section estimation

The effect of illiquidity on stock return during the SEO period is examined for stocks traded in the NYSE, NASDQ and AMEX in the years 1980-2006, using data from daily and monthly databases of CRSP. We choose a five-year test window before and after the SEO month, which captures almost the entire period of SEO stock performance. The five-year interval is based upon the evidence in Loughran and Ritter (1995), who reports the SEO underperformance for approximately five years. We define the offering month is the month m=0, then the test window is from $m = -60$ to $m = 60$. Tests are divided into three exchanges because of the differences in

[3]The 24 months period before SEO is used because of the beta is estimated from the previous 24 month stock price performance.

market microstructures[4] . The test procedure follows the Fama and MacBeth(1973) method. A cross-section model is estimated for each month $m = -60, -59, ... - 1, 0, 1, 2, ..., 59, 60$, where monthly stock returns are a function of stock characteristics:

$$R_{im} = k_{im} + \sum_{j=1}^{J} k_{jm} X_{ji,m} + U_{im} \tag{3.1}$$

R_{im} is the return on stock i on the month m ,with returns including the dividends and $X_{ji,m}$ is characteristic j of stock i, estimated from date in month m. $X_{ji,t-1}$ includes the variables as beta, liquidity, issue volume, issue size relative to the company size and a January dummy is also included to capture the January abnormality. The coefficient k_{im} is the effects of stock characteristics on expected return and U_{im} are the residuals.

$BETA$ We estimate the beta for every stock every month during the test period. We use the rolling method, from the daily stock price data 24 months before to the previous month. The estimation method is based on Fama and MacBeth (1973), presented in the equation (3.2). The market return RM_t, is the value-weighted market return, Rf_t is the risk free return, using the contemporaneous Treasury-bill rate and is the estimated slope coefficient.

$$R_{it} - Rf_t = \alpha + \beta(RM_t - Rf_t) + \sigma \tag{3.2}$$

$AILLIQ_t$. The daily stock illiquidity is the ratio of the daily absolute return to the dollar trading volume on that day, $|R_{it}|/VOLD \bullet R_{it}$ is the return on stock i on day t and $VOLD_{it}$ is the respective daily volume in dollars, which follows Kyle's concept of illiquidity-the response of price to order flow-and Silber's (1975) measure of thinness, defined as the ratio of absolute price change to absolute excess demand

[4]Reinganum (1990) works on the effects of the differences in microstructure between the NASDAQ and the NYSE on stock returns, after adjusting for size and risk. In addition, volume figures on the NASDAQ have a different meaning than those on the NYSE, because trading on the NASDAQ is done almost entirely through market makers, whereas on the NYSE most trading is done directly between buying and selling investors. This results in artificially higher volume figures on NASDAQ.

for trading, noted as $ILLIQ$.

$$AILLIQ_{im} = 1/N_i \sum_{t=1}^{N_i} ILLIQ_{it} \tag{3.3}$$

The monthly average illiquidity, $AiLLIQ_m$ is the average $AILLIQ_t$. in that month. N_i is the number of observations in that month. $LnAilliq_m$ is the logarithm of the daily stock $Ailliq$.

3.1.2 Time-series estimation

Following Amihud (2002) method to test the effect of market illiquidity on stock excess return, we estimate the individual stock return on the expected stock liquidity and market liquidity. The model is described as:

$$E(R_{im} - Rf_m | \ln AILLIQ_{im}^E) = f_0 + f_1 \ln AILLIQ_{im}^E \tag{3.4}$$

R_{im} is daily stock return for stock i day m, Rf_m is the risk-free return, (using the contemporaneous Treasury-bill rate) and $\ln AILLIQ_{im}^E$ is the expected stock illiquidity for month m

Also, assuming illiquidity can be predicted from the information available in day $m-1$, then stock daily illiquidity is assumed to follow the AR(1) process:

$$\ln AILLIQ_{im} = c_0 + c_1 \ln AILLIQ_{i,m-1} + v_m \tag{3.5}$$

Then the expected illiquidity of the stock can be generated as:

$$\ln AILLIQ_{i,m}^E = c_0 + c_1 \ln AILLIQ_{i,m-1} \tag{3.6}$$

The calculation of daily market illiquidity is used the similar method, so the time-series model (3.5) can be reiterated as following:

$$(R_t - Rf)_m = f_0 + f_1 \ln AILLIQ_m^E + u_m = g_0 + g_1 \ln AILLIQ_{m-1} + u_m \tag{3.7}$$

Denote the residual u_m, w_m as the unexpected stock return, then integrate the contemporaneous and unexpected stock return to the model:

$$(R_t - Rf)_m = g_0 + g_1 \ln AILLIQ_{i,m-1} + g_2 lnAILLIQ_{i,m}^U + w_m \tag{3.8}$$

Model (3.8) is to estimate effect of the expected illiquidity and the unexpected illiquidity, of both individual level and market level, on the stock price after issue day. Both the $\ln AILLIQ_{i,m-1}$ and $\ln AILLIQ_{im}^U$ may positively correlated to the return.

3.2 The illiquidity and capital structure

Following Kyle's (1985) competitive equilibrium solution, shown in Appendix B, the relation between the firm's capital structure and the underlying equity liquidity is positive. Following is the proof.

Given the assumption of exogenous liquidity demand, increases in leverage at the initial date 0 decreases the equity liquidity at date 1.

Proof: As shown in Appendix B, the depth, or the sensitivity to order flow, is defined as $L = 1/$ (the measure of liquidity in the market). Using Kyle's result, it can be shown that equity liquidity, L, is given by:

$$L = \frac{1}{\lambda} = \frac{2\sigma_u}{\sigma_\epsilon \left(1 + \frac{D}{S_0}\right)} \tag{3.9}$$

Equation (3.9) shows an inverse relation between liquidity and leverage. For highly levered firms, the level of liquidity costs is higher (lower liquidity) compared to less levered firms, ceteris paribus. Differentiating the expression for the liquidity, L, and assuming a value preserving recapitalization (so that $dD = dS$), with respect to leverage, D/S, we get:

$$\frac{dL}{d(D/S)} = \frac{-2\sigma}{\sigma_{\epsilon}\left(1 + \frac{D}{S_0}\right)} \tag{3.10}$$

with simplifying this relation reduces to:

$$\frac{dL}{d(D/S)} = \frac{-L}{\left(1 + \frac{D}{S_0}\right)} \tag{3.11}$$

Equation (3.11) is clearly negative and the larger the initial value of the ratio between liquidity (transaction costs) and leverage, the larger the liquidity change. Equation (3.11) is also monotonically decreasing in leverage, so that (3.9) has a maximum at zero leverage. Therefore, debt financing reduces the depth or liquidity of the firm's equity and equity financing increases the liquidity of the firm's equity.

Thus, we examine the empirical relation between the liquidity and leverage in the event of SEOs. The test controls for the commonly used variables that explain the cross-sectional variation in liquidity (Stoll 2000). We regress the illiquidity measure *Ailliq* on the corporate characteristics. The estimation period is 1980-2006. The capital structure measure is the estimation result from a regression using monthly variables, which are summarized from daily data. The measure is an estimate of the Kyle model's (1985). The capital structure measure is DTA, debt divided by the total asset. The control variables are $\ln cshtrq$, $Prcstd$, $TobinQ$ and ROA. $\ln cshtrq$ is the number of shares transacted during the past month, which is log scaled. $Prcstd$ is the daily stock price standard deviation in one month. $TobinQ$ is defined as long term assets plus the difference between the market value of equity to the book value of equity divided by the book value of assets using the annual Compustat database measured in each of the pre and post SEO periods. ROA is the measure of return of return of equity, which is the net income divided by total assets.

So the regression for testing the liquidity and corporate characteristics is:

$$\begin{aligned} Ailliq &= \alpha_1 + \alpha_2 \cdot DTA + \alpha_3 \cdot \ln cshtrq + \alpha_4 \cdot Prcstd \\ &+\alpha_5 \cdot TobinQ + \alpha_6 \cdot ROA + \sigma \end{aligned} \tag{3.12}$$

Chapter 4

Empirical Result

4.1 Liquidity and stock return

Using Amihud illiquidity measure, a time-series average illiquidity level is calculated from the sample data. From Figure 4.1 to Figure 4.6, we present the average stock return and illiquidity level from the $month = -60$ to the $month = 60$ relative to the SEO month. The trend of illiquidity and stock return is quite similar among the three exchanges. The illiquidity drops about 55% from the level of 12 month before the SEO on the NYSE, 70% on the Nasdaq and 63% on the AMEX. And the stock monthly average return rises more than 100% from the 12 month before SEO level, and then drops 80% after the SEO announcement on NYSE. On Nasdaq and AMEX, the monthly average stock return rise about 100% and peak at 0.09 and 0.08 respectively, then drop to negative after SEO announcement.

From the descriptive statistics, we find the illiquidity change is most fierce on the Nasdaq and then AMEX. It's reasonable that, trading on the NASDAQ is done almost entirely through market makers. So this could make the trading volume artificially high. While through the change of company characteristics, the liquidity change is more apparent on NASDAQ.

Table 4.1 presents the means of the coefficients from the monthly cross-sectional

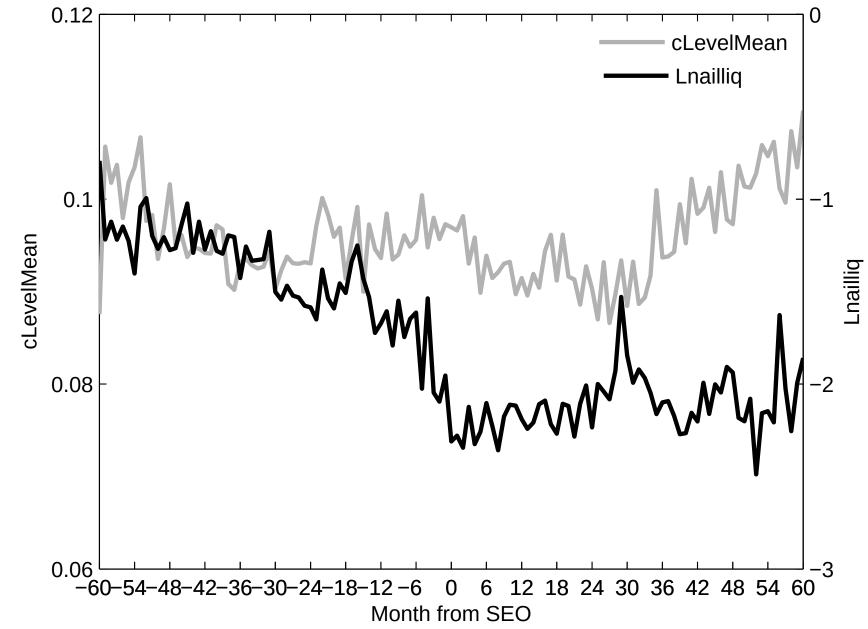


Figure 4.1: The Stock Illiquidity around SEO period–NYSE

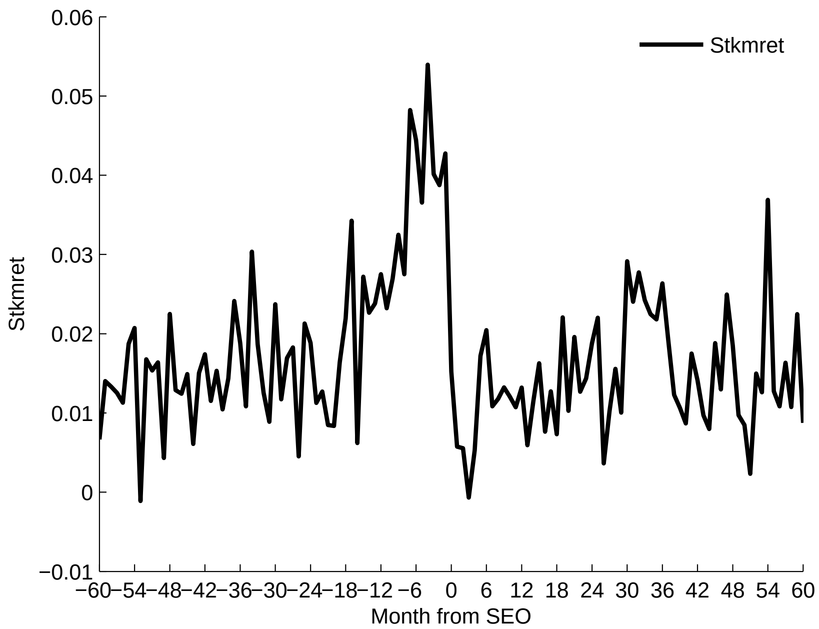


Figure 4.2: The Stock Monthly return around SEO period–NYSE

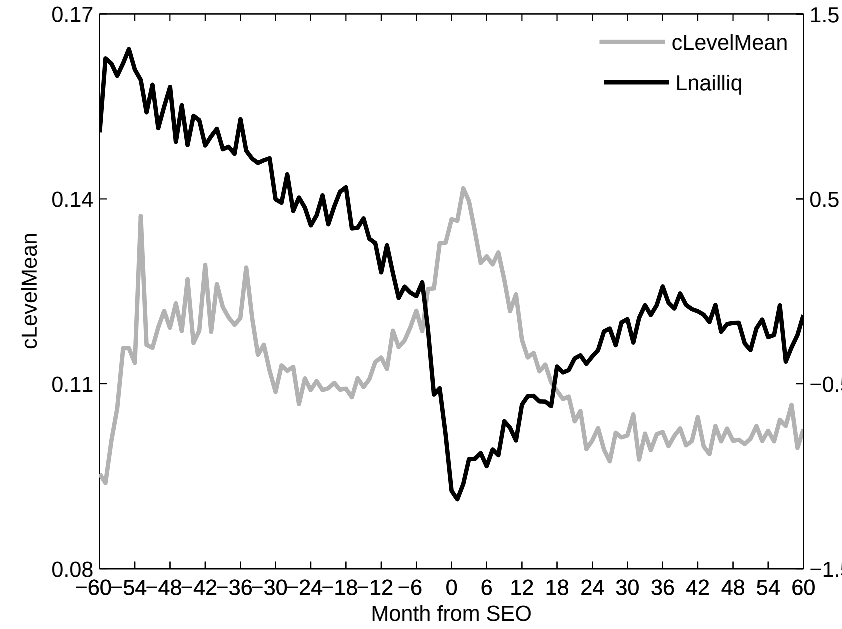


Figure 4.3: The Stock Illiquidity around SEO period–NASDAQ

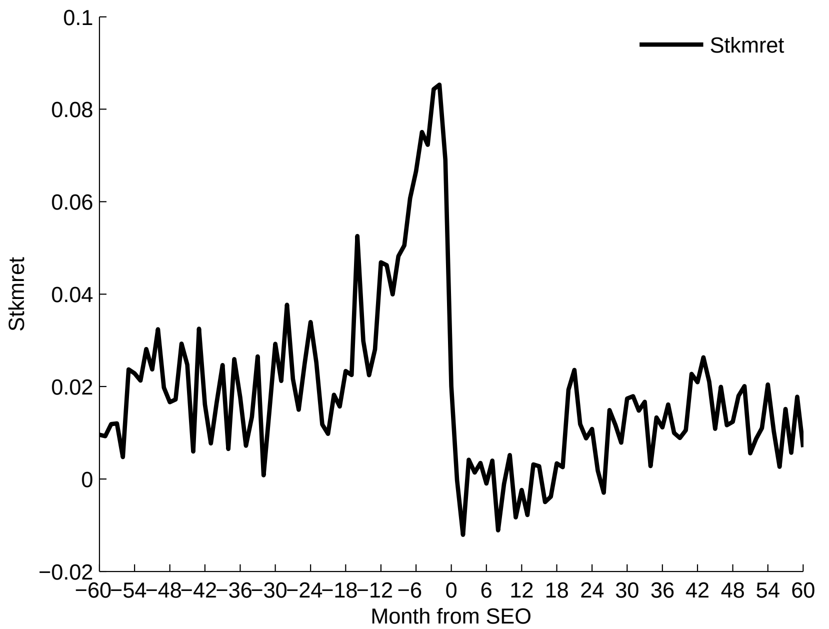


Figure 4.4: The Stock Monthly return around SEO period– NASDAQ

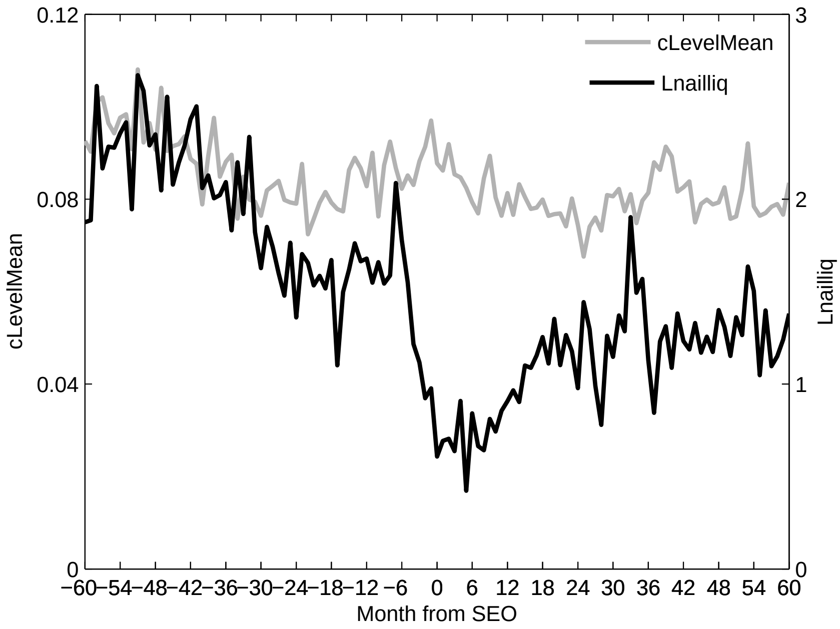


Figure 4.5: The Stock Illiquidity around SEO period–AMEX

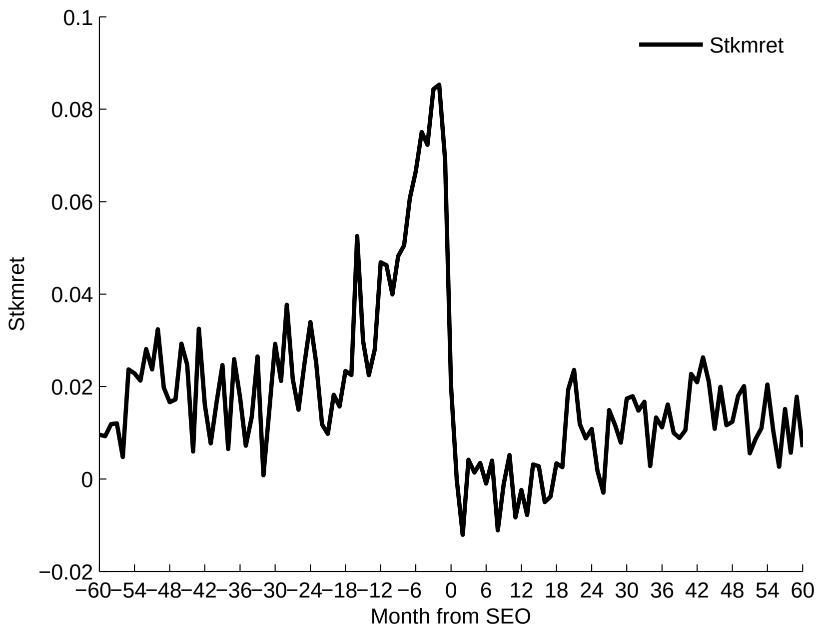


Figure 4.6: The Stock Monthly return around SEO period– AMEX

regression of stock excess return (the stock return in excess of Treasury bill rate) on the respective variables. In each month of year, $y = 1980, 1981, ..., 2005, 2006$, stock returns are regressed cross-sectionally on stock characteristics that are calculated from data in the respective years and months. The data include 324 months over 26 years, 1980-2006. Stocks admitted all experienced seasoned equity offering and have more than 24 months of data of the calculation of the characteristics during the SEO period. Beta is the slope coefficient from a 2 year time-series regression of daily return on the market return (equally weighted). The stock's Beta is calculated based on the daily return of previous 24 months and market return. The illiquidity measure $LnAilliq$ is the logarithm of the daily stock $Ailliq$, which is calculated as the daily absolute stock return divided by the daily dollar volume of the stock. $LnUailliq$ is the unexpected illiquidity, the residual from an autoregressive model of $LnAilliq$. $LnAilliq$ and $LnUailliq$, both are generated following Amihud's (2002) model. *Lndollar* is the dollar issue volume of the seasoned equity offering. Issuesize is the ratio of the dollar issue volume to the stock book value before the offering. Jandum is the January dummy. $Jandum = 1$, if it is January, otherwise, $Jandum = 0$. T-statistics are in parentheses.

Table 4.1: **Cross-section regressions of stock return during SEO period on illiquidity and other characteristics**

This table presents the means of the coefficients from the monthly cross-sectional regression of stock excess return (the stock return in excess of Treasury bill rate) on the respective variables. In each month of year, $y = 1980, 1981, ..., 2005, 2006$, stock returns are regressed cross-sectionally on stock characteristics that are calculated from data in the respective years and months. The data include 324 months over 26 years, 1980-2006. Stocks admitted all experienced seasoned equity offering and have more than 24 months of data of the calculation of the characteristics during the SEO period. Beta is the slope coefficient from a 2 year time-series regression of daily return on the market return (equally weighted). The stock's Beta is calculated based on the daily return of previous 24 months and market return. The illiquidity measure *LnAilliq* is the logarithm of the daily stock *Ailliq*, which is calculated as the daily absolute stock return divided by the daily dollar volume of the stock. *LnUailliq* is the unexpected illiquidity, the residual from an autoregressive model of *LnAilliq*. *LnAilliq* and *LnUailliq*, both are generated following Amihud's (2002) model. *Lndollar* is the dollar issue volume of the seasoned equity offering. Issuesize is the ratio of the dollar issue volume to the stock book value before the offering. Jandum is the January dummy. $Jandum = 1$, if it is January, otherwise, $Jandum = 0$. T-statistics are in parentheses.

Panel A: NYSE						
Variable	1980-2006	1980-1997	1998-2006	1980-2006	1980-1997	1998-2006
Intercept	0.0107	0.0073	0.0104	-0.0431	0.0110	-0.0858
	(6.18)	(2.39)	(5.04)	(-4.99)	(0.95)	(-6.14)
Beta	0.0042	0.0076	0.0050	0.0053	0.0080	0.0056
	(3.18)	(2.37)	(2.77)	(4.67)	(3.87)	(3.86)
$\ln Ailliq_{m-1}$	0.0012	0.0013	0.0016	0.0026	0.0019	0.0036
	(5.29)	(4.13)	(4.85)	(5.56)	(2.84)	(6.05)
$\ln Uailliq_m$	0.0065	0.0022	0.0115	0.0069	0.0025	0.0120
	(5.77)	(1.77)	(6.87)	(6.19)	(2.07)	(7.18)
$\ln dollar$				0.0030	-0.0003	0.0054
				(6.34)	(-0.40)	(7.00)
Issue/Size				-0.4035	-0.5442	-0.3649
				(-5.67)	(-5.49)	(-3.65)
Jandum				0.0053	0.0265	-0.0080
				(3.22)	(7.70)	(-3.66)

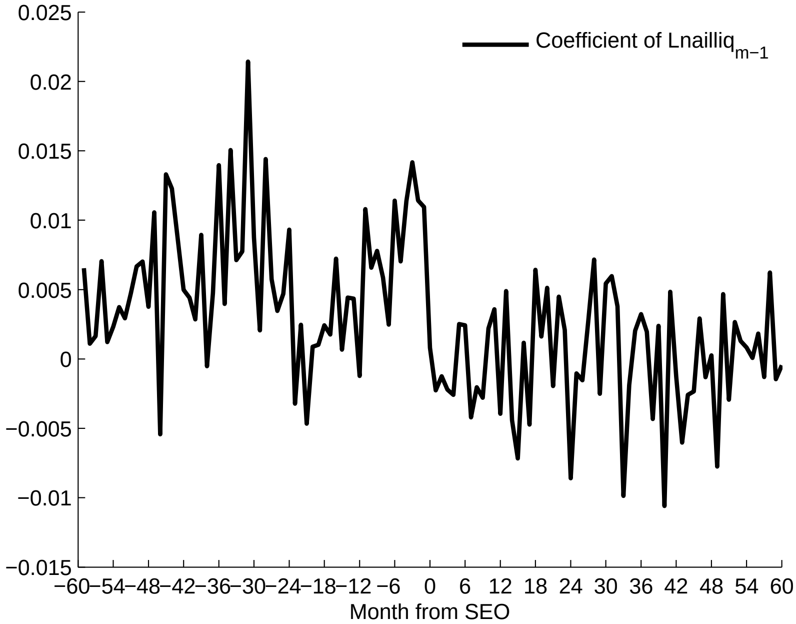
Panel B: NASDAQ						
Variable	1980-2006	1980-1997	1998-2006	1980-2006	1980-1997	1998-2006
Intercept	0.0159	0.0128	0.0169	-0.2233	-0.2436	-0.2036
	(8.95)	(7.46)	(10.98)	(-17.76)	(-11.01)	(-12.71)
Beta	-0.0032	-0.0019	-0.0032	-0.0053	-0.0027	-0.0056
	(-1.71)	(-1.70)	(-2.81)	(-1.61)	(-1.43)	(-1.91)
$\ln Ailliq_{m-1}$	0.0011	-0.0001	0.0026	0.0045	0.0039	0.0052
	(2.31)	(-0.20)	(4.83)	(9.24)	(7.43)	(10.57)
$\ln Uailliq_m$	0.0079	0.0026	0.0152	0.0088	0.0039	0.0153
	(8.43)	(2.60)	(9.78)	(9.66)	(4.49)	(9.85)
$\ln dollar$				0.0134	0.0147	0.0123
				(11.13)	(8.85)	(8.75)
Issue/Size				-0.1341	-0.5847	-0.1309
				(-3.38)	(-7.36)	(-5.69)
Jandum				0.0424	0.0379	0.0440
				(16.97)	(7.58)	(14.37)
Panel C: AMEX						
Variable	1980-2006	1980-1997	1998-2006	1980-2006	1980-1997	1998-2006
Intercept	0.0166	0.0023	0.0224	-0.1141	-0.0617	-0.1518
	(6.91)	(0.61)	(6.38)	(-5.70)	(-2.32)	(-4.47)
Beta	-0.0066	-0.0057	-0.0133	-0.0059	-0.0051	-0.0144
	(-3.03)	(-1.88)	(-3.83)	(-2.70)	(-1.69)	(-4.15)
$\ln Ailliq_{m-1}$	0.0022	0.0031	0.0021	0.0041	0.0031	0.0044
	(5.13)	(1.06)	(2.84)	(7.54)	(3.87)	(4.97)
$\ln Uailliq_m$	0.0027	0.0017	0.0060	0.0025	0.0008	0.0047
	(1.93)	(1.14)	(2.01)	(1.76)	(0.53)	(1.58)
$\ln dollar$				0.0073	0.0036	0.0098
				(6.42)	(2.33)	(5.08)
Issue/Size				-0.0050	0.4122	-0.0397
				(-0.13)	(2.44)	(-0.83)
Jandum				0.0425	0.0448	0.0389
				(10.71)	(9.66)	(5.71)

Table 4.2: **Cross-section regressions of stock return during SEO period on illiquidity and other characteristics-Gibbs estimates**

This table presents the means of the coefficients from the monthly cross-sectional regression of stock excess return (the stock return in excess of Treasury bill rate) on the respective variables. In each month of year, y=1980, 1981, , 2006, stock return s are regressed cross-sectionally on stock characteristics that are calculated from data in the respective year and month. Beta is the slope coefficient from a 2 year time-series regression of daily return on the market return (equally weighted). The stock's Beta is calculated based on the daily return of previous 24 months and market return. For robustness check, we include Bayesian estimation using the Gibbs sampler to proxy the illiquidity measure, as an alternative to Amihud's ones. $cLevelMean$ is the estimator regarded as a drift of trading cost for an individual stock, which can proxy the expected illiquidity, z is estimated as a latent factor, a measure of innovation, common to effective trading costs for all stocks, which can proxy the unexpected illiquidity. We get the estimated variables from Hasbrouck's website and the two estimators are calculated annually . $Lndollar$ is the dollar issue volume of the seasoned equity offering. Issuesize is the ratio of the dollar issue volume to the stock book value before the offering. Jandum is the January dummy. $Jandum = 1$, if it is January, otherwise, $Jandum = 0$ The data include 324 months over 26 years, 1980-2006. Stocks admitted all experienced seasoned equity offering and have more than 24 months of data of the calculation of the characteristics during the SEO period. T-statistics are in parentheses.

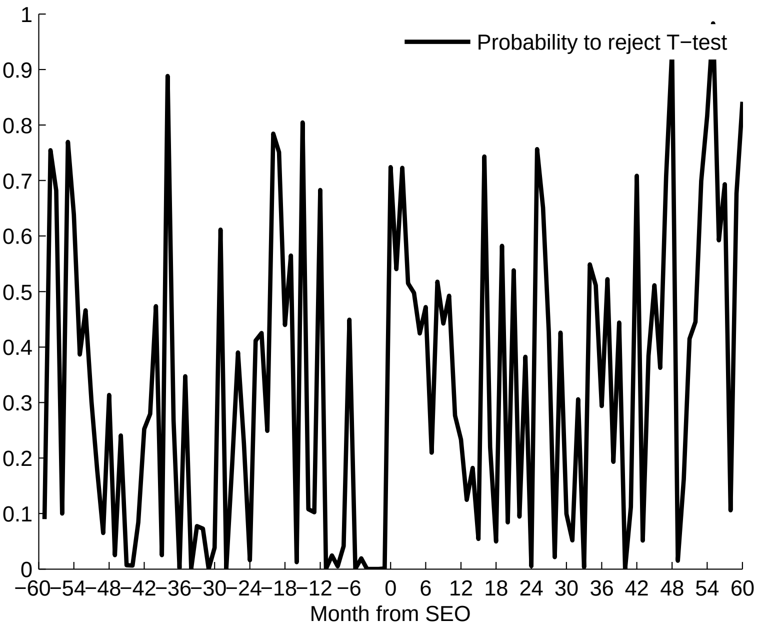
Panel A: NYSE						
Variable	1980-2006	1980-1997	1998-2006	1980-2006	1980-1997	1998-2006
Intercept	0.0115	0.0104	0.0102	0.0240	0.0109	0.0415
	(8.22)	(5.75)	(4.24)	(3.38)	(0.86)	(4.21)
Beta	0.0027	0.0027	0.0039	0.0025	0.0026	0.0044
	(2.22)	(1.59)	(1.99)	(2.04)	(1.52)	(2.19)
$cLevelMean$	0.0486	0.0361	0.0828	0.0582	0.0477	0.0835
	(7.84)	(4.7)	(7.43)	(8.58)	(5.45)	(7.48)
z	-0.0099	-0.0027	-0.0188	-0.0107	-0.0013	-0.0184
	(-5.94)	(-1.14)	(-8.35)	(-6.36)	(-0.51)	(-8.15)
$lndollar$				-0.0007	-0.0001	-0.0019
				(-1.92)	(-0.16)	(-3.36)
Issue/Size				0.0540	0.2804	-0.2492
				(0.82)	(2.99)	(-2.74)
Jandum				0.0060	-0.0112	0.027
				(3.35)	(-4.37)	(10.98)

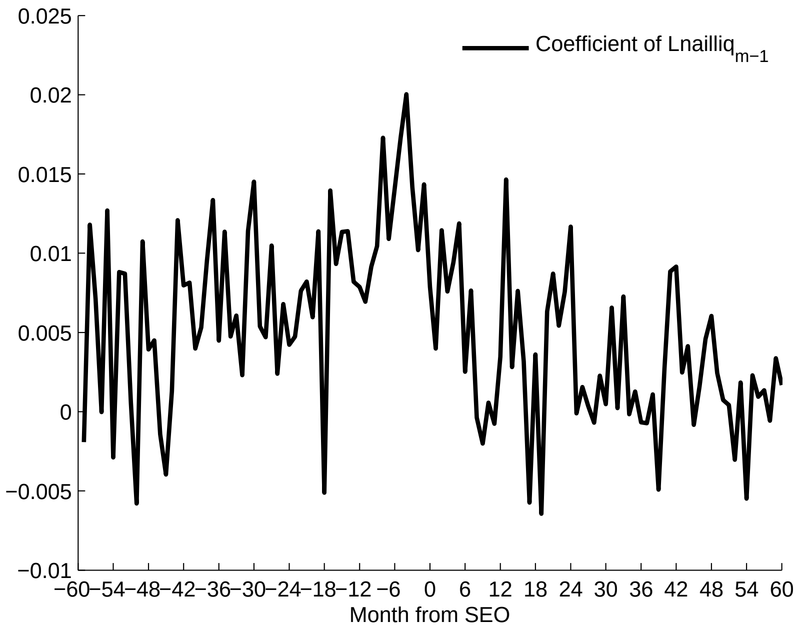
Panel B: NASDAQ						
Variable	1980-2006	1980-1997	1998-2006	1980-2006	1980-1997	1998-2006
Intercept	0.0238	0.0257	0.0224	-0.1027	-0.0956	-0.0546
	(18.82)	(11.35)	(14.79)	(-11.36)	(-6.05)	(-4.45)
Beta	-0.0055	0.0044	-0.0102	-0.0099	0.0015	-0.0125
	(-6.65)	(2.63)	(-10.59)	(-11.24)	(0.9)	(-12.08)
$cLevelMean$	0.0402	-0.0219	0.0688	0.0371	-0.0185	0.0648
	(8.54)	(-2.81)	(11.98)	(7.87)	(-2.37)	(11.2)
z	-0.0141	-0.0511	0.0044	-0.0188	-0.0515	-0.003
	(-7.76)	(-21.04)	(1.87)	(-10.31)	(-21.19)	(-1.25)
$lndollar$				0.0073	0.0071	0.0044
				(13.9)	(7.51)	(6.23)
Issue/Size				-0.0068	0.0487	0.0006
				(-0.32)	(0.47)	(0.02)
Jandum				0.0501	0.0457	0.0484
				(24.73)	(14.86)	(11.39)
Panel C: AMEX						
Variable	1980-2006	1980-1997	1998-2006	1980-2006	1980-1997	1998-2006
Intercept	0.0258	0.0222	0.027	-0.0179	0.0053	-0.0400
	(9.00)	(5.66)	(5.92)	(-1.09)	(0.25)	(-1.31)
Beta	-0.0069	0.0005	-0.0144	-0.0069	0.0015	-0.0157
	(-3.12)	(0.16)	(-3.82)	(-3.11)	(0.52)	(-4.1)
$cLevelMean$	0.0065	-0.0309	0.0525	0.0067	-0.0257	0.046
	(0.39)	(-1.45)	(1.94)	(0.40)	(-1.21)	(1.68)
z	-0.0124	-0.0136	-0.0098	-0.0162	-0.0166	-0.0172
	(-3.25)	(-3.27)	(-1.31)	(-4.25)	(-4.00)	(-2.27)
$lndollar$				0.0024	0.0006	0.0038
				(2.49)	(0.43)	(2.16)
Issue/Size				0.1109	0.7879	0.0711
				(2.93)	(5.62)	(1.56)
Jandum				0.0449	0.047	0.0421
				(11.01)	(10.2)	(5.56)



This figure presents the coefficients from the monthly cross-sectional regression of NYSE stock return on the variable $LnAilliq_{m-1}$ on respective months during SEO period, i.e. M=-60, -59,...,0,1,2,...,59,60. The following figure presents the t value of the estimation result.

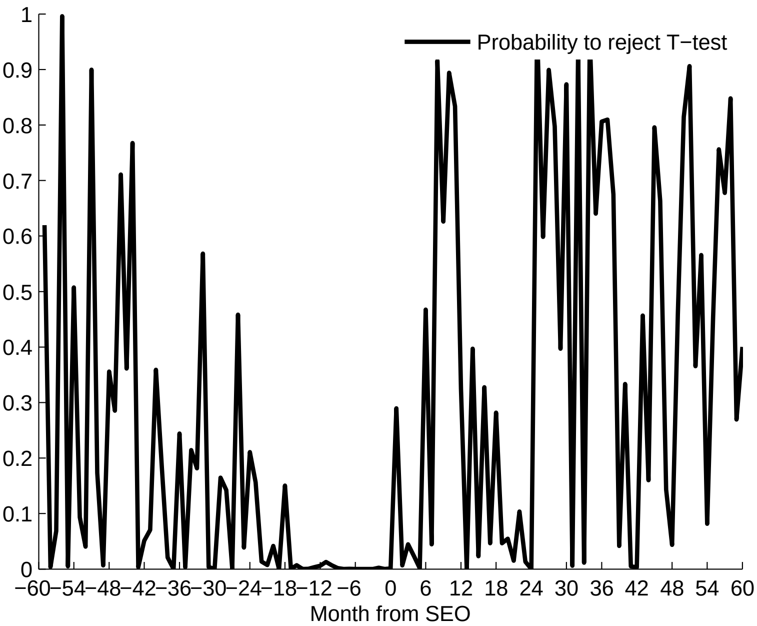
Figure 4.7: Expected Liquidity impact around SEO period–NYSE

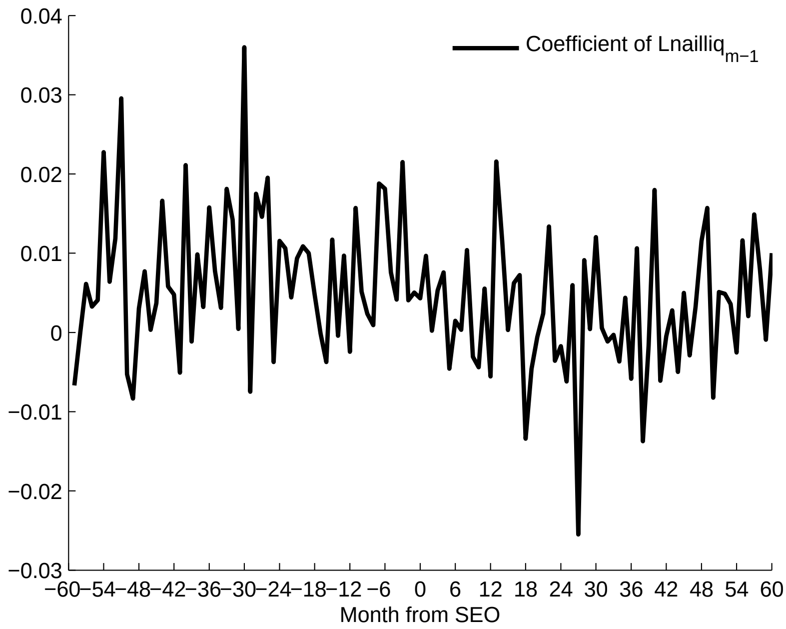




This figure presents the coefficients from the monthly cross-sectional regression of NASDAQ stock return on the variable $LnAilliq_{m-1}$ on respective months during SEO period, i.e. M=-60, -59,...,0,1,2,...,59,60. The following figure presents the t value of the estimation result.

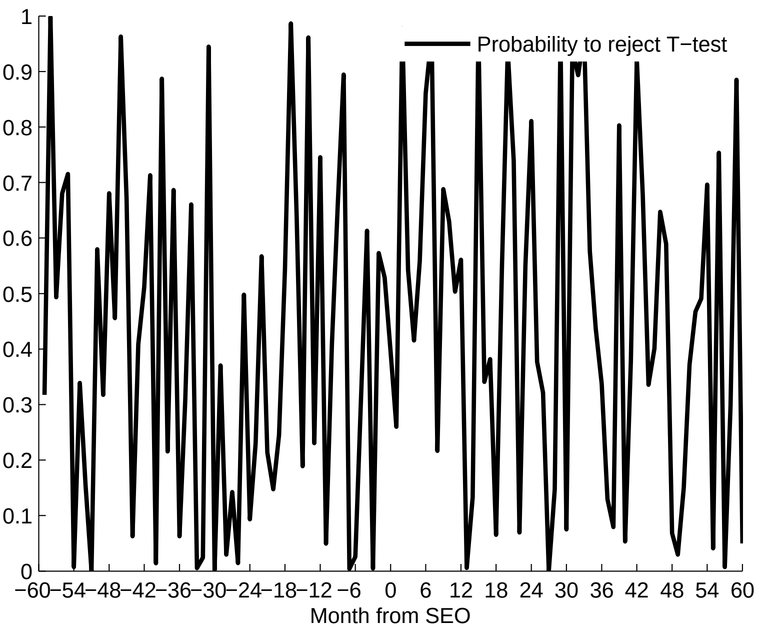
Figure 4.8: Expected Liquidity impact around SEO period–NASDAQ





This figure presents the coefficients from the monthly cross-sectional regression of AMEX stock return on the variable $LnAilliq_{m-1}$ on respective months during SEO period, i.e. M=-60, -59,...,0,1,2,...,59,60. The following figure presents the t value of the estimation result.

Figure 4.9: Expected Liquidity impact around SEO period–AMEX



4.1.1 Liquidity measure

The proposition here is that over time, expected illiquidity positively affects expected stock return premium(the stock return in excess of Treasury bill rate). This is consistent with the positive cross-sectional relationship between stock excess return and illiquidity. If investors anticipate higher market illiquidity, they will price stocks so that they generate higher expected return. This suggests that stock excess return, traditionally interpreted as "risk premium" includes a premium for illiquidity. Indeed, stocks are not only riskier, but are also less liquid than short-term Treasury securities. First, both the bid-ask spread and the brokerage fees are much higher on stocks than they are on Treasury securities. That is, illiquidity costs are greater for stocks. Second, the size of transactions in the Treasury securities market is greater: investors can trade very large amounts (tens of millions of dollars) of bills and notes without price impact, but block transactions in stocks result in price impact that implies high illiquidity costs. It thus stands to reason that the expected return on stocks in excess of the yield on Treasury securities should be considered as compensation for illiquidity, in addition to its standard interpretation as compensation for risk.

In our method, we test the effect of illiquidity in terms of two aspects: 1, the expected illiquidity and 2, the unexpected illiquidity. Using the methodology mentioned in Chapter Three, we decompose the illiquidity into the expected illiquidity and unexpected illiquidity. From the calculation, we find the expected illiquidity, $\ln ailliq_{m-1}$, that varies over the time and the unexpected illiquidity, $\ln Uailliqm$, is relatively constant over the time. Thus we can propose that, it is the expected illiquidity that affect the stock expected return, and such expectation is realized during the SEO period.

From Table 4.1, we find the coefficients of expected illiquidity and unexpected illiquidity are all positive. Since the unexpected illiquidity, $\ln Uailliqm$, is relatively constant over the SEO period, we regard it as a stochastic noise of the expected illiquidity. Because of that, the coefficient of the unexpected illiquidity has the same sign as the coefficient of expected illiquidity, which is positive. And the positive relation between the expected illiquidity and the stock excess return is reconfirmed. The coefficient remains positive and significant in the whole sample and the two subsamples. We divide the sample before and after the year 1997, because the new regulation drastically changed the way the Nasdaq handles orders. An interesting finding is that, before 1997, the coefficient of the expected illiquidity is negative and insignificant for Nasdaq sample, while after 1997, it becomes positive and significant. We assume that, the new regulation affected the relation between illiquidity and stock return on Nasdaq. The trading cost on Nasdaq is much less after the 1997 reform and the relation pattern of illiquidity and stock return becomes more similar as that on the NYSE.

The coefficient of the liquidity measure on Nasdaq is about twice bigger as the NYSE. It's also in accordance with the microstructure difference between the two markets. Nasdaq, as a market maker driven market, the stock return is driven by the market maker and the liquidity level tends to be artificially driven by them.

Moveover, we also include other liquidity measure to verify our hypothesis of the relation between the stock return and the stock liquidity during the SEO period. We choose the "Effective Spread" (variable $cLevelMean$) and "Trading Cost Innovation" (variable z) which are the results from the Bayesian estimation using the Gibbs sampler.[1] $cLevelMean$ can be the proxy of the expected illiquidity, which is regarded as a drift of trading cost for an individual stock. z can be the proxy of the unexpected illiquidity as it is estimated as a latent factor, an measure of innovation, common to effective trading costs for all stocks. We get the estimated variables from Hasbrouck's website. The measures are computed from daily data, and compiled for each stock on an annual basis. Therefore, it is an alternative way to test the pattern of the stock return and liquidity we proposed before. The regression results are presented in Table 4.2. It implies the Gibbs liquidity estimates have the similar relation with

[1]The construction of the liquidity measure is described in detail in Hasbrouck (2006) and in documents on Hasbrouck's website.

the stock return as the Amihud's illiquidity measures.

4.1.2 Control Variables

We include beta in the regression in Table 4.1, Beta on NYSE is positive and significant, as expected. Moreover, it becomes bigger and more significant when other control variables are included. The beta effect is stronger for the period 1980-1997 and then drops a little bit recently.

The beta effect is negative on Nasdaq and AMEX, surprisingly, which is insignificant for Nasdaq and significant for the overall sample regression on AMEX. It is believe that, the beta risk is not reflected during the SEO period, at least, not a primary explanation, which is also presented by Loughran and Ritter (1995). In another aspect, as proposed by Miller (1977), under the scarce short selling condition (which is the case for Nasdaq and AMEX), the high beta stocks have the more diversity of opinion or the uncertainty. The uncertainty is lowered as the seasoned equity offering, the stocks become less risky, then their prices should drop. This may explain the negative beta on the Nasdaq and AMEX during the SEO period.

The coefficient of $\ln dollar$ is positive and significant, which implies that the more the dollar volume of the issue, the higher will be the stock excess return. The result is constant for the three exchanges. Issue/Size has the negative sign, implies that the more equity issue relative to the company capitalization, the less will be the stock return. However, this result is not significant for AMEX. January dummy is generally positive for the three exchanges. An exception is that, after 1998, the January dummy on NYSE becomes negative and marginally significant.

Figure 4.7 to 4.9 present the result of the estimated liquidity coefficient. We did cross-sectional regression for every month, $m = -60, -59, ..., -1, 0, 1, ..., 59, 60$. The expected illiquidity affect the stock return extensively and significantly from $m = -10$ to $m = 0$ for NYSE and from $m = -20$ to $m = 5$ for Nasdaq. AMEX does not have the similar significance. And from the t-test result for the coefficients of unexpected illiquidity, only the Nasdaq sample has a period of significant impact.

4.1.3 The size effect of illiquidity

The effect of market illiquidity on stock return over time varies between stocks by their level of liquidity. In most cases, the liquidity level is highly correlated with the company size. In an extreme case of a rise in illiquidity during the October 1987 crash there was a "flight to liquidity": that were more liquid stocks declined less in value, after controlling for the market effect and the stocks' beta coefficients (see Amihud et al., 1990). This suggests the existence of two effects on stock return when expected market illiquidity rises:

(a) A decline in stock price and a rise in expected return, common to all stocks.

(b) Substitution from less liquid to more liquid stocks ("flight to liquidity").

For low-liquidity stocks the two effects are complementary, both affecting stock returns in the same direction. However, for liquid stocks the two effects work in opposite directions. Unexpected rise in market illiquidity, which negatively affects stock prices, also increases the relative demand for liquid stocks and mitigates their price decline. And, while higher expected market illiquidity makes investors demand higher expected return on stocks, it makes liquid stocks relatively more attractive, thus weakening the effect of expected illiquidity on their expected return.

As a result, small, illiquid stocks should experience stronger effects of market illiquidity factor greater positive effect of expected illiquidity on ex ante return and a more negative effect of unexpected illiquidity on contemporaneous return. For large in capitalization, liquid stocks both effects should be weaker, because these stocks become relatively more attractive in times of dire liquidity. This hypothesis is tested by estimating model (3.7) using returns on size-based portfolio. In addition, the size variance of the three exchanges should be considered. NYSE sample has the biggest size variance, Nasdaq's is smaller and AMEX companies are almost all the small companies.

Table 4.3 presents the regression result of 10 sized portfolios, which is consistent with the previous hypothesis. For the NYSE sample, the coefficient of the expected illiquidity declines almost monotonically in size (see Figure 4.10). The difference between the biggest size group and the smallest size group is significant. The coefficient of the unexpected illiquidity rises in size, which implies that the big size firm suffers more from unexpected illiquidity shock. The January abnormality affects less the big companies compared than the small companies.

For Nasdaq companies, the size variance among the companies is not that big as the NYSE companies (see Figure 4.10), although the coefficient of expected illiquidity is slightly increasing in size, which is different from the result of NYSE. Thus, it's confirmed that NYSE is suitable for trading the large stocks and Nasdaq for the small ones. Evidence reflects that the illiquidity cost is relative small for the large stocks on NYSE and small stocks on Nasdaq. The coefficient of unexpected illiquidity rises in size significantly, which is in accordance with the result of NYSE. The coefficient of relative issuesize is negative and decreasing in size, implies that the big companies tend to be affected more from the big issue.

Table 4.3: **The size-based effect of illiquidity on stock excess return-monthly data**

This table presents the coefficients from the monthly cross-sectional regression of stock return on the respective variables on 10 size-portfolios. The estimation period is 1980-2006. Beta is the slope coefficient from a 2 year time-series regression of daily return on the market return (equally weighted). The stock's Beta is calculated based on the daily return of previous 24 months and market return. The illiquidity measure $LnAilliq$ is the logarithm of the daily stock $Ailliq$, which is calculated as the daily absolute stock return divided by the daily dollar volume of the stock. The measure follows Amihud's (2002) model. Ln $Uailliq$ is the unexpected illiquidity, the residual from an autoregressive model of $LnAilliq$. $lndollar$ is the dollar issue volume of the seasoned equity offering. Issuesize is the ratio of the dollar issue volume to the stock book value before the offering. Jandum is the January dummy. Jandum=1, if it is January, otherwise, Jandum=0. T-statistics are in parentheses and the F-test probabilities to accept the null hypnosis are in brackets.

Panel A: NYSE											
	Size-based portfolios										
Variables	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	-0.1506	-0.0270	-0.0277	-0.0132	-0.0142	0.0619	0.1159	0.0246	0.0629	-0.0361	-
	(-1.30)	(-0.36)	(-0.45)	(-0.19)	(-0.26)	(1.15)	(2.63)	(0.83)	(2.69)	(-1.84)	-
$LnAilliq_{m-1}$	0.0189	0.0149	0.0107	0.0144	0.0103	0.0089	0.0074	0.0052	0.0055	0.0081	-0.0108
	(1.77)	(4.81)	(4.47)	(6.36)	(5.86)	(5.82)	(5.66)	(4.53)	(5.51)	(9.02)	[<0.001]
$LnUailliq_m$	-0.0173	0.0073	0.0054	0.0032	0.0026	0.0058	0.0153	0.0122	0.0147	0.0279	0.0452
	(-1.82)	(1.13)	(1.33)	(0.85)	(0.83)	(2.02)	(4.73)	(4.8)	(6.34)	(12.27)	[0.2113]
$lndollar$	0.0067	-0.0004	0.0011	0.0006	0.0010	-0.0024	-0.0062	-0.0007	-0.0023	-0.0040	0.0107
	(1.05)	(-0.09)	(0.31)	(0.14)	(0.33)	(-0.79)	(-2.44)	(-0.4)	(-1.74)	(-3.57)	[0.8330]
Issue/Size	-0.2543	0.2420	-0.1089	0.2025	-0.0729	1.1692	5.3697	2.0445	3.1480	4.9809	5.2352
	(-1.23)	(0.54)	(-0.26)	(0.26)	(-0.09)	(1.13)	(3.58)	(1.8)	(2.65)	(3.25)	[0.0023]
Jandum	0.1155	0.0640	0.0317	0.0150	0.0120	0.0014	-0.0105	-0.0022	-0.0023	-0.0031	-0.1186
	(4.96)	(5.54)	(3.75)	(1.8)	(1.72)	(0.24)	(-2.29)	(-0.57)	(-0.69)	(-1.02)	[<0.001]
Beta	0.0301	0.0039	0.0096	0.0089	0.0110	-0.0031	0.0077	0.0066	0.0031	0.0048	-0.0253
	(2.18)	(0.48)	(1.58)	(1.55)	(2.28)	(-0.76)	(2.29)	(2.39)	(1.36)	(3.19)	[0.3527]
M	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(-2.71)	(-2.03)	(-2.22)	(-0.49)	(-1.88)	(-0.49)	(-0.83)	(0.57)	(1.25)	(3.79)	[<0.001]

Panel B: NASDQ											
	Size-based portfolios										
Variables	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	-0.2387	-0.1370	-0.0910	-0.1961	-0.2237	-0.1258	-0.1165	-0.0660	0.0290	-0.1175	-
	(-7.83)	(-3.64)	(-2.11)	(-4.2)	(-4.41)	(-2.38)	(-2.22)	(-1.11)	(0.45)	(-1.98)	-
$LnAilliq_{m-1}$	0.0098	0.0133	0.0113	0.0128	0.0157	0.0147	0.0159	0.0144	0.0127	0.0135	0.0131
	(8.82)	(12.83)	(10.81)	(11.4)	(13.12)	(11.13)	(10.21)	(8.59)	(6.33)	(5.56)	[0.0826]
$LnUailliq_m$	0.0048	0.0058	0.0065	0.0124	0.0164	0.0166	0.0292	0.0379	0.0422	0.0607	0.0559
	(3.02)	(3.18)	(3.72)	(6.28)	(7.05)	(7.23)	(8.88)	(9.54)	(8.47)	(9.20)	[$<$0.0001]
$lndollar$	0.0121	0.0070	0.0052	0.0117	0.0137	0.0091	0.0087	0.0059	0.0012	0.0100	-0.0021
	(6.72)	(3.09)	(2.02)	(4.28)	(4.66)	(2.98)	(2.91)	(1.76)	(0.33)	(2.93)	[0.0126]
Issue/Size	-0.0520	-0.2319	0.3271	-0.4039	-1.6836	-0.2211	-1.3281	-0.7577	2.5912	-9.0759	-9.0239
	(-1.86)	(-1.15)	(1)	(-0.89)	(-2.57)	(-0.24)	(-1.34)	(-0.47)	(1.09)	(-2.27)	[0.0072]
Jandum	0.1035	0.0699	0.0435	0.0397	0.0339	0.0121	0.0203	0.0060	0.0192	0.0177	-0.0858
	(15.63)	(13.27)	(8.47)	(7.65)	(6.56)	(2.32)	(3.59)	(1.05)	(2.79)	(2.16)	[$<$0.0001]
Beta	0.0017	-0.0052	-0.0049	-0.0026	-0.0003	-0.0109	-0.0030	0.0000	-0.0055	-0.0037	-0.0054
	(0.58)	(-2)	(-1.89)	(-0.96)	(-0.13)	(-4.34)	(-1.16)	(0.01)	(-1.81)	(-1.07)	[0.1385]
M	-0.2387	-0.1370	-0.0910	-0.1961	-0.2237	-0.1258	-0.1165	-0.0660	0.0290	-0.1175	0.1212
	(-7.83)	(-3.64)	(-2.11)	(-4.2)	(-4.41)	(-2.38)	(-2.22)	(-1.11)	(0.45)	(-1.98)	[0.1582]

Panel C: AMEX											
	Size-based portfolios										
Variables	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	-0.1246	-0.0490	0.0657	-0.0092	-0.1259	-0.0612	0.0593	-0.2476	0.3302	0.0293	-
	(-2.48)	(-0.74)	(0.85)	(-0.1)	(-1.06)	(-0.39)	(0.3)	(-1.36)	(2.31)	(0.18)	-
$LnAilliqm-1$	0.0104	0.0106	0.0103	0.0038	0.0061	0.0045	0.0081	0.0087	0.0011	0.0056	-0.0048
	(6.65)	(5.04)	(4.17)	(1.41)	(2.4)	(1.47)	(2.06)	(2.22)	(0.32)	(0.78)	[0.4327]
$LnUailliq_m$	0.0057	0.0044	0.0005	-0.0050	0.0010	0.0199	0.0190	0.0042	0.0130	0.0143	0.0086
	(2.25)	(1.39)	(0.08)	(-1.03)	(0.3)	(2.53)	(1.85)	(0.41)	(1.45)	(0.86)	[0.8322]
$lndollar$	0.0059	0.0019	-0.0045	0.0020	0.0089	0.0043	-0.0021	0.0168	-0.0176	0.0013	-0.0046
	(1.94)	(0.47)	(-0.95)	(0.38)	(1.25)	(0.47)	(-0.18)	(1.58)	(-2.16)	(0.13)	[0.7132]
Issue/Size	-0.0014	-0.1599	1.8037	-0.1285	-3.9015	4.7896	7.6282	-10.7253	19.3616	3.9037	3.9051
	(-0.03)	(-0.34)	(2.12)	(-0.08)	(-1.35)	(1.02)	(0.89)	(-1.12)	(2.04)	(0.27)	[0.9523]
Jandum	0.0869	0.0564	0.0203	0.0122	0.0256	-0.0069	0.0238	-0.0142	0.0342	0.0160	-0.0709
	(9.56)	(5.9)	(2.01)	(1.14)	(2.21)	(-0.52)	(1.58)	(-0.97)	(2.7)	(0.68)	[0.1334]
Beta	-0.0055	0.0014	-0.0004	-0.0114	-0.0073	-0.0151	-0.0168	-0.0136	-0.0115	-0.0231	-0.0176
	(-1.3)	(0.27)	(-0.06)	(-1.8)	(-0.98)	(-1.85)	(-1.83)	(-1.59)	(-1.49)	(-1.41)	[0.162]
M	-0.1246	-0.0490	0.0657	-0.0092	-0.1259	-0.0612	0.0593	-0.2476	0.3302	0.0293	0.1539
	(-2.48)	(-0.74)	(0.85)	(-0.1)	(-1.06)	(-0.39)	(0.3)	(-1.36)	(2.31)	(0.18)	[0.6962]

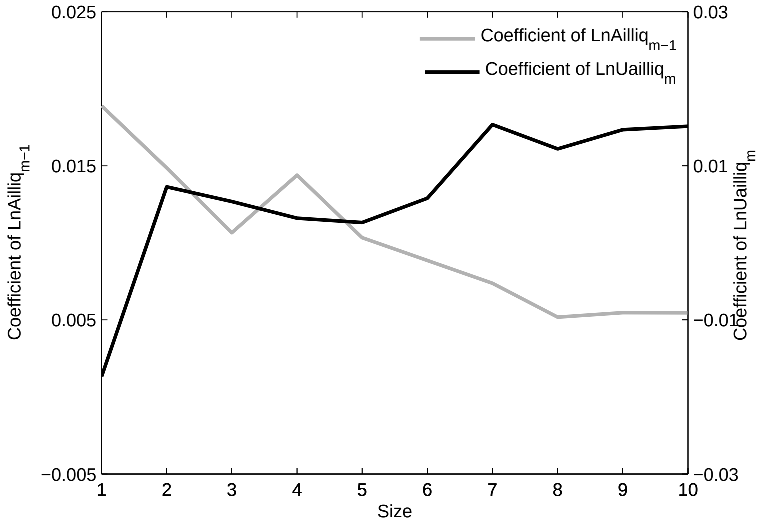


Figure 4.10: The trend of Liquidity Impact-NYSE

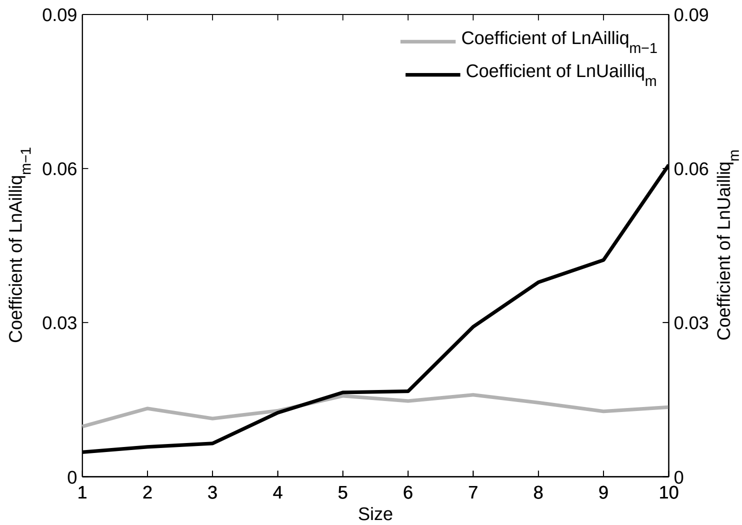


Figure 4.11: The trend of Liquidity Impact-NASDAQ

Furthermore, we look into several intervals of SEO period for the sample on Nasdaq.[2] For the period of $m = -60$ to 41, $m = -40$ to -21, $m = -20$ to -1 and $m = 0$ to 19, the unexpected illiquidity impact is increasing in size. This trend still

[2]the 10-month-interval result is not presented because of limitation of the space

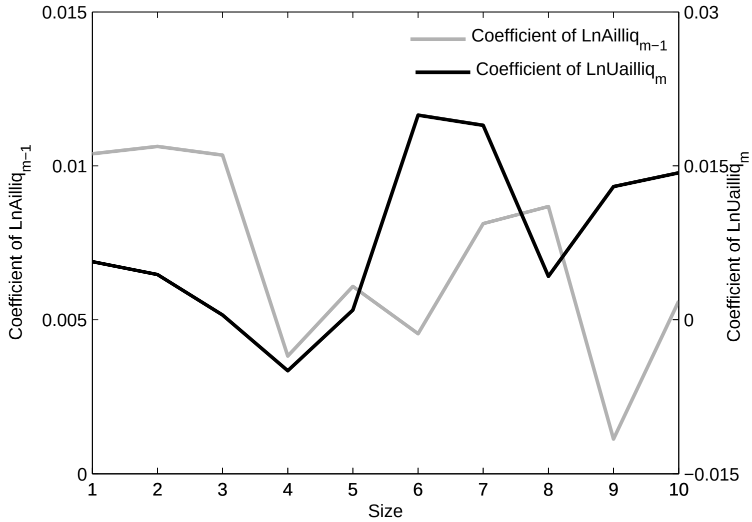


Figure 4.12: The trend of Liquidity Impact-AMEX

remains strong in the period of $m = 20$ to 39, and becomes vague after $m = 40$. The result confirms that the impact of the expected illiquidity does not vary too much as size grows. In contrast, the unexpected illiquidity impact grows significantly as the increasing size. In another word, those big firms, usually regarded as liquid stocks, and their information asymmetry level is thought to be low. However, they are more vulnerable when there's unexpected illiquidity shock or the valuation change during SEO period.

Table 4.4 presents the regression result of 10 relative issuesize-based portfolios. Companies issue great amount of stocks tend to suffer more from the expected illiquidity but less from the unexpected illiquidity. We can infer that there is stronger information conveyed to the investors through a large volume of issuing. The offering lowers the information asymmetry of the firms and makes their return more predictable by means of affecting their liquidity levels. The trend is also significant on Nasdaq while not for AMEX.

In addition, there is also an interesting phenomenon when we look into several intervals of SEO period for the sample on Nasdaq.[3] After the SEO announcement, the issuesize is related with the extent of illiquidity impact. The expected illiquidity impact increases as the issuesize grows, which implies that more information is released through the relative big volume of equity offering. In another aspect, the unexpected illiquidity impact decrease as the size grows. An explanation is that, when a large volume of equity is issued, the ex ante illiquidity should be low. And then a certain unexpected illiquidity shock affects the liquid stock less, which is called the "flight to liquidity". When there's an illiquidity shock on the market, the small size company suffers more and the big company stock is more favored by the investors. Therefore, the mixed effect makes the companies which just increased their capitalization more favored under the uncertain market condition.

[3]the result including a series of figures is not presented because of limitation of the space

Table 4.4: **The issuesize-based effect of illiquidity on stock excess return-monthly data**

This table presents the coefficients from the monthly cross-sectional regression of stock return on the respective variables on 10 issuesize-portfolios. The estimation period is 1980-2006. Beta is the slope coefficient from a 2 year time-series regression of daily return on the market return (equally weighted). The stock's Beta is calculated based on the daily return of previous 24 months and market return. The illiquidity measure Ln Ailliq is the logarithm of the daily stock Ailliq, which is calculated as the daily absolute stock return divided by the daily dollar volume of the stock. Ln Uailliq is the unexpected illiquidity, the residual from an autoregressive model of Ln Ailliq. Lndollar is the dollar issue volume of the seasoned equity offering. Issuesize is the ratio of the dollar issue volume to the stock book value before the offering. Jandum is the January dummy. Jandum=1, if it is January, otherwise, Jandum=0. Size is the market size of the stock, which is natural log scaled. M is the number of months from SEO month. T-statistics are in parentheses and the F-test probabilities to accept the null hypnosis are in brackets.

Panel A: NYSE											
	IssueSize-based portfolios										
Variables	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	0.0020	-0.1115	-0.1323	-0.1374	-0.1045	-0.2087	-0.3136	-0.2259	-0.3220	-0.1858	-
	(0.10)	(-2.77)	(-3.48)	(-3.05)	(-2.32)	(-4.26)	(-6.21)	(-4.18)	(-5.42)	(-3.00)	-
$LnAilliq_{m-1}$	0.0044	0.0055	0.0062	0.0067	0.0048	0.0080	0.0105	0.0079	0.0091	0.0062	0.0018
	(4.02)	(3.84)	(5.1)	(4.86)	(3.51)	(5.48)	(7.02)	(5.24)	(5.94)	(4.08)	[0.0377]
$LnUailliq_m$	0.0109	0.0085	0.0086	0.0076	0.0155	0.0150	0.0034	0.0079	0.0061	0.0029	-0.008
	(4.6)	(3.33)	(3.7)	(2.85)	(4.55)	(4.37)	(1.23)	(2.33)	(1.85)	(0.74)	[0.0404]
$lndollar$	0.0013	0.0074	0.0085	0.0086	0.0065	0.0124	0.0184	0.0127	0.0181	0.0098	0.0085
	(1.08)	(3.08)	(3.83)	(3.31)	(2.53)	(4.43)	(6.48)	(4.25)	(5.59)	(2.96)	[0.000]
Jandum	0.0064	0.0071	-0.0043	-0.0001	0.0019	-0.0042	-0.0076	0.0025	-0.0015	0.0497	0.0433
	(1.62)	(1.72)	(-1.04)	(-0.02)	(0.43)	(-0.91)	(-1.51)	(0.47)	(-0.25)	(6.1)	[<0.0001]
Beta	0.0022	0.0051	0.0071	0.0073	0.0024	0.0042	0.0049	0.0114	0.0069	0.0058	0.0036
	(0.65)	(1.73)	(2.34)	(2.2)	(0.76)	(1.28)	(1.39)	(3.01)	(1.73)	(1.24)	[0.5961]
M	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	-0.0001	-0.0001	-0.0003	-0.0003
	(1.09)	(2.17)	(1.51)	(1.35)	(1.55)	(1.68)	(0.33)	(-1.53)	(-2.77)	(-4.93)	[<0.0001]

Panel B: NASDQ											
	IssueSize-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	-0.1689	-0.3374	-0.4234	-0.5432	-0.5274	-0.5234	-0.6592	-0.6148	-0.6002	-0.5390	-
	(-5.36)	(-7.32)	(-9.24)	(-11.47)	(-10.98)	(-10.81)	(-13.61)	(-11.93)	(-10.89)	(-8.92)	-
$LnAilliq_{m-1}$	0.0060	0.0098	0.0126	0.0139	0.0132	0.0148	0.0154	0.0138	0.0131	0.0165	0.0105
	(4.97)	(7.26)	(9.89)	(10.89)	(10.55)	(11.74)	(12.91)	(11.19)	(10.18)	(11.32)	[0.0159]
$LnUailliq_m$	0.0146	0.0205	0.0180	0.0217	0.0158	0.0122	0.0152	0.0107	0.0074	0.0050	-0.096
	(6.15)	(8.04)	(6.75)	(8.47)	(7.96)	(4.72)	(7.52)	(5.16)	(3.48)	(2.38)	[0.0159]
$lndollar$	0.0112	0.0208	0.0252	0.0316	0.0307	0.0306	0.0376	0.0346	0.0332	0.0279	0.0167
	(5.89)	(7.63)	(9.43)	(11.55)	(11.12)	(11.1)	(13.73)	(11.95)	(10.92)	(8.53)	[0.0421]
Jandum	0.0203	0.0167	0.0191	0.0217	0.0307	0.0220	0.0457	0.0512	0.0680	0.1272	0.1069
	(3.95)	(3.31)	(3.95)	(4.22)	(5.7)	(4.11)	(8.22)	(8.52)	(10.5)	(14.91)	[¡0.0001]
Beta	-0.0021	-0.0032	0.0010	-0.0005	-0.0052	-0.0100	-0.0052	0.0013	-0.0025	-0.0046	-0.0025
	(-0.83)	(-1.3)	(0.39)	(-0.19)	(-1.97)	(-3.8)	(-1.92)	(0.47)	(-0.85)	(-1.31)	[0.2421]
M	0.0001	0.0000	0.0000	0.0001	-0.0001	-0.0001	-0.0001	-0.0002	-0.0001	-0.0002	-0.0003
	(1.45)	(-0.89)	(0.53)	(1.59)	(-1.48)	(-2.55)	(-1.08)	(-3.15)	(-2.58)	(-3.05)	[0.0001]

Panel C: AMEX											
	IssueSize-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	-0.1524	-0.0170	-0.1617	-0.1387	-0.3163	-0.3594	-0.3251	-0.1898	-0.0484	-0.1372	-
	(-2.5)	(-0.22)	(-1.97)	(-1.53)	(-3.37)	(-3.45)	(-3.29)	(-1.76)	(-0.37)	(-1.06)	-
$LnAilliq_{m-1}$	0.0063	0.0039	0.0064	0.0065	0.0096	0.0091	0.0106	0.0099	0.0097	0.0136	0.0073
	(2.64)	(1.59)	(2.47)	(2.4)	(3.7)	(3.16)	(3.48)	(3.37)	(3.19)	(4.35)	[0.1423]
$LnUailliq_m$	0.0107	-0.0008	0.0006	0.0011	0.0056	0.0061	0.0029	0.0088	-0.0025	0.0094	-0.0013
	(1.71)	(-0.25)	(0.12)	(0.24)	(1.35)	(1.32)	(0.57)	(1.4)	(-0.45)	(2.32)	[0.9996]
$lndollar$	0.0105	0.0020	0.0106	0.0089	0.0182	0.0213	0.0185	0.0100	0.0017	0.0050	-0.0055
	(2.8)	(0.45)	(2.2)	(1.68)	(3.38)	(3.53)	(3.32)	(1.62)	(0.23)	(0.69)	[0.4127]
Jandum	0.0329	0.0100	0.0180	0.0376	0.0419	0.0268	0.0594	0.0684	0.0583	0.0748	0.0419
	(3.23)	(0.99)	(1.79)	(3.78)	(4.03)	(2.27)	(4.9)	(5.29)	(3.91)	(3.76)	[0.0613]
Beta	-0.0117	-0.0014	-0.0067	-0.0097	-0.0001	-0.0062	0.0007	-0.0053	-0.0010	-0.0089	0.0028
	(-1.69)	(-0.23)	(-1.15)	(-1.55)	(-0.02)	(-0.81)	(0.09)	(-0.78)	(-0.14)	(-1.22)	[0.9031]
M	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0002	-0.0002	-0.0001	-0.0004	-0.0003	-0.0003
	(-0.18)	(-0.39)	(-0.3)	(-0.32)	(0.23)	(-1.84)	(-1.76)	(-1.09)	(-3.15)	(-1.96)	[0.2050]

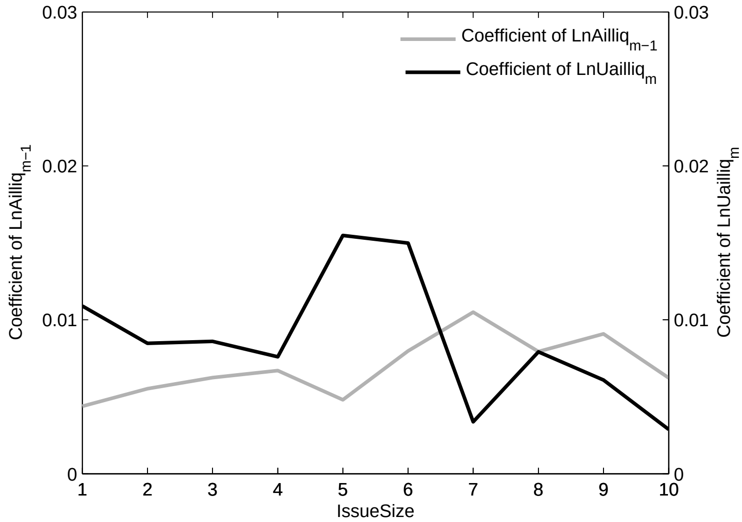


Figure 4.13: The Issue Size and Liquidity Impact-NYSE

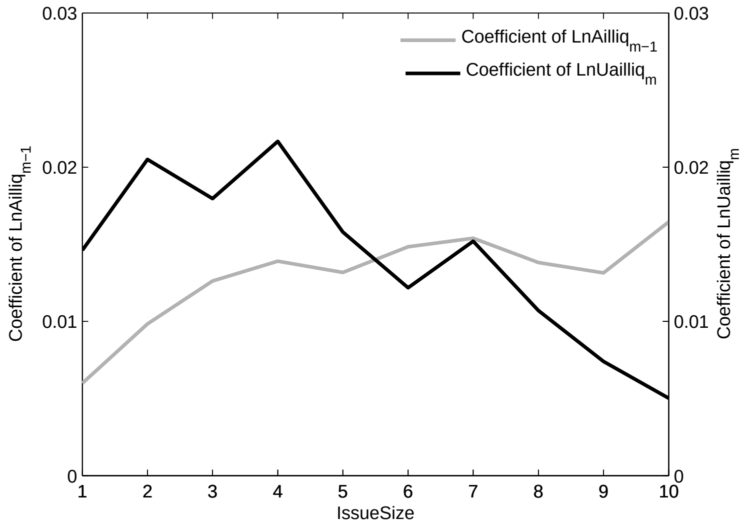


Figure 4.14: The Issue Size and Liquidity Impact-NASDAQ

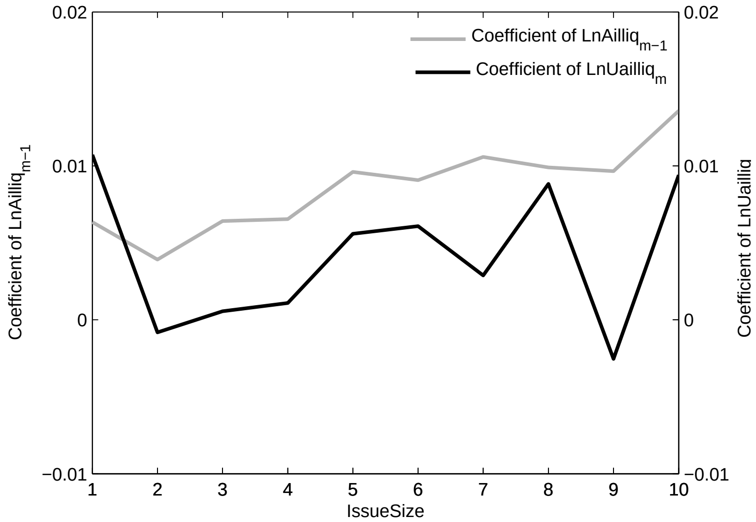


Figure 4.15: The Issue Size and Liquidity Impact-AMEX

4.2 Liquidity and capital structure

This section examines the relation between the change in leverage and liquidity using a battery of regression tests for alternate leverage and liquidity expressions. We follow these direct tests with tests of asymmetric information around the leverage recapitalization.

For all the empirical tests, we regress the Amihud's illiquidity on the commonly used variables that explain the cross-sectional variation in liquidity (Stoll 2000). This test is the OLS based test, principally stem from Stoll (2000) and include leverage change, volume, volatility, and operating performance. Inventory holding costs are proxied with price volatility, order processing costs are proxied by daily trading volume and asymmetric information costs are proxied by firm size.

In Table 4.5, $\ln cshtrq$ is the number of shares traded during the past quarter, which is log scaled. $Prcstd$ is the daily stock price standard deviation in one month. $TobinQ$ is defined as long term assets plus the difference between the market value of equity to the book value of equity divided by the book value of assets using the annual Compustat database measured in each of the pre and post SEO periods. ROA

is the measure of return of return of equity, which is the net income divided by total assets.

We also separate the firm listed on different exchange. This controls for the general information environment that presumably would be greater for NYSE/Amex firms than for NASDAQ firms.

Table 4.5: **Changes in the Capital Structure and the Impact of the Illiquidity-Monthly data**

We regress the illiquidity measure *Ailliq* on the corporate characteristics. The estimation period is 1980-2006. The capital structure measure is the estimation result from a regression using monthly variables, which are summarized from daily data. The measure is an estimate of the Kyle model's (1985). The capital structure measure is DTA, debt divided by the total asset. The control variables are *Lncshtrq*, *Prcstd*, TobinQ and ROA. *Lncshtrq* is the number of shares traded during the past quarter, which is log scaled. *Prcstd* is the daily stock price standard deviation in one month. TobinQ is defined as long term assets plus the difference between the market value of equity to the book value of equity divided by the book value of assets using the annual Compustat database measured in each of the pre and post SEO periods. ROA is the measure of return of return of equity, which is the net income divided by total assets. The first column shows the pooled regression result. Others are the regression result based on the 10 size portfolios. T-statistics are in parentheses and the F-test probabilities to accept the null hypnosis are in brackets.

Panel A: NYSE												
	Size-based portfolios											
Variable	Pooled	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	15.42	1001.15	43.47	22.69	17.79	19.23	8.68	5.31	1.14	-0.62	0.49	-
	(22.68)	(3.62)	(11.02)	(16.74)	(24.56)	(28.91)	(29.42)	(28.71)	(8.45)	(-4.28)	(13.42)	-
DTA	11.18	434.49	0.80	-0.78	-0.84	-0.46	0.21	0.11	0.06	-0.17	-0.07	-434.42
	(3.94)	(-4.87)	(0.57)	(-1.67)	(-2.92)	(-1.89)	(1.97)	(1.83)	(1.31)	(-4.21)	(-4.93)	[<0.001]
Lncshtrq	-0.9932	-93.3855	-2.4126	-1.2123	-1.0335	-1.3175	-0.5493	-0.3269	-0.0562	0.0550	-0.0239	93.312
	(-24.87)	(-4.59)	(-8.45)	(-12.56)	(-20.47)	(-29.05)	(-28.35)	(-26.93)	(-6.54)	(6.22)	(-11.64)	[0.0341]
Prcstd	97.04	13998.69	153.87	40.37	34.63	80.74	16.72	8.69	-0.49	-0.61	0.90	-13997
	(25.16)	(18.73)	(8.36)	(5.54)	(9.28)	(21.24)	(10.83)	(8.41)	(-0.65)	(-0.87)	(4.23)	[<0.001]
TobinQ	-0.0002	-0.1395	-0.0036	-0.0012	-0.0006	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.1396
	(-3.29)	(-1.44)	(-3.9)	(-5.11)	(-5.71)	(3.24)	(0.91)	(0.6)	(-0.78)	(-3.3)	(-4.19)	[0.1325]
ROA	-10.97	2176.45	-8.78	-6.11	-0.17	5.11	-0.10	-0.77	-0.71	-0.59	-0.25	-2176.7
	(-5.61)	(3.3)	(-0.94)	(-1.93)	(-0.11)	(3.18)	(-0.17)	(-1.92)	(-2.29)	(-1.84)	(-3.15)	[<0.001]

	Panel B: NASDQ											
		IssueSize-based portfolios										
Variable	Polled	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	80.56	343.66	135.29	74.69	36.84	18.07	8.19	3.98	0.72	1.36	0.22	-
	(9.64)	(7.67)	(49.91)	(55.22)	(52.22)	(32.51)	(43.41)	(21.03)	(3.01)	(5.01)	(5.54)	-
DTA	80.52	250.39	-3.45	2.29	0.64	0.74	0.10	0.39	0.58	0.35	0.02	-250.37
	(28.88)	(15.52)	(-3.61)	(5.77)	(3.43)	(5.45)	(2.36)	(9.05)	(10.11)	(5.8)	(2.09)	[<0.001]
Lncshtrq	-11.3738	-49.9300	-8.8682	-4.8893	-2.3114	-1.1455	-0.4925	-0.2473	-0.0524	-0.0862	-0.0119	49.9181
	(-22.3)	(-16.05)	(-48.15)	(-54.31)	(-50.43)	(-32.43)	(-42.26)	(-21.82)	(-3.72)	(-5.58)	(-5.73)	[<0.001]
Prcstd	2059.82	6126.72	361.50	136.14	46.71	29.23	9.30	6.73	2.42	2.75	0.18	-6126.54
	(64.42)	(53.46)	(33.88)	(26.41)	(17.98)	(14.72)	(14.76)	(11.23)	(3.32)	(3.47)	(1.61)	[<0.001]
TobinQ	-0.0006	0.0118	-0.0018	-0.0005	-0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.118
	(-3.8)	(1.93)	(-9.78)	(-7.13)	(-7.51)	(-2.81)	(-6.68)	(-1.55)	(1.17)	(-0.95)	(-0.35)	[0.1345]
ROA	96.92	291.35	-12.79	-2.59	-3.52	-2.05	-1.06	-0.76	-0.28	0.17	-0.01	-291.36
	(10.64)	(6.41)	(-5.09)	(-1.72)	(-4.51)	(-3.32)	(-5.16)	(-3.54)	(-1.41)	(0.57)	(-0.24)	[0.1722]

	Panel C: AMEX											
		IssueSize-based portfolios										
Variable	Polled	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	95.33	1003.62	108.45	57.03	52.13	23.93	13.81	5.67	2.93	1.16	0.31	-
	(3.38)	(7.29)	(15.32)	(12.18)	(11.19)	(16.8)	(16.72)	(7.69)	(8.4)	(25.15)	(22.32)	
DTA	192.60	113.94	-0.41	12.77	3.50	2.88	1.79	2.41	0.86	0.06	0.00	-113.94
	(23.08)	(2.75)	(-0.16)	(10.24)	(2.47)	(6.28)	(7.12)	(10.81)	(7.52)	(3.49)	(-0.62)	[0.2449]
Lncshtrq	-18.7522	-119.244	-8.0968	-4.5859	-3.8233	-1.7078	-0.9193	-0.4680	-0.2050	-0.0693	-0.0167	119.23
	(-10.32)	(-11.23)	(-15.11)	(-13.03)	(-11.65)	(-17.81)	(-17.14)	(-9.88)	(-9.79)	(-25.74)	(-22.75)	[0.2068]
Prcstd	3316.39	14487.8	504.85	273.97	200.51	52.31	11.31	39.00	6.29	1.59	0.29	-14487
	(26.47)	(36.98)	(16.08)	(10.77)	(7.5)	(6.91)	(3.68)	(11.18)	(3.47)	(6.49)	(5.54)	[0.0019]
TobinQ	-0.0006	-0.0335	-0.0012	0.0002	-0.0002	0.0005	0.0002	0.0000	0.0000	0.0000	0.0000	0.0335
	(-2.44)	(-1.85)	(-2.88)	(0.95)	(-1.34)	(9.89)	(8.92)	(-4.12)	(7.09)	(4.54)	(-6.65)	[0.1150]
ROA	35.9728	245.526	-35.490	0.4655	-9.9472	-6.5626	-6.4102	-3.2770	-0.5730	-0.0290	0.0075	-245.52
	(1.98)	(0.97)	(-3.73)	(0.2)	(-1.6)	(-3.41)	(-6.87)	(-2.69)	(-0.69)	(-0.29)	(3.31)	[0.4525]

As is shown in Table 4.5, the coefficient of DTA is positive and significant for the pooled regression. It confirms that higher leverage is associated with higher illiquidity. Univariate results show a consistent association between leverage and liquidity. Adding the control variables does not alter that finding. The results would indicate that, using debt-to-all assets coefficient of 11.18 as a base, for a 10% decrease in leverage (for example, changing from 30% to 20%) coupled with a $100,000 dollar volume transaction would lead to a 1.118 percent less on the absolute of return. This return impact is extremely significant for the small size companies. It can be explained that investors usually don't care about the capital structure change of the big companies. If the debt-to-all asset ratio increases for big companies, they usually do not penalize it, but still regard it as a stock of high quality. When some uncertainty happened on the market, they would still be the good resort of the extra money. It is the phenomenon that people just think those firms are too big to fall. The money invested in those companies is relatively safe, enjoying a high level of liquidity. In contrast, investors concern the capital structure of the small companies much more than the big companies. Even a small change of the debt will reflect on the stock liquidity.

The size effect is also significant for the estimator of price volatility and number of the trades. The big companies liquidity level is less affected by the price volatility and number of trades compared with the small companies. This result is constant across the three exchanges.

Table 4.6: **Changes in the Capital Structure and the Impact of the Illiquidity-Monthly data (using issuesize-based portfolios)**

We regress the illiquidity measure *Ailliq* on the corporate characteristics. The estimation period is 1980-2006. The capital structure measure is the estimation result from a regression using monthly variables, which are summarized from daily data. The measure is a estimate of the Kyle model;s (1985). The capital structure measure is DTA, debt divided by the total asset. The control variables are *Lncshtrq*, *Prcstd*, TobinQ and ROA. *Lncshtrq* is the number of shares traded during the past quarter, which is log scaled. *Prcstd* is the daily stock price standard deviation in one month. TobinQ is defined as long term assets plus the difference between the market value of equity to the book value of equity divided by the book value of assets using the annual Compustat database measured in each of the pre and post SEO periods. ROA is the measure of return of return of equity, which is the net income divided by total assets. The regression result is based on the 10 issuesize portfolios. Issuesize is the ratio of the SEO dollar volume to the book value of the corporate equity. T-statistics are in parentheses and the F-test probabilities to accept the null hypnosis are in brackets.

Panel A: NYSE											
	IssueSize-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	0.30	0.05	-0.01	-0.15	-4.23	-0.36	-2.28	3.10	13.96	66.78	-
	(-13.78)	(-4.9)	(-0.13)	(-25.09)	(-0.01)	(2.95)	(0)	(-0.92)	(35.51)	(12.41)	-
DTA	-0.0675	-0.0025	-0.0061	-0.1813	-0.3717	-2.9472	-0.5537	12.8368	0.4917	3.0429	3.1104
	(4.09)	(-1.16)	(-26.75)	(0.00)	(-0.59)	(0.00)	(5.08)	(1.11)	(3.47)	(1.38)	[0.0050]
Lncshtrq	-0.0135	-0.0004	-4.2584	-0.0778	5.3019	-3.4662	0.0001	-0.2286	-0.8107	-4.1671	-4.154
	(-5.74)	(10.07)	(0)	(-0.44)	(1.38)	(-0.58)	(0.56)	(-10.47)	(-33.02)	(-11.54)	[0.0717]
Prcstd	0.7218	-2.2007	25.9394	2.2576	-0.2910	0.2046	-0.3444	-0.0205	8.6153	246.9308	247.61
	(-8.76)	(-0.12)	(3.27)	(-0.39)	(0)	(-3.5)	(-2.57)	(-0.02)	(3.59)	(11.48)	[<0.001]
TobinQ	0.0000	28.4322	3.5969	0.6081	-1.3924	-0.0496	-0.0055	-0.0503	0.0000	-0.0018	-0.0018
	(-0.1)	(1.9)	(0.12)	(0)	(-2.67)	(-5.83)	(8.47)	(-3.68)	(-1.25)	(-2.11)	[<0.001]
ROA	26.28	2.69	-4.39	-2.03	-0.04	-0.01	21.67	0.00	-0.82	-20.91	-47.19
	(1.17)	(0.12)	(0)	(-0.25)	(-5.19)	(2.17)	(-2.75)	(-0.54)	(-1.21)	(-1.74)	[<0.001]

Panel B: NASDQ											
	IssueSize-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	132.58	8.21	13.57	41.74	51.47	76.60	156.70	192.75	313.97	371.89	-
	(18.2)	(19.53)	(22.08)	(17.45)	(21.27)	(21.73)	(9.84)	(22.07)	(19.79)	(5.79)	-
DTA	15.31	-0.24	0.34	2.95	2.89	5.57	9.18	1.69	-13.24	363.15	347.84
	(6.36)	(-2.03)	(1.83)	(3.84)	(3.73)	(4.78)	(1.82)	(0.6)	(-2.75)	(19.28)	[<0.0001]
Lncshtrq	-8.9285	-0.4689	-0.8295	-2.7366	-3.3479	-5.3388	-12.2166	-14.0553	-21.4946	-54.8114	-45.8829
	(-21.31)	(-18.93)	(-22.57)	(-19.05)	(-22.94)	(-24.27)	(-12.15)	(-25.24)	(-20.35)	(-12.43)	[<0.0001]
Prcstd	545.25	12.78	31.28	131.22	148.11	333.15	1,119.78	930.31	968.10	5,656.42	5111.17
	(19.97)	(8.71)	(12.33)	(13.54)	(14.76)	(21.2)	(16.55)	(26.6)	(15.73)	(32.01)	[<0.0001]
TobinQ	-0.0003	0.0000	0.0000	-0.0001	-0.0002	-0.0003	-0.0018	-0.0019	-0.0039	0.0169	0.0172
	(-4.09)	(-2.35)	(-3.57)	(-2.82)	(-3.63)	(-4.1)	(-2.88)	(-4.82)	(-3.74)	(3.09)	[0.8451]
ROA	35.2685	-0.1573	-0.0295	2.4749	-0.9838	14.2386	16.5528	-6.7740	-75.2051	394.1942	359.07
	(3.62)	(-0.3)	(-0.04)	(0.91)	(-0.32)	(3.78)	(0.76)	(-1.02)	(-3.7)	(7.16)	[0.2709]

Panel C: AMEX											
	IssueSize-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	14.96	8.35	15.64	53.11	98.29	102.91	150.19	160.40	137.06	1202.66	-
	(11.55)	(5.58)	(13.31)	(4.87)	(7.44)	(5.53)	(5.18)	(8.65)	(2.85)	(5.57)	-
DTA	-3.70	-0.25	0.63	10.28	4.18	-4.09	11.75	-13.17	86.23	235.19	238.89
	(-4.55)	(-0.3)	(1.04)	(2)	(0.86)	(-0.5)	(1.16)	(-1.98)	(5.98)	(6.87)	[0.8275]
Lncshtrq	-0.7715	-0.4256	-0.9427	-3.7895	-6.1982	-6.3834	-12.0886	-10.1680	-17.3078	-100.9455	-100.174
	(-10.26)	(-4.91)	(-13.4)	(-5.59)	(-7.31)	(-5.65)	(-6.35)	(-8.09)	(-4.99)	(-6.39)	[0.0001]
Prcstd	32.66	23.08	28.90	259.75	179.33	309.85	1406.27	846.22	2643.59	6112.22	6079.56
	(5.72)	(3.85)	(4.37)	(4.54)	(2.55)	(4.09)	(10.98)	(9.97)	(11.01)	(10.05)	[<0.0001]
TobinQ	0.0000	-0.0002	0.0000	-0.0002	-0.0005	-0.0003	-0.0025	-0.0019	0.0015	-0.0443	-0.0443
	(-2.68)	(-6.09)	(-1.87)	(-0.32)	(-1.44)	(-0.5)	(-1.73)	(-1.58)	(0.45)	(-2.75)	[0.7618]
ROA	-2.6133	-12.5320	-0.0156	9.1611	0.0639	30.3157	58.3662	5.1960	-1.3498	-344.7787	-342.165
	(-2.14)	(-8.04)	(-0.07)	(0.53)	(0)	(0.9)	(1.38)	(0.21)	(-0.02)	(-1.41)	[0.6845]

$TobinQ$ has the negative and significant coefficient, which implies that the market premium value of the firm do increase the stock liquidity. When investors are optimistic about the firm, there will be more price forecast and trading, while for the distressed firm, the valuation is difficult, thus the trade becomes less. The $TobinQ$ impact also decreases in the firm size, although the statistic significance is not that enough. Generally the estimator of the ROA is negative. The positive sign for the pooled regression result on Nasdaq and AMEX is mainly driven by the first group of size-portfolio. We believe that some of the small companies are extremely profitable and also very illiquid. This drives the coefficient extremely high, affecting the overall result. However, for most of the size portfolios, the coefficient for ROA is negative, which indicates that the profitable companies tend to be more liquid. This is more evident for the results of NYSE, compared with Nasdaq and AMEX.

Table 4.6 shows the result in the relative $issuesize$ portfolios. The more the new stock offering, the bigger marginal impact of the leverage increase on the stock illiquidity. We can conclude that the more the company deleverage, the higher will be the marginal illiquidity cost. In addition, the liquidity impact on the stock is bigger for the large issuing volume in terms of shares traded and price volatility. $TobinQ$ has the significant difference among $issuesize$ groups. Under the same $TobinQ$, the larger issuing companies will be more liquid because of the decreasing marginal effect.

Table 4.7 divides the sample into 10 offerpremium-portfolios. Offer-premium is the ratio of the SEO price to the average price of the stock before the SEO date. The coefficients do not reflect a significant trend, which implies that the offer premium does not reveal the information to the investors.

Table 4.7: **Changes in the Capital Structure and the Impact of the Illiquidity-Monthly data (using offerpremium-based portfolios))**

We regress the illiquidity measure *Ailliq* on the corporate characteristics. The estimation period is 1980-2006. The capital structure measure is the estimation result from a regression using monthly variables, which are summarized from daily data. The measure is a estimate of the Kyle model;s (1985). The capital structure measure is DTA, debt divided by the total asset. The control variables are *Lncshtrq*, *Prcstd*, TobinQ and ROA. *Lncshtrq* is the number of shares traded during the past quarter, which is log scaled. *Prcstd* is the daily stock price standard deviation in one month. TobinQ is defined as long term assets plus the difference between the market value of equity to the book value of equity divided by the book value of assets using the annual Compustat database measured in each of the pre and post SEO periods. ROA is the measure of return of return of equity, which is the net income divided by total assets. The regression result is based on the 10 offer-premium portfolios. Offer-premium is the ratio of the SEO price to the average price of the stock before the SEO date. T-statistics are in parentheses and the F-test probabilities to accept the null hypnosis are in brackets.

Panel A: NYSE											
	OfferPremium-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	23.82	4.36	3.33	18.80	6.59	15.54	8.79	21.14	29.40	25.92	-
	(16.6)	(6.74)	(22.2)	(7.97)	(36.26)	(12.94)	(22.89)	(3.17)	(19.54)	(26.68)	-
DTA	3.56	1.33	-0.07	-3.63	-0.30	-4.47	1.72	17.88	-3.46	0.45	-0.88
	(4.25)	(5.51)	(-1.19)	(-3.58)	(-2.97)	(-7.43)	(8.35)	(5.95)	(-5.09)	(1.34)	[0.1732]
Lncshtrq	-1.4780	-0.3708	-0.1845	-1.2258	-0.3635	-0.7735	-0.6267	-2.0059	-1.5989	-1.4694	0.0086
	(-18.03)	(-9.62)	(-22.41)	(-8.33)	(-35.79)	(-11.8)	(-27.88)	(-5.22)	(-17.01)	(-25.31)	[0.3124]
Prcstd	61.29	60.51	8.71	218.49	1.74	96.63	42.45	191.96	85.65	25.99	-35.30
	(6.76)	(20.87)	(8.72)	(18.75)	(1.43)	(15.71)	(16.55)	(6.2)	(9.99)	(4.7)	[0.0002]
TobinQ	0.0000	-0.0001	0.0000	-0.0002	0.0001	-0.0003	0.0000	0.0005	-0.0007	-0.0002	-0.0002
	(0.07)	(-2.72)	(-2.09)	(-1.5)	(4.43)	(-3.58)	(0.43)	(1.14)	(-4.66)	(-2.16)	[0.8269]
ROA	-8.2544	1.1187	-0.4920	-62.0162	-2.6423	-0.4017	-2.7244	21.3155	-15.8416	-27.9294	-19.675
	(-2.78)	(0.75)	(-0.88)	(-9.5)	(-4.35)	(-0.14)	(-1.74)	(1.39)	(-3.41)	(-8.31)	[0.0035]

Panel B: NASDQ											
	OfferPremium-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	207.47	82.78	257.66	119.57	93.19	-565.39	74.28	115.53	185.82	407.39	-
	(16.5)	(27.82)	(16.64)	(14.86)	(16)	(-9.03)	(11.28)	(12.25)	(12.71)	(14.41)	-
DTA	27.05	1.87	-13.83	11.67	2.10	544.01	7.49	14.56	17.44	43.07	16.02
	(6.45)	(1.95)	(-2.8)	(3.98)	(0.96)	(24.59)	(2.99)	(5.82)	(3.38)	(4.59)	[0.1075]
$Lncshtrq$	-14.0835	-5.2471	-17.2933	-8.5915	-6.2711	-2.6884	-5.3582	-7.8208	-13.5858	-34.1542	-20.0707
	(-18.25)	(-28.63)	(-17.91)	(-17.15)	(-18.65)	(-0.71)	(-13.5)	(-13.47)	(-15.23)	(-19.58)	[<0.001]
$Prcstd$	777.17	158.53	1301.65	681.13	466.94	8701.95	456.67	310.64	1011.48	3248.81	2741.64
	(19.56)	(12.4)	(19.54)	(19.89)	(18.69)	(33.9)	(17.06)	(9.48)	(18.11)	(39.47)	[<0.001]
TobinQ	-0.0005	-0.0002	-0.0002	-0.0002	-0.0003	0.0081	-0.0005	-0.0010	-0.0011	-0.0007	-0.0002
	(-2.41)	(-4.75)	(-0.84)	(-1.98)	(-2.69)	(2.55)	(-2.86)	(-3.82)	(-3.47)	(-1.44)	[0.4752]
ROA	48.7175	5.1575	-31.0999	6.0275	14.3934	721.3304	1.3233	-112.6482	-77.9066	290.0526	241.3351
	(2.91)	(1.77)	(-2.49)	(0.75)	(1.73)	(6.86)	(0.19)	(-10.67)	(-4.25)	(9.13)	[0.2935]

Panel C: AMEX											
	OfferPremium-based portfolios										
Variable	1	2	3	4	5	6	7	8	9	10	10-1
Intercept	99.63	-264.89	141.01	127.89	527.91	154.97	510.77	30.68	319.21	107.05	-
	(1.06)	(-1.85)	(7.24)	(13.61)	(3.2)	(10.45)	(3.24)	(0.82)	(4.66)	(6.85)	-
DTA	245.42	426.84	20.13	-8.64	-71.18	6.34	36.39	66.21	115.14	7.29	-238.13
	(20.02)	(14.51)	(1.61)	(-2.21)	(-0.85)	(0.71)	(0.43)	(3.41)	(4.29)	(1.3)	[<0.0001]
Lncshtrq	-16.3334	3.1650	-9.2999	-8.0581	-43.4562	-8.4574	-43.1296	-1.5199	-25.0522	-6.7556	9.5778
	(-2.64)	(0.31)	(-7.61)	(-12.33)	(-4.97)	(-8.14)	(-4.48)	(-0.77)	(-6.01)	(-7.29)	[0.0367]
Prcstd	1837.54	1265.12	677.85	617.75	9523.89	158.70	6894.11	750.94	1982.64	361.13	-1476.4
	(4.74)	(2.25)	(6.99)	(8.63)	(12.88)	(2.49)	(11.93)	(5.08)	(9.57)	(7.79)	[<0.001]
TobinQ	-0.0063	-0.0011	-0.0037	-0.0013	-0.0004	-0.0040	-0.0182	-0.0062	0.0006	-0.0008	0.0055
	(-2.54)	(-0.61)	(-3.27)	(-2.39)	(-0.94)	(-6.41)	(-1.68)	(-3.54)	(0.27)	(-2.74)	[0.0015]
ROA	57.2795	50.0005	29.6818	-70.4966	-741.7526	-92.5756	5.7452	-187.5267	171.9917	20.1689	-37.111
	(0.73)	(0.91)	(1.2)	(-2.74)	(-1.33)	(-3.56)	(0.02)	(-1.35)	(2.73)	(1.92)	[0.3976]

Chapter 5

Conclusion

In this article, we try to examine the SEO underperformance in the aspect of liquidity change. As the hypothesis on the relationship between stock return and stock liquidity is that return increases in illiquidity, as proposed by Amihud and Mendelson (1986), we assume that, the liquidity change is one of the causes of the post SEO underperformance and pre SEO overperformance.

We test the liquidity around the SEO period separately on the three exchanges because NYSE is a specialist-auction market and the NASDAQ is a dealer market. They each provide price discovery and liquidity services for equity shares, but differ substantially in design.

We find that during the SEO period (a five year period before and after SEO), the illiquidity has a positive relation with the stock return. The illiquidity is high before the SEO period and drop drastically after the SEO announcement. This is the evidence that, the individual stock level liquidity, do play an important role in explaining the SEO underperformance.

We divided the illiquidity factor into expected illiquidity and unexpected illiquidity. Generally, big companies suffer more from the unexpected illiquidity across the three exchanges, and the NYSE big companies and Nasdaq small companies are relatively less sensitive to the expected illiquidity. This implies the matching relation between the trading mechanism and the stocks of different corporate size. We also find that the more stock issued, relative to the previous capitalization, the more price impact will be caused by expected illiquidity, while less by unexpected illiquidity. This implies that, the large volume of new issuance conveys more information to the investor, thus decreases the information asymmetry, making the illiquidity impact on the return more predictable.

Furthermore, we test the theoretical source the illiquidity. We believe the capital structure change caused by the SEO makes the liquidity change. We find the positive relation between the leverage and the stock illiquidity, that the decreased leverage makes the stock more liquid, and the large stocks are less affected by the leverage changes. This is the phenomenon that market is usually not sensitive to the capital structure of big companies. They are regarded as ones are too big to fall. The marginal illiquidity cost of leverage is big when the company deleveraging quite a lot. And there is no evidence that the offer premium, i.e., the offer price relative to the stock price around the SEO period, provide more information to the investors.

Apart from all the result mentioned above, we still understand that there are so many liquidity measures in the previous literature. It's worthwhile to reconfirm the result in this article using more liquidity or market microstructure measures like LOT or PIN.

Moreover, we may also include variables of institutional holdings. The institutional holding is to allow for larger trade sizes made by institutions that would have a greater probability of price impact. We assume that the higher levels of institutional holdings would increase the probability of large trades that would presumably move the liquidity and stock price.

Appendix A

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Appendix B

Market Equilibrium

The market equilibrium follows Kyle (1985). First, the market maker is assumed to set the price as a linear function of total demand, $y_1 + x_1$, and public information, $X_0(1 + q_1)$. The market maker cannot observe the source of demand. In addition, to preclude outside arbitrager from making expected profits based on publicly available information, the price set by the market maker, s, must satisfy the condition:

$$E[s - s^q | y_1 + x_1] = 0 \tag{B.1}$$

s^q is the publicly observed value of the stock. Second, the informed agent submits order flow independent of the uninformed demand, so that ex-ante trading profits are maximized.

$$x_1 = arcmax_x X_1 E[s^i - s | s^q + \epsilon_1(1 + D/S_0)] \tag{B.2}$$

s_i is the stock price that reflects the informed agent's private information. In particular, it is assumed that the informed trader follows a linear demand schedule, given below:

$$x_1(\epsilon, D/S_0) = a + B\epsilon_1(1 + D/S_0) \tag{B.3}$$

Third, market equilibrium is determined jointly by the market maker's pricing condition, the informed agent's rationality condition, and the informed agent's linearity restriction. The solution to this problem is given in Kyle (1985) and is:

$$x_1 = \frac{s - s^q}{2\lambda} \text{ and } s = s^q + \lambda(x_1 + y_1) \tag{B.4}$$

where $(1/\lambda)$ is the market liquidity. The joint association between the informed demand and capital structure yields a liquidity relation stated as:

$$L = \frac{1}{\lambda} = \frac{2\sigma_\mu}{\sigma_\epsilon \left(1 + \frac{D}{S_0}\right)} \tag{B.5}$$