ESSAYS ON REAL ASSETS, CORPORATE INVESTMENT AND EQUITY FINANCING: EVIDENCE FROM U.S. CAPITAL MARKETS AND SECURITIZED REAL ESTATE

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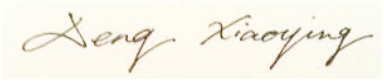
DECLARATION

I hereby declare that this thesis is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which have been used in the thesis.

This thesis has also not been submitted for any degree in any university previously.



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SUMMARY

This thesis deepens the understanding of real estate in the capital markets by addressing following three questions (1) how real estate risk influences corporate policies; (2) how securitized real estate manages the liquidity risk using real activities manipulation; (3) how investors' behaviour affects the equity pricing in the securitized real estate market.

In the first essay, I ask how capital heterogeneity influences corporate investment given that an option to grow the company through investment is subject to the riskiness of the firm's asset. Using the US general firm data from 1985 to 2010, I include shocks to the real estate market as a proxy for state-variable risk in the asset pricing model and construct the real estate risk factor at the firm level. I document that the real estate risk embedded in corporate real estate holdings affects the corporate investment decisions made by firms' managers (a negative effect), and further decreases long-term external financing in both equity and debt.

In the second essay, I look into the characteristics of the securitized real estate, Real Estate Investment Trusts (REITs). I explore how REITs manage the liquidity risk in the equity market considering that real estate is less liquid compared with other asset classes in nature. I show that REITs managers engage in real earnings management to attract more uninformed trading in order to provide the liquidity services at lower cost during seasoned equity offerings. I find less liquid REITs are more likely to manipulate earnings prior equity offerings, and uninformed trading is higher following the real earnings

management. REITs set the offer price at a smaller discount after engaging in real earnings management and stock returns decline in the long run. The findings are consistent with real option and liquidity explanations for equity offerings.

In the third essay, I study the pricing of the securitized real estate market from a behavioural perspective. I answer whether investor sentiment contributes to the price anomaly in REITs equity offerings, empirically addressing that REITs managers time the market to issue equity by timing the sentiment investors and the behaviour of investors impacts price formation around seasoned equity offerings. Consistent with the notion that market interprets SEO announcement in high sentiment periods as more negative signal, I find that announcement returns are negatively related to sentiment. Further, I document that investor sentiment is positively related with the SEO discounting and first day returns. Finally, sentiment does not seem to proxy for unobservable risk characteristic as I find that post-SEO long run returns are more negative in high sentiment periods.

Overall, this thesis highlights the importance of real estate in corporate investment and corporate financing strategies. This research provides significant information on real estate values from novel perspectives as well as guidance to the corporate policy decisions making for different firm managers.

CHAPTER 1 INTRODUCTION

This PhD thesis bundles three empirical essays on the role of real estate asset in capital market, aiming to provide significant information on real estate values from novel perspectives as well as guidance to the corporate policy decisions making for different firm managers.

1.1 Research Background

Real estate composes a significant part of firm's portfolio. According to the survey in Zeckhauser and Silverman (1983), real estate assets comprise one-quarter of firm's assets on average. For manufacturing firms, this figure increases to about 40%.

Firm owns real estate for a variety of reasons. Real estate has a slow depreciation rate (Glaeser and Gyourko 2005). According to the Bureau of Economic Analysis report, non-residential real estate depreciates at a rate between 1.5% and 3%, far more slow than the other equipment. Unlike equipment, real estate is heterogeneous in space, which varies even cross the firms in the same industry. The lower risk embedded in real estate assets compared to other risky assets alters a firm's underlying risk, which makes real estate an ideal investment strategy for portfolio diversification as well as inflation hedge. All the features of corporate real estate make corporate policies complex for corporate real estate holding firms.

Firms can hold the real properties either by investing directly in real estate market or via securitized real estate. The development of securitized real estate has further bridged the capital market and the real estate market, which makes

the real estate strategies feasible for both corporate and individual investors. The most common form of securitized real estate is Real Estate Investment Trusts (REITs). Created in United States, REITs offer institutions and individuals the opportunities to invest in real properties. The tax-exempt feature of REITs requires REITs to distribute a minimum 90% of their taxable income to investors as dividends, limiting the possibility of free cash flow. Restricted investment options on real estate assets, REIT managers' cannot simply boost their compensation through activities like merger and acquisitions and also the dual performance measurement by net income and funds from operation limits agency problems.

Regardless of recent advances in direct and securitized real estate, understanding of real estate in the context of capital market remain obscure, as both corporate and individual investors are uncertain about how far to invest in real estate due to the lack of sufficient information on the real estate vehicles.

1.2 State of The Art

Despite the recognized importance of real estate in many firms' production and investment, past studies provide limited analysis on the effects of real estate. The finance literature has focused on the collateral effect of real estate assets. An increase in real estate value will exert a positive collateral effect on corporate investment. Gan (2007) uses a difference-in-difference approach, documenting that real estate holding firms are more vulnerable to real estate bubble bust than non-real estate holding firms in Japan. Chaney, Sraer and Thesmar (2012) finds a similar result using the U.S. firm data, concluding that firms expand investment via debt issuance when real estate prices increase as

they use real estate for project financing. In a production economy, Tuzel (2010) solves a general equilibrium with a high irreversibility cost for real estate and justifies that low depreciation rate of real estate deteriorates real estate holding firms' capacity to productivity shocks. The amplified risk of real estate drives investors for a return premium when they invest in firms concentrated in real estate ownership(Ling, Naranjo and Ryngaert 2012). Meanwhile, capital adjustment cost is asymmetric, which indicates that firms are less flexible in downsizing capitals in bad times. Since the capital stocks of real estate holding firms have been more long-lived, countercyclical real estate risk would serve as an important factor for corporate investment, which, according to my knowledge, has not been examined in the existing literature before.

Besides, for the equity pricing in the securitized real estate market, literature suggests that firms time seasoned equity offerings (SEO, thereafter) either by selling the overpriced shares (window of opportunity/behavioral hypothesis) or by exploiting the time-varying risk to minimize the cost of equity (the risk-trade off hypothesis). In the context of REITs, I revisit those above hypothesis by analyzing from real earnings management and investor sentiment perspectives, both of which emerge out in recent years, to test whether real earnings management and investor sentiment stories reconcile with the current theoretical implications.

1.3 Research Objective

This thesis deepens the understanding of real estate in capital market by addressing following three questions (1) how real estate risk influences

corporate policies; (2) how securitized real estate manages the liquidity risk; (3) how investors' behaviour affects the pricing in securitized real estate market.

In the first essay, I ask how capital heterogeneity influences corporate investment given that an option to grow the company through investment is subject to the riskiness of the firm's asset. Specifically, I examine how real estate risk impacts corporate policies. Previous studies identify real estate factor that explains much of the underlying risk inherent in classic asset pricing models via its collateral effects and its irreversibility. If investors understand the firm's exposure to real estate risk, real estate risk should be correlated closely with both corporate investment and financing decisions made by firms.

In the second essay, I look into the characteristics of the securitized real estate, Real Estate Investment Trusts (REITs). I explore how REITs manage the liquidity risk in the equity market considering that real estate is less liquid compared with other asset classes in nature. The empirical corporate finance literature claims that information asymmetries would induce market frictions, which reduce the liquidity of the firm's securities. However, real activities manipulation may reduce the concern given its cash flow consequences. Therefore, the research question for my second essay is how real earnings management activities influence REITs SEO dynamics.

In the third essay, I study the pricing of securitized real estate market from a behavioural perspective. I ask whether investor sentiment contributes to the

price anomaly in REITs equity offerings, empirically testing whether managers time the market to issue equity by timing the sentiment investors.

1.4 Intended Contribution

The significance of this thesis is to provide significant information on corporate real estate values as well as guidance to the corporate investment and financing policy making for firm managers.

In the first essay, I ask how capital heterogeneity influences corporate investment in a real option framework. First, this research highlights the role of real estate risk. Prior literature only focuses on the price level of the real estate assets. Second, this research establishes the link between real estate risk and corporate investment. Finally, this research contributes to the existing corporate investment, asset pricing, and corporate real estate literature by providing another setting in which real estate risk plays a nontrivial role in corporate investment. This research provides significant information on corporate real estate values as well as guidance to the corporate investment decisions making for firm managers.

To further analyze how real estate interacts with the capital market, I examine managers' incentives to issue seasoned equity offerings and their impact on SEO dynamics in Real Estate Investment Trusts (REITs) in my second and third essays. Literature suggests that firms time seasoned equity offerings (SEO, thereafter) either by selling the overpriced shares (window of opportunity/behavioral hypothesis) or by exploiting the time-varying risk to minimize the cost of equity (the risk-trade off hypothesis). I revisit those

above hypothesis by analyzing from real earnings management and investor sentiment perspectives, both of which emerge out in recent years, to test whether real earnings management and investor sentiment stories reconcile with the current theoretical implications.

In my second essay, I examine the effect of real earnings management activities on REITs SEO dynamics. There is no study examining how real earnings management affects the stock return and cost of equity around seasoned equity offering. My research contributes to several strands of literature. First, I contribute to the REITs seasoned equity issuance literature by providing evidence that real earnings management influences REITs equity offering decision, supporting the notion that managers distort the earnings to time the market. Second, I contribute to the determinants of SEO discounting and underpricing by providing another important determinant - real earnings management. Third, I contribute to accounting literature by providing another setting where real earnings management plays a nontrivial role in market timing and price formation. Finally, this paper provides the empirical evidence on real earnings management and stock liquidity, supporting recent debates on information quality and liquidity risk.

In my third essay, I investigate the price anomaly around seasoned equity offerings from a behavioral perspective, empirically testing whether managers time the market to issue equity by timing the sentiment investors. My contributions are manifold. First, I contribute to the seasoned equity issuance literature by providing evidence that investor sentiment is positively related to pre-SEO mispricing levels, a relationship that further influences the REIT

equity offering decision and thus supports the notion that managers time the market in the presence of investor sentiment. Second, I contribute to the determinants of SEO discounting and underpricing by providing another important determinant--investor sentiment. Third, I contribute to the sentiment literature by providing an additional setting in which sentiment plays a nontrivial role in market timing and price formation in securitized real estate market.

Overall, this research intends to contribute to the existing corporate investment, asset pricing, and corporate real estate literature by providing another setting in which real estate factor plays a nontrivial role in corporate investment and financing policy.

1.5 Organization of the Thesis

This thesis is organized as follows. Chapter Two presents the first essay, titled — *Real Estate Risk, Corporate Investment and Financing Choice*. In the first essay, I ask whether capital heterogeneity influences corporate investment by examining the effect of real estate risk on corporate policies. To further analyze the real estate in capital market, I look into the characteristics of the securitized real estate, Real Estate Investment Trusts (REITs). In Chapter three titled-- *Real Earning Management, Liquidity and REITs SEO dynamics*, I analyze the consequence of real earnings management activities around REITs SEO. In Chapter four titled—*Investor Sentiment and SEO pricing process: Evidence from REITs*, I answer the price anomaly around seasoned equity offerings from a behavioral angle, empirically addressing that managers time the market to issue equity by timing the sentiment investors and the behavior

of investors impacts price formation around seasoned equity offerings. The final chapter concludes the thesis, highlights the limitations of the study, as well as offer recommendations for future research.

CHAPTER 2 REAL ESTATE RISK, CORPORATE INVESTMENT AND FINANCING CHOICE

Previous studies identify that real estate factor explains much of the underlying risk inherent in classic asset pricing models via its collateral effects and its irreversibility. Since a firm's ability to finance new projects depends on its risk exposure, this chapter explores the link between the real estate risk and corporate investment. Using the US general firm data from 1985 to 2010, evidence shows that real estate risk is negatively associated with firms' long-term investments and long-term external financing in both equity and debt. However, the leverage depends on both the measure of risk and types of assets. Overall, in contrast to previously documented effect of the real estate value, risk exposure exhibits the mostly opposite effects on investment, financing, and capital structure.

Keywords: Real estate risk exposure, corporate investment, external financing

2.1 Introduction

Real estate composes a significant part of firm's portfolio. According to the survey in Zeckhauser and Silverman (1983), real estate assets comprise one-quarter of firm's assets on average. For manufacturing firms, this figure increases to about 40% with the book value amounting to $8.6 trillion in the early 2000s (Roulac 2003).[1]

The unique features of corporate real estate compared to other capital goods contribute interesting influences on corporate finance. One strand of literature focuses on the collateral effect of real estate assets, suggesting that an increase in real estate value will exert a positive collateral effect on corporate financing hence investment. Chaney, Sraer and Thesmar (2012) document that firms expand investment via debt issuance when real estate prices increase as they use real estate for project financing. Gan (2007) shows that the same channel makes real estate holding firms more vulnerable to real estate bubble bust than non-real estate holding firms in Japan. Another strand of literature examines the effect of real estate holding on real or financial portfolio risks. Tuzel (2010) models a general equilibrium in a production economy, in which high irreversibility cost and low depreciation rate of real estate deteriorate firms' capacity to sustain through productivity shocks. Ling, Naranjo and Ryngaert (2012) also document that real estate intensive firms exposes to greater real estate risk. Consequently, investors demand a higher return premium when they invest in firms concentrated in real estate ownership (Funke, Gebken, Gaston and Lutz 2010) and hedge funds that concentrate in real estate strategies

[1] The core (i.e., non-specialized) business for real estate investment by institutional investors amounts to $3.2 trillion

underperform(Ambrose, Cao and D'Lima 2013).However, none of these studies have examined how the risk of real estate assets affects corporate real investment.

The risk of real estate assets also differs from those of other capital goods. First, real estate has a slow depreciation rate(Glaeser and Gyourko 2005) Second, unlike equipment, real estate is heterogeneous in space, which varies even cross the firms in the same industry. Furthermore, the lower risk embedded in real estate assets compared to other risky assets alters a firm's underlying risk, which makes real estate an ideal investment strategy for portfolio diversification as well as inflation hedge(Ambrose, Cao and D'Lima 2013). Since asset liquidation values determine a firm's financing capacity, corporate real estate holdings are likely to affect firm's investment decisions. All the features of corporate real estate make corporate policies complex for corporate real estate holding firms.

In this paper, I ask whether capital heterogeneity influences corporate investment given that an option to grow the company through investment is subject to the riskiness of the firm's asset. It follows the spirit of Berk, Green and Naik (1999), in which the firm value comes from the value of assets-in-place and the value of growth options, and the firm's investment decision is to exercise the real option to maximize firm value. The value of the option depends on demand shock level and risk, current and new investment production capacity, operational costs, and adjustment cost. Meanwhile, capital adjustment cost is asymmetric, which indicates that firms are less flexible in downsizing capitals in bad times. Since the capital stocks of real

estate holding firms have been more long-lived, countercyclical real estate risk would serve as an important factor for corporate investment, which, according to my knowledge, has not been examined in the existing literature before.

In the empirical analysis, I focus on the real estate assets holding, not only because it empirically captures the adjustment costs through its irreversibility feature, but also because the addition exposure to real estate market capture both the risk of assets and the correlated risk between different types of assets, i.e., real estate assets and other corporate assets. Specifically, I examine how real estate risk impacts corporate policies. If investors understand the firm's exposure to real estate risk, real estate risk should be correlated closely with both corporate investment and financing decisions made by firms. I use two measures of real estate risk. The first one is a real estate industry specific risk which uses residuals from an estimation of REITs on capital market portfolio in time series. The second one measures the individual firms' exposure to real estate risk, i.e., an estimated beta on REITs returns from a two-factor model including both the capital market factor and the real estate factor. I find that both real estate risk measures are negatively associated with corporate investment and external financing. However, the overall leverage effect is mixed due to the additional collateral effect in debt financing and related credit market condition. In addition to the above new evidence, I also include the value of real estate holdings in the analysis and I find that the value of real estate is positively associated with debt financing and investment. The results are consistent with extant empirical evidence in the literature about this effect through collateral channel (Chaney, Sraer and Thesmar 2012).

So far this research is the first to directly examine the real estate risk on firm's corporate investment and its financing policies. My paper makes important contributions to the literature: First, while prior empirical literature focuses on only the price level of the real estate assets, this paper highlights the role of real estate risk. Gan (2007) document that firms holding real estate assets are more vulnerable to real estate bubble bust than non-real estate holding firms in Japan, which is the closest to examine the effect of risk in term time series fluctuation. However, the bubble burst is a specific case and the event is unambiguously significant. My paper provides the missing link -investment, between the production and assets pricing studies that are related to real estate assets holding in corporations. Second, my hypotheses are aligned with studies on how assets irreversibility affects firm production. Tuzel (2010) suggests that, in a production economy, the general equilibrium shows that high irreversibility cost and low depreciation rate of real estate held by the firm deteriorate firms' capacity to adjust for productivity shocks. I further illustrate the mechanism through investment in this channel. Moreover, my discussion on the cross sectional pattern that, firms with high real estate risk have low investment, is also intuitively an alternative explanation for the empirical evidence in the assets pricing literature that hedge fund strategies that target on real estate underperforms (Ambrose, Cao and D'Lima 2013), aside from the vague explanation that extra risk estate exposure requires additional premium, which actually implies high returns. Finally, this research provides significant information on corporate real estate values as well as guidance to the corporate investment decisions making for firm managers.

This paper proceeds as follows. I review the relevant literature in Section II and identify the literature gap. Section III displays the model and constructs the hypotheses. Section IV describes the data and empirical design. Section V discusses the empirical results. Section VI presents the robustness test. This paper closes with some concluding remarks.

2.2 Literature Review

2.2.1 Corporate investment and asset-in-place

When evaluating corporate investment decisions, researchers often view it in a real option framework(McDonald and Siegel 1985; McDonald and Siegel 1986). An option to grow the company through investment is subject to the riskiness of the firm's asset-in-place, which also determines the expected returns.

Existing literatures establish the connection between investment decisions, the riskiness of asset-in-place, and expected stock returns. Berk, Green and Naik (1999) assumes that firms owns two kinds of assets, asset-in-place and growth options and predict that size and market-to-book ratio can present the overall riskiness of assets in place. Gomes, Kogan, and Zhang (2003) relax Berk, Green, and Naik (1999)'s model on some restrictions and get similar results in equilibrium. Considering in a competitive market setting, Zhang (2005) extends the model and suggests that the value premium is likely to be influenced by the business cycle. In Cooper (2006)'s model which includes the fixed adjustment costs in investment decisions, Cooper (2006) documents

empirical evidence that investment spikes are significantly correlated with expected returns. And Carlson, Fisher and Giammarino (2006) develop two models to link the expected return and endogenous corporate investment decision determined by firm's asset in place. They suggest that the book-to-market effect is driven by gearing and the size effect is relevant to the proportional growth.

So far, though the literature has documented that expected returns are affected by firm-level decisions which are endogenously determined by firms' underlying risk, no analysis has been provided on either how the composition of firms' capital, like a real estate component, will affect the corporate investment or how this will contribute to the expect stock returns.

2.2.2 Real estate and asset pricing

Real estate composes a significant part of both firms' asset portfolio and households' portfolio. Real estate returns are expected to contribute to cross sectional variations of asset returns. Fluctuations in real estate impact the real economy through its interaction with asset and credit markets. Recent literature use real estate markets in the context of asset pricing.

Studies relevant to real estate asset pricing include Stambaugh (1982), Flavin and Yamashita (2002), Kullmann(2003), Lustig and Van NieuIrburgh (2005), and Piazzesi, Schneider and Tuzel(2007). Lustig and Van Nieuwerburgh (2005) and Piazzesi, Schneider and Tuzel (2007) incorporate the important role of housing for household consumption to the Consumption CAPM and document that a factor based on housing consumption is priced cross-sectionally. Stambaugh (1982) uses several asset groups to construct the

market portfolio and find a significant explanation power in proxies for residential real estate. Flavin and Yamashita (2002) examine the household portfolio choice using exogenous returns, in which housing factor is economically significant. Other studies construct a real estate included market portfolio to test the asset pricing models and find a significant explanation power in returns for real estate proxies. In Kullman (2003)'s test for asset pricing models, he constructs a market portfolio using residential real estate returns and commercial real estate returns. For the measure of commercial real estate, he measures the returns from real estate investment trusts. He documents results more significant using real estate included market portfolio. Furthermore, Lustig and van Nieuwerburgh (2005) find that there is a significant relation between the ratio of housing wealth and market price of risk, and suggest that real estate factor has asset pricing implications. In Piazzesi, Schneider, and Tuzel (2007)'s equilibrium asset pricing model, they show that the housing composition in the consumption bundle is in the pricing kernel and hence implies for asset pricing. Funke, Gebken, Gaston and Lutz (2010) further document that a real estate factor explains much of the underlying risk inherent in the Fama-French size and value factors.

2.2.3 Real estate and corporate policies

The extant literature shows that unique features of real estate assets compared to other capital goods are associated with several interesting patterns in corporate finance. The diverse effects can be grouped by the following three channels: the collateral, the lending and the adjustment cost. The first strand of research is on the collateral effects of real estate. Collateral is vital in bank lending given that 70% of all commercial and industrial loans are issued on a

secured basis (Berger and Udell 1990). An increase in real estate value will exert a positive collateral effect on corporate investments. Gan (2007) uses a difference-in-difference approach, documenting that real estate holding firms are more vulnerable to real estate bubble bust than non-real estate holding firms in Japan. Chaney, Sraer and Thesmar (2012) finds a similar result using the U.S. firm data that firms increase debt issuance when real estate prices increase as they use real estate as collateral for project financing. The second strand of research is on the lending channel of banks. Banks in general have a significant exposure to real estate markets given their lending and direct investment in the real estate sectors. Therefore, shocks to real estate markets could transmit to the real economy via the banks' reduced lending to firms, taking the subprime crisis as an example. This, in turn, would force the firms to forego the profitable investments. In Gan (2007)'s study, she documents that when there is a significant decline in real estate values, banks are credit-constraints and firms reliant on banks' supply have to invest less. Similar results are also found in Peek and Rosengren (2000), who apply the Japanese banking crisis in the early 1990s as an event study and document a significant negative real effect of the bank loan supply shock on the construction activity. The third strand of research focus on the irreversibility costs for real estate. In a production economy, Tuzel (2010) suggests the general equilibrium with a high irreversibility cost for real estate and justifies that low depreciation rate of real estate deteriorates real estate holding firms' capacity to productivity shocks. And she also documents the empirical evidence on real estate holdings and firm's risk using the U.S. firm data. Ling, Naranjo and Ryngaert (2012) further examine how sensitive the stock returns to a real estate factor using the

retail firm data, indicating that real estate intensive firms get a greater exposure to a real estate factor.

To summarize, the use of collateral, reliance on bank financing, and high sensitivity to the business cycle may provide the basis for firms to be affected by the real economy via real estate risk. The swing in real estate markets determines the time-varying investment opportunities via different channel. Though some works have been done on real estate and asset pricing, how the real estate component contributes to the corporate investment is unclear. Since corporate financing activities like equity offerings will be directly linked to firm's investment decisions, it can be expected that those firms who are more susceptible for financing channels than others, would potentially monitor the real estate market when making their corporate financing decisions.

2.3 Hypothesis

The recent approach to analyze corporate investment decisions is to consider it in a real option framework (Brennan and Schwartz 1985; Dixit and Pindyck 1994; McDonald and Siegel 1985; McDonald and Siegel 1986). The investment can change the firm's risk profile in response to whether the growth option is finite and infinite. Also, the increase in tangible assets like real estate and equipment will likely to impact the operating leverage, changing the underlying risk. And all the corporate assets can be viewed as a portfolio of puts of the firm like the securities in corporate finance.

Classic real investment model proposes the valuation of the firm comprises of a growing perpetuity generated by assets-in-place and the value of growth

options generated from corporate investment. In a production economy, Tuzel (2010) suggests the general equilibrium with a high irreversibility cost for real estate and justifies that low depreciation rate of real estate deteriorates real estate holding firms' capacity to productivity shocks. Therefore the firm's value is also determined by the asset heterogeneity of the firm. The amplified risk of real estate relative to other forms of capital drives investors for a return premium when they invest in firms concentrated in real estate ownership.

According to Tuzel (2010), firms invest in real estate assets will have higher adjustment cost (cost of irreversibility) than invest in non-real estate assets. To understand this result, recognize that developing a land implies that the firm foregoes some current profits. These foregone profits are a cost of not investing, and must be offset by a more valuable option to motivate alternative asset investment. Firm's exposure to real estate risk undermines firm's ability to counter with bad productivity shocks and thus investors will require higher risk premium. Clearly, firm manager make the corporate investment decision as a trade-off between firm's asset-in-place value and potential cash flow of the corporate investment. As a result, the firm exposing to more real estate risk optimally invests at a lower demand level. Therefore, I hypothesize,

Hypothesis1 Firm's exposure to real estate risk reduces the corporate investment.

Firms often go to capital market to fund their investments. Firms deploy real estate as collaterals for project financing. Nevertheless, the financing cost depends on the capital market dynamics and risk of firm value, hence the risk of its assets-in-place. Although the collateral channel suggests that the value of

assets-in-place, in particular, real estate assets, enables better access to debt financing, the risk of real estate, disregarding whether it comes from the market fluctuation, such as a downturn in housing/equity markets or firms' heterogeneous exposure to the markets, increases the uncertainty of future cash flows, hence hurts firms' credit worthiness. Therefore, the risk of assets raises firms' financing costs in both equity and debt, and reduces firms' external financing capacity. Meanwhile, fluctuations in real estate markets affect a firm's debt capacity as well as the level of investment as discussed previously. Since part of the investment can be used as further collateral, the shrink in investment exacerbates the reduction in firm's debt capacity or increase the cost of debt, influencing the financing channel. In this case, firms with high ownership concentrations in real estate have to further forego profitable investment and reduce output. Hence,

Hypothesis2: In the presence of external financing, firm's exposure to real estate risk reduces external financing in both equity and debt.

Since assets market shocks are often correlated with real economy shocks, the bank industry is likely to go through a credit crunch during the assets markets' downturn period. The debt financing may be decreased more than equity financing because of this feedback effect. Therefore, the overall leverage is likely to be negatively associated with the assets risk in time series pattern. In cross section, however, while the assets risk raises financing cost in both equity and debt, assets with collateral values may help reduce the cost in debt. Therefore, firm leverage is likely to be positively associated with the portion of collateral assets in the firm. Therefore, how the risk of assets-in-place is

correlated with firm leverage depends on the measurement of the risk and composition of assets.

Hypothesis3A: The market wide risk of firm's assets-in-place reduces firms' leverage.

Hypothesis3B: The exposure to collateral assets' risk raises firm's leverage.

2.4 Data and Empirical Design

The sample includes a panel of US firms from 1985 to 2010. I exclude financial, energy industries, and REITs (identified with "6" in the first digit of SIC code). The accounting data are retrieved from COMPUSTAT, and the stock return data from CRSP. I choose to measure the risk of real estate assets held by the firm for two reasons: First, the adjustment cost of any particular type of assets lacks variation within itself, but differs across the real estate assets and other corporate assets, hence I can use the exposure or relative portion of real estate assets over total assets as a good proxy for the adjustment cost. Second, I want to measure both the time series and cross sectional variation in the risk of assets. The real estate assets is better than general corporate assets, because the real estate market fluctuation is not as correlated as the stock market with the real economy fluctuation.

2.4.1 Measuring Real Estate Factor

In this paper, I deploy the overall returns on real estate investment trusts (REITs) as the basis for the real estate factor. Created in United States, Real Estate Investment Trusts (REITs), offer individuals the opportunities to invest in real properties. Restrictions on investment options for real estate assets and regulations on dividend pay-outs (Boudry 2011) force REITs to rely primarily on external financing to fund investments; they use external financing far more often than general firms do (Boudry, Kallberg and Liu 2011; Ott, Riddiough and Yi 2005). These frequent forays to the market result in the disclosure of more information about the firm, and thus reduce information asymmetry. Thus, REITs contain the timely information about the public real estate market. Also, given that REITs are excluded from the portfolio formation of the major asset pricing factors like Fama-French factors, using REITs return will isolate the effect of real estate factors from test assets and other pricing factors(Funke, Gebken, Gaston and Lutz 2010).

I extract the variation in real estate by orthogonalizing the excess REIT returns to the excess market return in the following model.

$$R_{re,t} - R_f = \alpha_0 + \alpha_1(R_{mk,t} - R_f) + \varepsilon_t \quad (1)$$

where R_{re} is the returns on the composite REITs index[2] minus, R_{mk} is the returns on the CRSP value-weighted portfolio, and both are measured in excess of the risk-free rate R_f on U.S. 3-month treasury. The regression is

[2] Composite REITs index contains a broad set of publicly-traded real estate, including equity REITs (EREITs), hybrid REITs (HREITs), and mortgage REITs (MREITs). The index data is obtained from the National Association of Real Estate Investment Trusts (NAREIT) website (www.nareit.com).

conducted with monthly data, and then for each year, we sum up the residuals. I define the real estate specific risk (REF) with the yearly residual ε_t, which gives us measures of a time series real estate assets risk.

2.4.2 Measuring Firm-level Real Estate Factor

I am mindful that firms react differently to the real estate risk since there is a variation in corporate real estate holdings. To address this difference, I further construct the firm level real estate exposure/intensity by employing a multi-factor asset pricing framework (Jorion 1990; Ling, Naranjo and Ryngaert 2012). To determine the market and real estate risk exposure, I estimate the following two factor model using monthly data.

$$R_{it} - R_f = \alpha_0 + \beta_i^{mk}(R_{mk,t} - R_f) + \beta_i^{re}(R_{re,t} - R_f) + \varepsilon_{it} \quad (2)$$

where R_{it} is the return on firm stocks, R_f is the returns on 3-month treasury, R_{re} is the returns on REITs, and R_{mk} is the returns on the CRSP value-weighted portfolio. I calculate firm's betas prior observation month by regressing their past 60 month returns on the market and real estate factors. Observations with less than 24 months return data in their previous 60 months are excluded. The coefficient β_i^{mk} is the market beta. The coefficient β_i^{re} (the real estate beta) is the firm i's exposure to the real estate risk, after controlling the stock market exposure. I prefer the two-factor equation here over Fama-French equation, because the beta measured from the latter are likely suffer from a correlated-error problem as large firms are more likely to hold real estate than small firms. Nevertheless, I conduct robustness test with the latter.

2.4.3 Real Estate Factor and Corporate Investment

To analyze the impact of real estate factor on corporate investment, I run a standard investment equation for firm i, at date t, with

$$INV_{it} = \alpha_i + \delta_t + \beta REex_{it} + \gamma controls + \varepsilon_{it} \quad (3)$$

Where INV is the ratio of investment to PPE, $REex$ is the firm level real estate risk exposure, α_i is firm fixed effect, δ_t is time fixed effect. Firm characteristics control variables follow the conventions in the literature: I use the nature logarithm of firm's market capitalization (Size) as firm size, the logarithm of firms' market value divided by its book value (logMB) as market-to-book ratio. To capture the firm's financial slack, I use cash flows including both cash and short-term investment measured as log(Cash). I measure financing both in term of access and amount.

My goal is to provide an estimate of the financial multiplier (i.e. by how much an increase in real estate volatility increases/decreases investment) at the firm-level. Be minded that the coefficient measures how investment responds to real estate risk overall (real estate market factor), as well as how a firm's investment responds to each additional increase in real estate volatility the firm exposes to (firm level real estate risk exposure). The specification allows me to abstract from real estate shocks that would affect both firms with and without real estate assets.

However, I am mindful that there might be endogeneity in the estimation of equation that real estate risk could be correlated with investment opportunities. I address the influence using the financial crisis as a natural experiment. During the financial crisis, all firms are experiencing the downturns of the real

economy and shrink their investment. The downturn in real estate market is unlikely to provide firm with the investment opportunities during the subprime crisis.

2.4.4 Real Estate Risk and Corporate Financing Choice

Standard finance theories with credit/collateral constraints predict that an increasing collateral value will lead to more debt issuance. Secured on the appreciated value of land holdings, Gan (2007) and Chaney, Sraer and Thesmar (2012) find that an increase in real estate value will exert a positive collateral effect on corporate investments. However, the inherent assumption in their papers is that the real estate risk is relatively constant with other asset classes. Since the risk embedded in real estate assets alters a firm's underlying risk and affect the liquidation value, the firm is likely to resort to an alternative outside financing instead of debt issuance. I intend to analyze how the real estate risk affects the financing choices as follows.

$$EXF_{it} = \alpha_i + \delta_t + \beta REex_{it} + \gamma controls + \varepsilon_{it} \quad (4)$$

where EXF is external financing such as debt and equity issuance, respectively. For the analysis is on debt financing, EXF_{it} are log(new debt issuance amount) and log(change in debt balance) observed for each firm in each year, respectively. REex is real estate industry specific risk and firms' exposure to real estate risk, α_i is firm fixed effect, and δ_t is time fixed effect. Control variables include market-to-book ratio, cash, leverage and others that are identified in the previous studies.

As for equity issuance, EXF_{it} takes both the access and amount. To measure access, EXF_{it} takes the value 1 if the firm i issues equity in year t, otherwise 0. For the amount, EXF_{it} takes log(equity issuance amount) for firm i and year t.

2.4.5 Control variables

I include a set of control variables for firms' characteristics that have been documented in previous studies. I use the nature logarithm of firm's market capitalization (Size) to control for firm size. I calculate firms' market-to-book ratio (logMB) as the logarithm of firms' market value divided by its book value in the most recent quarter. Cash and short-term investment (Cash) is applied to control firm's financial slack.

2.5 Empirical Results

2.5.1 Descriptive Statistics

Table 2.1 describes the key variables and the controls will be used in this research. Variables are the real estate risk, firm level real estate risk exposure, firm real estate value, market-to-book ratio, cash, and leverage.

[Insert Table 2.1]

In Figure 2.1 I plot in Figure 1 the market returns and the estimated real estate industry specific risk (REF) across the sample over 1985 to 2010. It is salient that the market and real estate specific returns have varied significantly over time. These two markets co-moves better and the volatility is relatively smaller in real estate market prior 1997 than afterwards. Both real estate risk and market risk exhibit wider fluctuations in early 2000s when the tech-bubble hits the peak and burst with market suffered from a downturn and bottomed

out in 2000. After 2005, real estate market fluctuates more than the stock market as the subprime crisis emerges.

[Insert Figure 2.1]

To verify that firm's exposure to real estate risk is not a mimicking for the market exposure, I form 10*10 portfolios based on firm size and real estate βs estimated with data in the prior five years in any during 1985 to 2010. Then I estimate the portfolio's real estate beta and market beta.

Table 2.2 shows average returns, post-ranking real estate βs and market βs for portfolios formed from 1985 to 2010. Forming portfolios on size and pre-ranking real estate βs helps to magnify the range of both post-ranking real estate βs and market βs. Panel A of Table 2.2 shows the average monthly returns for each portfolio. The spread of return across the 10 real estate β deciles is smaller than the spread across the 10 size deciles. And the spreads of average returns across the real estate β deciles decrease with firm's size.

Panel B and Panel C of Table 2.2 show the distributions of post-ranking real estate βs and market βs for the portfolio. It is observed that post-ranking real estate βs closely reproduce the ordering of the pre-ranking real estate βs. However, the post-ranking market βs seem to reproduce the inverse ordering of the pre-ranking real estate βs. This again suggests that real estate factor is not a mimicking factor for the market factor.

[Insert Table 2.2]

2.5.2 Real Estate Risk and Corporate Investment

Table 2.3 presents the results on real estate risk and corporate investment level. The dependent variable is corporate investment level scaled by lagged PPE (in logarithm) in the observation year. The independent variables are the real estate risk factor (REF), firm level real estate risk factor, firm real estate exposure (risk loading), firm real estate value, market-to-book ratio, cash, and leverage.

Column (1) reports the results with the simplest estimation with only control variables, and they explain about 8.9 % of corporate investment. In Column (2), I include only the real estate industry specific risk (REF) as the independent variable. I find that the coefficient is negative and significant and REF by itself explains 1.4 % variation of corporate investment. In Column (3), I include only the firms' exposure to real estate risk (REF exposure) in the specification. The coefficient is also significantly negative, with an explanation power of 2.15% on the investment variation. From Column (4) to Column (6), I include both real estate risk and controls in the specification. The coefficients for the real estate risk measures remain negative and significant. All the adjusted R^2s have significantly improvement after incorporating the real estate risk measures. Column (7), I include firm's real estate value (RE value scaled by PPE) in specification. I find that, in consistent with previous studies(Chaney, Sraer and Thesmar, 2012), the coefficient is positive and significant.

It is problematic to directly measure adjustment costs. Nevertheless, as real estate assets have higher adjustment cost λ compared to other corporate assets,

it is reasonable to assume that the portion of real estate assets over total assets is highly correlated with firms' assets' adjustment cost. In column (8), I include real estate assets portion in the specification. I find that the coefficient on the real estate assets portion is significantly negative.

Overall, the results in table 2.3 provide support to the hypotheses that corporate investment is negatively associated with the real estate risk.

[Insert Table 2.3]

To control for the endogeneity in investment opportunity, I run the regression in the subsample from 2007 to 2009, when the twin crises in real estate market and real economy both occurred. This setting gives two advantages: First the investment opportunity is relatively and homogeneously low for all firms in the twin crises; and second, the correlated risk between real estate and other corporate assets are high during the crisis period. I find that the coefficients on the real estate risk measures remain significantly negative and the magnitude of all the measures are greater compared with those in whole sample result. However, the measure for the firm real estate value loses its explanation power in the subsample, which suggests that the findings on the real estate value in relation to investment during crisis (Gan 2007) is indeed a specific case of our model's prediction on risk, rather than the effect of real estate value.

[Insert Table 2.4]

2.5.3 Real Estate Risk and Corporate Financing Choice

Standard finance theories with credit/collateral constraints predict that an increasing collateral value leads to more debt issuance. Secured on the

appreciated value of land holdings, Gan (2007) and Chaney, Sraer and Thesmar (2012) find that an increase in real estate value will exert a positive collateral effect on corporate investments. However, the inherent assumption in their papers is that the real estate risk is relatively constant with other asset classes. Since the risk embedded in real estate assets alters a firm's underlying risk and affect the liquidation value, the firm is likely to resort to an alternative external financing instead of debt financing.

2.5.3.1 Debt Financing

Table 2.5 presents the results of multivariate regression on real estate risk and inflows of debt: long term debt issuance. Coefficients for all the real estate risk measures are negative and significant. I find that when the real estate risk increases, real estate holding firms make fewer debt issuances. Columns (5) to (7) confirm the robustness by looking at the relation between the real estate risk and changes in long-term debt. Borrowers are likely to resort to other financing methods than long-term liabilities to finance their additional investment in the face of heightened real estate risk. In comparison, when the firm real estate value increases, firm resorts to debt financing via the collateral channel of real estate.

[Insert Table 2.5]

2.5.3.2 Equity Financing

As firms' assets risk also affect equity financing cost, I report in table 2.6 the results on how equity financing is affected. The dependent variable is a dummy variable that takes the value one when the firm issue new equity in the

year, otherwise zero. I find that both real estate risk measures are significantly and negatively associated with the likelihood of firm issuing new equity. The coefficient on firm real estate value however is negative and significant, which aligns with crowding of debt through collateral effects.

[Insert Table 2.6]

I further test how much the equity issuance quantitatively could be explained by the real estate risk. In Table 2.7, I regress log(new equity issuance amount) on real estate risk and firm characteristics. I find that both real estate risk measures are significantly and negatively associated with the amount raised through equity. Overall, the results in table 2.6 and 2.7 support my hypothesis that the risk of real estate assets raises financing costs, which reduces equity financing.

[Insert Table 2.7]

2.5.3.3 Real Estate Risk and Capital Structure

The final question on the real estate risk is whether this effect persists. Cvijanovic (2013) documents the collateral channel of real estate exerts a long term impact on firm's capital structure. An increase in collateral value will reduce a firm's annualized cost of debt in the long term, highlighting the importance of collateral values in mitigating information imperfections.

Table 2.8 presents the results of multivariate regression on real estate risk and capital structure. The result shows that the real estate industry specific risk is negatively associated with the leverage (H3A). However, in cross sectional, firm specific exposure to real estate market is positively associated with firm

leverage (H3B), but the magnitude is small. In Columns (3) to (4), I conduct robustness test by replace the leverage with its change as the dependent variable and the results are consistent with those in the first two columns.

[Insert Table 2.8]

2.6 Robustness Check

In unreported analysis, besides employing a two factor asset pricing framework in the main analysis, I use other multi-factor models, including Fama-French factor models, models with lagged beta structures. All results are qualitatively similar across the various multi-factor model representations.

2.7 Conclusions

Real estate composes a significant part of firm's portfolio. However, very little is known about the effects of real estate risk on these firms. This research explores the link between the real estate risk and corporate investment of these firms. Using the US general firm data from 1985 to 2010, I document that real estate risk embedded in corporate real estate holdings affect the corporate investment decisions made by firms' managers (a negative effect), and decrease the external finance in both debt and equity.

So far this research is the first to directly examine the real estate risk on firm's corporate investment and its performance. While real estate composes a significant part of firm's portfolio, very little is known about the effects of real estate risk on these firms. My paper fills the gap with empirical tests. This

research also provides significant information on corporate real estate values as well as guidance to the corporate investment decisions making for firm managers.

Table 2.1 Descriptive Statistics

This table describes the key variables and the controls will be used in this research. Variables are the real estate risk measures at the market and the firm level, firm level real estate risk exposure, market-to-book ratio, cash and leverage.

Panel A

	REF	RE exposure
Mean	-0.00179	0.261
Medium	-0.00283	0.215
Standard Deviation	0.0136	0.792
Observations	61063	61063

Panel B

	Investment	Cash	Asset	Market-to-book	Leverage
Mean	0.256	2.193	5.468	1.590	0.316
Medium	0.191	2.190	5.381	1.109	0.302
Standard Deviation	2.594	2.420	2.185	2.011	0.252
Observations	61063	61063	61063	61063	61063

Figure 2.1 The market factor and the real estate risk from 1985 to 2010

The figure plots the market factor and the estimated real estate risk across the sample over 1985 to 2010. Real estate risk is calculated by using in the following model.

$$R_{re,t} = \alpha_0 + \alpha_1 R_{mk,t} + \varepsilon_t$$

Where R_{re} is the excess REIT return, calculated as the returns on the composite REITs index minus the U.S risk-free rate. R_{mk} is the return on the CRSP value-weighted portfolio in excess of the U.S risk-free rate. The real estate risk is defined as the monthly residual ε_t from the time-series regression.

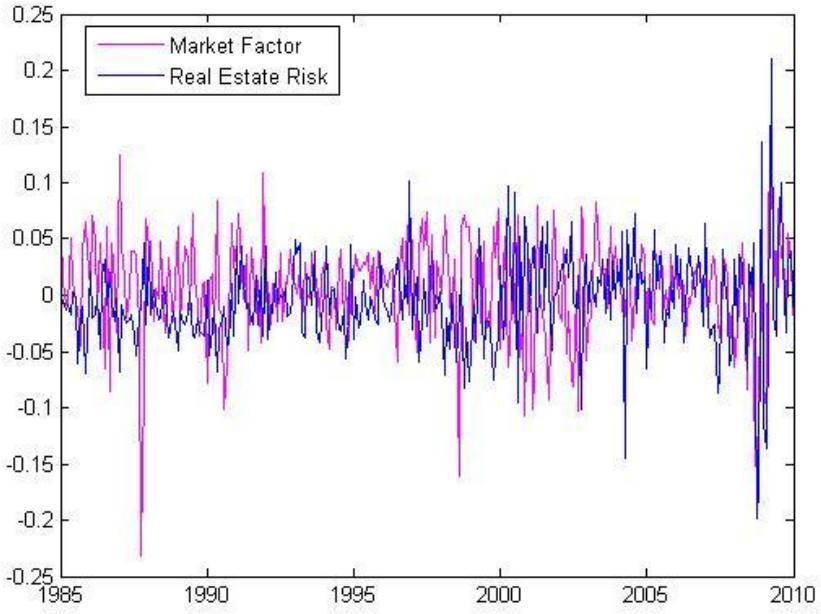

Table 2.2 Average Returns, Post-Ranking βs For Portfolios Formed on Size and then Real Estate β: 1985 to 2010

This table presents the average returns, post-ranking betas for portfolios formed on firm size and firm level real estate risk exposure (beta). Firm level real estate risk exposure and market beta estimated using the following model.

$$R_{it} - R_f = \alpha_0 + \beta_i^{mk}(R_{mk,t} - R_f) + \beta_i^{re}(R_{re,t} - R_f) + \varepsilon_{it}$$

Where R_{re} is the excess REIT return, calculated as the returns on the composite REITs index minus the U.S risk-free rate. R_{mk} is the return on the CRSP value-weighted portfolio in excess of the U.S risk-free rate. The coefficient β_i^{mk} is the market beta. The coefficient β_i^{re} (the real estate beta) is the firm i's exposure to the real estate risk factor, after controlling the stock market movement. All betas prior observation month is calculated by regressing their past 60 month returns on market and real estate factors. Observations with less than 24 months return data in their prior 60 months are excluded.

	All	Low-β	β-2	β-3	β-4	β-5	β-6	β-7	β-8	β-9	High-β
Panel A: Average Monthly Returns											
All	1.18%	1.30%	1.10%	1.08%	1.01%	1.01%	1.12%	1.16%	1.20%	1.29%	1.52%
Small-ME	1.87%	2.29%	1.88%	1.74%	1.79%	1.74%	1.64%	1.62%	1.64%	1.89%	2.47%
ME-2	1.42%	1.82%	1.26%	1.31%	0.90%	1.09%	1.28%	1.48%	1.52%	1.70%	1.83%
ME-3	1.20%	1.38%	1.24%	1.20%	1.21%	0.85%	1.14%	0.97%	1.10%	1.18%	1.72%
ME-4	1.15%	1.22%	1.18%	1.10%	0.76%	0.79%	1.11%	1.08%	1.23%	1.50%	1.52%
ME-5	1.03%	1.13%	0.76%	0.74%	0.80%	0.97%	1.15%	1.11%	1.25%	1.17%	1.18%
ME-6	1.02%	0.93%	0.88%	0.95%	0.93%	0.93%	0.97%	1.16%	1.01%	1.07%	1.37%
ME-7	1.06%	1.15%	0.94%	0.97%	0.83%	0.95%	1.03%	1.17%	1.14%	1.18%	1.29%
ME-8	1.06%	0.88%	1.02%	0.98%	1.01%	0.95%	1.08%	1.07%	1.09%	1.18%	1.28%
ME-9	1.02%	1.23%	0.79%	0.95%	0.92%	0.97%	0.85%	0.98%	1.17%	1.07%	1.31%
Large-ME	0.96%	0.93%	1.01%	0.89%	0.90%	0.85%	0.94%	1.01%	0.88%	1.00%	1.19%

\

	All	Low-β	β-2	β-3	β-4	β-5	β-6	β-7	β-8	β-9	High-β
Panel B: Post Ranking real estate βs											
All	0.27	0.02	0.16	0.24	0.24	0.27	0.27	0.28	0.30	0.36	0.51
Small-ME	0.18	0.09	0.11	0.19	0.10	0.21	0.16	0.16	0.23	0.23	0.33
ME-2	0.18	0.05	0.17	0.20	0.17	0.16	0.15	0.17	0.21	0.18	0.32
ME-3	0.24	0.01	0.16	0.25	0.30	0.26	0.27	0.29	0.12	0.26	0.45
ME-4	0.31	0.03	0.25	0.27	0.30	0.34	0.36	0.34	0.38	0.39	0.47
ME-5	0.33	0.13	0.26	0.30	0.34	0.29	0.30	0.29	0.37	0.46	0.54
ME-6	0.36	0.06	0.23	0.35	0.35	0.41	0.41	0.31	0.34	0.50	0.59
ME-7	0.35	0.08	0.18	0.31	0.29	0.34	0.35	0.39	0.42	0.44	0.65
ME-8	0.33	0.02	0.17	0.32	0.33	0.33	0.31	0.37	0.34	0.46	0.64
ME-9	0.25	-0.05	0.12	0.18	0.19	0.27	0.22	0.27	0.27	0.37	0.66
Large-ME	0.14	-0.19	-0.07	0.07	0.06	0.13	0.19	0.19	0.27	0.26	0.45

Panel C: Post Ranking market βs											
All	0.80	1.36	0.99	0.76	0.70	0.65	0.66	0.67	0.66	0.74	0.80
Small-ME	0.71	1.14	0.80	0.74	0.71	0.54	0.60	0.55	0.53	0.68	0.79
ME-2	0.76	1.22	0.90	0.79	0.68	0.67	0.58	0.68	0.56	0.74	0.79
ME-3	0.76	1.28	0.93	0.64	0.65	0.60	0.59	0.62	0.69	0.75	0.82
ME-4	0.77	1.36	0.99	0.69	0.58	0.59	0.65	0.58	0.66	0.72	0.87
ME-5	0.78	1.39	0.87	0.69	0.59	0.61	0.69	0.71	0.64	0.77	0.82
ME-6	0.79	1.42	0.99	0.71	0.59	0.59	0.62	0.66	0.68	0.76	0.86
ME-7	0.81	1.40	1.00	0.72	0.73	0.70	0.70	0.69	0.66	0.75	0.77
ME-8	0.83	1.39	1.09	0.76	0.76	0.65	0.70	0.68	0.74	0.73	0.75
ME-9	0.88	1.49	1.10	0.90	0.81	0.73	0.73	0.74	0.77	0.78	0.74
Large-ME	0.91	1.51	1.20	0.98	0.90	0.79	0.76	0.76	0.71	0.75	0.76

Table 2.3 Real Estate Risk and Corporate Investment

This table presents the results on real estate risk and corporate investment level. The dependent variable is corporate investment level scaled lagged PPE (in logarithm) in the observation year. The independent variables are firm level real estate risk exposure, the real estate risk, market-to-book ratio, cash, leverage and sale. *, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

	Y= log (CAPEX/PPE)						
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
REF		-6.661***		-4.944***			
		(-14.54)		(-11.00)			
RE exposure			-0.0460***		-0.0185**		
			(-5.62)		(-2.37)		
RE value						0.00880***	
						(6.59)	
RE weight							-0.777***
							(-9.16)
Period				-0.00789*	-0.392***	-0.388***	-0.104***
				(-1.78)	(-13.01)	(-12.88)	(-7.18)
Market-to-book	0.0997***			0.0979***	0.0948***	0.0950***	0.0977***
	(13.42)			(13.35)	(12.97)	(12.97)	(13.33)
Cash	0.0432***			0.0448***	0.0481***	0.0483***	0.0366***
	(9.24)			(9.57)	(10.07)	(10.11)	(8.10)
Asset	-0.142***			-0.143***	-0.144***	-0.143***	-0.144***
	(-11.29)			(-11.43)	(-11.40)	(-11.32)	(-11.56)
Sale	0.129***			0.129***	0.126***	0.125***	0.134***
	(11.32)			(11.34)	(11.08)	(11.02)	(11.85)
Leverage	-0.648***			-0.639***	-0.641***	-0.648***	-0.632***
	(-21.46)			(-21.20)	(-21.25)	(-21.47)	(-21.19)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effect-firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effect-year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	61063	61063	61063	61063	61063	61063	61063
Adjusted R^2	0.0890	0.0141	0.0215	0.0910	0.103	0.107	0.0928

Table 2.4 Real Estate Risk and Corporate Investment during the subprime crisis

This table presents the results on real estate risk and corporate investment level during the financial crisis. The dependent variable is corporate investment level scaled by PPE in the observation year. The independent variables are firm level real estate risk exposure, the real estate risk, market-to-book ratio, cash, leverage and sale. *, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

Y= log (CAPEX/PPE): Subsample 2007-2009						
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
REF		-10.49***		-11.57***		
		(-7.68)		(-11.13)		
RE exposure			-0.104***		-0.0736**	
			(-3.22)		(-2.36)	
RE value						-0.246
						(-0.70)
Market-to-book	0.0984***			0.106***	0.109***	0.125***
	(6.99)			(7.37)	(7.53)	(8.66)
Cash	0.0539***			0.0482***	0.0531***	0.0525***
	(5.23)			(4.48)	(5.18)	(5.03)
Asset	-0.0876***			-0.0842***	-0.0832***	-0.0800**
	(-2.73)			(-2.63)	(-2.61)	(-2.42)
Sale	0.0748**			0.0753**	0.0709**	0.0779**
	(2.49)			(2.56)	(2.38)	(2.56)
Leverage	-0.591***			-0.586***	-0.594***	-0.592***
	(-8.24)			(-8.06)	(-8.29)	(-8.18)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effect-firm	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	6913	6913	6913	6913	6913	6913
Adjusted R^2	0.0730	0.292	0.0498	0.0847	0.0851	0.0730

Table 2.5 Real Estate Risk and Long Term Debt Issuance

This table presents the results on real estate risk and long term debt issuance. The dependent variable is firm's long term debt issuance in the observation year. The independent variables are firm level real estate risk exposure, the real estate risk, market-to-book ratio, cash, leverage and sale. *, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

	Log(long-term debt issued in amount)			**Log(Changes in Long Term Debt balance)**		
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
REF	-14.17***			-23.99***		
	(-5.07)			(-16.59)		
RE exposure		-0.214***			-0.261***	
		(-4.57)			(-8.51)	
RE value			0.356*			0.839***
			(1.71)			(2.82)
period	1.066***	0.241***	0.550***	0.813***	0.561***	0.685***
	(22.40)	(2.96)	(6.44)	(14.71)	(4.28)	(5.25)
Market-to-book	0.0435**	0.0317	0.0383*	0.0526**	0.0383*	0.0460**
	(2.14)	(1.62)	(1.92)	(2.54)	(1.93)	(2.27)
Leverage	3.941***	3.977***	3.926***	4.813***	4.876***	4.799***
	(31.15)	(31.71)	(31.24)	(36.25)	(37.01)	(36.28)
Profit	4.376***	4.422***	4.403***	4.241***	4.307***	4.298***
	(24.80)	(25.46)	(25.23)	(19.26)	(19.56)	(19.56)
Tangible Asset	0.959***	1.053***	1.059***	0.997***	1.061***	1.037***
	(7.15)	(7.88)	(7.81)	(7.41)	(7.93)	(7.65)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effect-firm	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effect-year	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	33,861	33,861	33,861	20,926	20,926	20,926
Adjusted R^2	0.218	0.243	0.239	0.242	0.261	0.256

Table 2.6 Real Estate Factor and Probability of Equity Issuance

This table presents the results on real estate risk and equity issuance. The dependent variable is the equity issuance dummy in the observation year. The independent variables are firm level real estate risk exposure, the real estate risk, market-to-book ratio, cash, leverage and sale. *, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

	Equity Issuance Dummy			
	Column 1	Column 2	Column 3	Column 4
REF		-97.96***		
		(-16.97)		
RE exposure			-0.0849***	
			(-4.23)	
RE value				-0.00295***
				(-5.41)
Cash	0.210***	0.165***	0.208***	0.215***
	(18.04)	(15.25)	(17.86)	(18.30)
Market-to-book	0.0457***	0.0113	0.0444***	0.0469***
	(3.94)	(1.27)	(3.88)	(4.05)
Profit	-1.694***	-1.397***	-1.673***	-1.854***
	(-12.91)	(-11.46)	(-12.80)	(-13.86)
Sale	0.0575***	0.0434***	0.0562***	0.107***
	(4.35)	(3.52)	(4.25)	(7.59)
Leverage	-0.610***	-0.231***	-0.586***	-0.563***
	(-7.82)	(-3.05)	(-7.50)	(-7.20)
Period	5.743***	4.896***	5.730***	7.043***
	(17.22)	(14.71)	(17.18)	(7.99)
Constant	Yes	Yes	Yes	Yes
Fixed Effect-firm	Yes	Yes	Yes	Yes
No. of Obs.	60004	60004	60004	60004
Pseudo R2	0.208	0.355	0.209	0.229

Table 2.7 Real Estate Factor and Net Equity Issuance

This table presents the results on real estate risk and net equity issuance. The dependent variable is the net equity issuance amount in the observation year. The independent variables are firm level real estate risk exposure, the real estate risk, market-to-book ratio, cash, leverage and sale. *, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

Log(Equity Issuance Amount)			
	Column 1	Column 2	Column 3
REF		-79.77***	
		(-15.99)	
RE exposure			-0.106***
			(-3.94)
Cash	0.395***	0.395***	0.392***
	(23.86)	(23.93)	(23.92)
Market-to-book	0.410***	0.409***	0.408***
	(9.53)	(9.51)	(9.54)
Profit	-0.327***	-0.328***	-0.307***
	(-2.74)	(-2.77)	(-2.58)
Sale	0.466***	0.466***	0.469***
	(22.25)	(22.31)	(22.56)
Leverage	-0.0854	-0.0817	-0.0570
	(-0.89)	(-0.86)	(-0.60)
Constant	Yes	Yes	Yes
Fixed Effect-firm	Yes	Yes	Yes
Fixed Effect-year	Yes	Yes	Yes
No. of Obs.	24481	24481	24481
Adjusted R^2	0.441	0.447	0.442

Table 2.8 Real Estate Factor and Capital Structure

This table presents the results on real estate risk and capital structure. The dependent variable is the book leverage and its change in the observation year. The independent variables are firm level real estate exposure, the real estate risk, market-to-book ratio, cash, leverage and sale. *, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

	Leverage		**Change in Leverage**	
	Column 1	Column 2	Column 3	Column 4
REF	-0.396*		-0.376*	
	(-1.95)		(-1.70)	
RE exposure		0.0243***		0.0295***
		(11.87)		(13.22)
Market-to-book	-0.0183***	-0.0179***	-0.0171***	-0.0164***
	(-12.99)	(-13.10)	(-11.46)	(-11.32)
Cash	-0.0446***	-0.0440***	-0.0408***	-0.0400***
	(-33.86)	(-33.45)	(-29.99)	(-29.53)
Sale	0.00616**	0.00540*	0.00555*	0.00471*
	(2.20)	(1.93)	(1.95)	(1.66)
Profit	-0.197***	-0.198***	-0.106***	-0.107***
	(-16.96)	(-17.13)	(-10.83)	(-11.14)
Tangible Asset	0.166***	0.166***	0.156***	0.155***
	(14.96)	(15.01)	(13.60)	(13.63)
Constant	Yes	Yes	Yes	Yes
Fixed Effect-firm	Yes	Yes	Yes	Yes
Fixed Effect-year	Yes	Yes	Yes	Yes
No. of Obs.	62022	62022	55681	55681
Adjusted R^2	0.272	0.278	0.242	0.251

CHAPTER 3 REAL EARNINGS MANAGEMENT, LIQUIDITY AND REITS SEO DYNAMICS

The empirical corporate finance literature claims that information asymmetries would induce market frictions, which reduce the liquidity of the firm's securities. However, real activities manipulation may reduce the concern given its cash flow consequences. Using REITs as a unique laboratory, I show that managers engage in real earnings management to attract more uninformed trading in order to provide the liquidity services at lower cost during seasoned equity offerings. I find less liquid firms are more likely to manipulate earnings prior equity offerings and uninformed trading is higher following the real earnings management. Firms set the offer price at a smaller discount after engaging in real earnings management and stock returns decline in the long run. The findings are consistent with real option and liquidity explanations for equity offerings.

Keywords: Real estate investment trusts, liquidity risk, real earnings management, equity offering

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3.1 Introduction

A long-standing research question in accounting and finance literature is how financial transparency impacts individual firms. Managerial discretion over accounting choices and business practices render the potential possibilities for managers to manipulate earnings to disguise real corporate performance, i.e. earnings management. Previous studies suggest that such information asymmetries would induce frictions between sellers and buyers, which reduce the liquidity of the firm's securities. This reduction in liquidity is unwanted for firms either with large growth opportunities or who are unable to fund corporate investment internally, since those firms will face an increased cost of capital when resorting to external financing(Ng 2011).

If informational asymmetries create economic disadvantages for firms, a key question is why firms do not disclose all relevant private information to the marketplace and even distort earnings when conducting equity offerings. The evidence of the accrual based earnings management around seasoned equity offerings (DuCharme, Malatesta and Sefcik 2004; Rangan 1998; Teoh, Welch and Wong 1998) suggest that firms distort earnings report to inflate the share prices to benefit existing shareholders at the expense of potential shareholders. This could serve as one plausible explanation. However, recent observations show that SEO firms are found to engage in real earnings management during seasoned equity offerings and the decline in post-SEO firm performance is more severe compared to accrual manipulation(Cohen and Zarowin 2010). The finding is intriguing. Since real earnings management activities could distort the information quality to inflate prices like accrual-based earnings

management, their direct cash flow consequences could affect the stock volatility and liquidity, thus impact stock prices. The relationship among information transparency, stock liquidity and cost of equity is unclear in this regard.

The focus of my analysis is seasoned equity issuance of Real Estate Investment Trusts (REITs). Created in United States, Real Estate Investment Trusts (REITs), offer individuals the opportunities to invest in real properties. The tax-exempt feature of REITs requires REITs to distribute a minimum 90% of their taxable income to investors as dividends, limiting the possibility of free cash flow. Restricted investment options on real estate assets, REIT managers' cannot simply boost their compensation through activities like merger and acquisitions and also the dual performance measurement by net income and funds from operation limits agency problems. In such a relative transparent industry like REITs, REITs managers are inclined to engage in real earnings management activities over accrual based manipulation. Ambrose and Bian (2010) indicate that REITs firms that are suspected of earnings management do not seem to be more mispriced than the non-suspected firms, and the information seems to drive the negative earnings management. Moreover, since REITs with less cash flow from operations are less probable to external financing, their inclination to real earnings management is higher compared to general firms.

In this paper, I examine the impact of real earnings management activities on the REITs SEO process to explore the potential linkages among information transparency, stock liquidity and equity offerings. Corporate finance literature

suggests that firms time seasoned equity offerings either by selling the overpriced shares (window of opportunity/behavioural hypothesis) or by exploiting the time-varying risk to minimize the cost of equity (the risk-trade off hypothesis). Eckbo and Norli (2005) examine the risk factor associated with stock returns around seasoned equity offerings, concluding that liquidity risk also determines post-SEO stock returns. DeAngelo, DeAngelo and Stulz (2010) document that "most issuers would have run out of cash by the year after the SEO had they not received the offer proceeds". Lin and Wu (2010) also find a decrease in liquidity risk prior to SEO filing help to reduce firms' cost of equity.

Particularly, I apply a recently developed liquidity-augmented asset pricing model to measure the liquidity risk and market risk for REITs. I focus on REITs' exposures to liquidity risk and market risk in relation to the level of real earnings management around SEO to (1) test the role of real earnings management in REITs SEO timing, and (2) examine whether real earnings management will play a role in SEO firms' stock price dynamics.

I find that REITs managers engage in real earnings management to attract more uninformed trading in order to provide the liquidity services at lower cost during seasoned equity offerings. Less liquid firms are more likely to manipulate earnings prior equity offerings, and uninformed trading is higher following the real earnings management. REITs set the offer price at a smaller discount after engaging in real earnings management and stock returns decline in the long run.

Contribution of this paper is manifold. First, I contribute to the REITs seasoned equity issuance literature by providing evidence that real earnings management influences REITs equity offering decision, supporting the notion that managers distort the earnings to time the market. Second, I contribute to the determinants of SEO discounting and underpricing by providing another important determinant - real earnings management. Third, I contribute to accounting literature by providing another setting where real earnings management plays a nontrivial role in market timing and price formation. Finally, this paper provides the empirical evidence on real earnings management and stock liquidity, supporting recent debates on information quality and liquidity risk.

This paper proceeds as follows. I review the relevant literature in Section II and construct the hypotheses in Section III. Section IV describes the data. Section V discusses the empirical results. Section VI presents the robustness test. Section VII concludes.

3.2 Literature Review

3.2.1 Real Earnings Management

Real earning management happens when managers disguise real economic performance by taking real economic actions. In Graham, Harvey and Rajgopal (2005)'s survey on more than 400 executives of U.S. firms, managers are willing to sacrifice small economic value for meeting earnings targets. Strong evidence is reported that managers take real economic actions, like decreasing discretionary expenditures to burn real cash flow for a desired reported earnings (Bartov 1993; Roychowdhury 2006). Real earnings

management masks a firm's current unbiased economic performance, and may endanger a firm's competitiveness in the long term (Wang and D'Souza 2006; Zang 2007). Unlike accrual-based earnings management, real earnings management could negatively impact on the level of future net cash flows and increase the volatility. Gunny (2010) tests the consequences of real earning management activities and results show that reported income increases through real earnings management activities. By reducing research and development (R&D) expenses for instance, real earnings management negatively impacts on the firm's future operating performance(Cohen, Dey and Lys 2008).

It is hard for outsiders to distinguish the suboptimal decisions from the optimal. After Sarbanes-Oxley Act (SOX) imposed more stringent reporting standards, firms started to switch from accrual-based earnings management to real earnings management methods. Though real earnings management costs higher (Roychowdhury 2006), it is more opaque and more difficult for outsiders to detect (Cohen and Zarowin 2010; Zang 2007). Later, Lobo, Zhang and Zhou (2008) confirm the time pattern of manager's preference on alternatives of earning management and indicate that the decrease in accruals earning management was smaller at firms with better corporate governance. Consistent with this hypothesis, in Mizik and Jacobson (2007)'s test around a seasoned equity offering, financial markets overvalue the firms' engaging in earnings inflation linked to real activity manipulation.

In REITs, real earnings management is a sparsely explored topic. Edelstein, Gao and Tsang (2013) document that REITs engage in significant real

activities manipulation, which, however, are constrained by the effect of corporate governance. Edelstein, Liu and Tsang (2009) indicate that REITs may employ real earnings management when confronting a constrained capability for meeting their legal dividend payout requirements. They find that these firms are more likely to reduce the taxable income and thus the required dividend payment, by deferring the recognition of revenue and by incurring expenses sooner. They further find that REITs which can generate less cash flow from operations and which have fewer opportunities to obtain external funding are more likely to engage in real earnings management. Ambrose and Bian (2010) investigate whether information generated from stock market trading influences managers' incentives to engage in earnings management in REITs and whether investors can anticipate earnings management. Their findings imply real earnings management is utilized to affect equity stock pricing.

3.2.2 REITs Seasoned Equity Offerings

The literature on REITs seasoned equity offerings is well established. There is a large literature providing estimates of the market reaction to security issue announcements. Like general stocks, a significant negative reaction is identified under the implication of Myers and Majluf (1984). Using REITs data from 1970 to 1985, Howe and Shilling (1988) document a negative stock price reaction to equity offerings and a positive stock price reaction to debt offerings. Ghosh, Nag and Sirmans (1999) report a significant negative market reaction using REITs equity offering in 1990s.

Another strand of literature on REITs seasoned equity offerings is concerned with capital structure changes. Since the trade-off and pecking order rationales are almost silent due to REITs unique characteristics, previous literature on REIT capital structure largely focuses on the signaling effects of equity and debt offerings of REITs (Howe and Shilling, 1988; Brown and Riddiough, 2003). Recent empirical results show that REITs time market within a general targeted debt ratio environment. Ooi, Ong and Li (2010) examine the public offerings timing attempts in REITs and targeted debt ratios. They point out that REITs time market within a general targeted debt ratio environment. Studies by Boudry, Kallberg and Liu (2010) and Ghosh, Roark and Sirmans (2011) also recorded strong evidence supporting the market timing theory in explaining the issuance decisions of REITs.

However, limited studies are conducted on REITs SEO pricing. Ghosh, Nag and Sirmans (2000) document that the significant REITs SEO underpricing is related with institutional ownership, issue size, and underwriter reputation. Goodwin (2011) further argues that when there is high placement cost and value uncertainty with new REITs shares, investors will ask for a greater discounting. Short-selling and IPO returns indicate the strong evidence for behavioral trading in REITs market (Blau, Hill and Wang 2011). Surprisingly, there is no work relating real earnings management to REITs seasoned equity issuance and its pricing process.

Much has been done in the areas of seasoned equity offerings, but questions remain. Recent research indicates that equity issuers often exercise large real investment options around equity offering, suggesting endogenous corporate

investment/financing decision determined by firm's asset in place. Since firm's real earnings management activities distort the firm cash flow, this would be interesting to ask how real earnings manipulation will affect the corporate financing decisions like seasoned equity offerings or how this will contribute to the expect stock returns.

3.2.3 Liquidity Risk

Liquidity risk is defined in Pastor and Stambaugh (2003)as a stock's return sensitivity to unexpected market liquidity changes. Empirical evidence supports for the pricing of liquidity risk, including the work of Pastor and Stambaugh (2003), Acharya and Pedersen (2005), and Sadka (2006). Pastor and Stambaugh (2003) incorporate their concept of liquidity into empirical test by estimating the correlation of a firm's stock return to aggregate liquidity (liquidity beta). Acharya and Pedersen (2005) further address four possible types of systematic risk between a firm and the market in return and liquidity. And several studies highlight the difference between liquidity risk and liquidity (Acharya and Pedersen 2005; Korajczyk and Sadka 2008; Lou and Sadka ; Sadka 2011).The liquidity risk of a particular stock is viewed as the stock return sensitivity to unexpected changes in market liquidity. However, the liquidity means the ability to trade large quantities at low cost and efficiently.

As discussed in the introduction, this study is largely motivated by Lambert, Leuz and Verrecchia (2007)'s theoretical work on the effect of information quality on market risk. Since real earnings management distorts firm's

information quality, the substantial effect of information quality on cost of capital through liquidity might be significant.

3.3 Hypothesis

Literature suggests that illiquid firms face an increased cost of capital when seeking external financing. Therefore, less liquid firms are more likely to increase its stock liquidity prior external financings to reduce the liquidity service cost. Since real earnings manipulations have direct cash flow consequences as well as distort information quality, my first objective is to examine whether there exists any relation between real earnings management and stock liquidity, i.e. whether firms adopt real earnings management to increase its stock liquidity. Ng (2011) evidence there exists a negative relation between information quality and liquidity risk. Since a higher level of real earnings management indicates lower information quality, therefore, my first hypothesis is

Hypothesis1 The decision by REITs to manage earnings via real activities manipulation is associated with its risk profile (pre-liquidity risk and pre-market risk).

My second objective is to analyze the economic impact of real earnings management. If certain firms manage earnings via real activities to increase their stock liquidity, this will result in a higher stock liquidity and an increasing presence of institutional investors. All these could attract more uninformed trading to further increase the liquidity. Therefore, my second hypothesis is

Hypothesis2 Pre-SEO abnormal trading is positively related with real earning management prior SEO.

Last but not the least, my third objective is to examine the impact of real earnings management on the subsequent stock performance.

Market timing theories argues that firms time seasoned equity offerings either by selling the overpriced shares (window of opportunity/behavioural hypothesis) or by exploiting the time-varying risk to minimize the cost of equity (the risk-trade off hypothesis). In the light of real earnings management, the manager invests inefficiently by engaging in real earnings management activities (exercising the investment option too early) in order to fool the investors into overvaluing the project's NPV before seasoned equity issuance. Therefore, I hypothesize:

Hypothesis3 Pre-SEO price mispricing is positively related with real earning management prior SEO.

Should real earnings management be attributable to good pre-filing stock performance, SEO firms with real earnings management will be less prone to market liquidity shocks. Investors will require a lower liquidity risk premium at and after the SEOs. Firms could set the offer price as a lower discount in line with liquidity service cost (floatation) reduction. Meanwhile, as point out in Hypothesis 1, the higher betas would make firms more inclined to real earnings management, which would further increase the risk. Hence, the impact of real earnings management on offer price becomes an empirical question. Therefore, I hypothesize

Hypothesis4 (A) SEO discounting is negatively related with the level of real earnings management prior SEO.

Hypothesis4 (B) SEO discounting is positively related with the level of real earnings management prior SEO.

However, real earnings management masks a firm's current unbiased economic performance, and may endanger a firm's competitiveness in the long term. SEO firms are also found to engage in real earnings management during seasoned equity offerings and the decline in post-SEO operating performance is more severe compared to accrual manipulation(Cohen and Zarowin 2010). Hence,

Hypothesis5 Post-SEO long run return is negatively related with the level of real earnings management prior SEO.

3.1 Data and Sample Description

I analyze the SEOs conducted by equity REITs during January 1, 2000 and December 31, 2011, reported in SDC database. The study period begins from 2000, since real earnings management activity is found to increase over accrual based earnings management in the recent decade. I further restrict the sample to 1) common share offerings 2) listed on NYSE, NASDAQ, or Amex, 3) nonmissing values on Compustat and CRSP. This finally generates 508 seasonal equity offerings.

Table 3.1 summarizes the descriptive statistics of the REITs SEO sample. Panel A summarizes the issuers' characteristics. The SEO firms in the sample

tend to have higher market to book value. This is expected, since firms tend to issue equity when their market valuations are overvalued. Panel B and Panel C present the SEO activities of REITs sector during the study period. Since the market suffered from a downturn and bottomed out in 2000, fewer SEOs were issued in early 2000. After 2001, REITs SEO activities revived and steadily increased onwards.

[Insert Table 3.1]

3.4 Research Design

3.4.1 Real Earnings Management Measure

I follow prior studies to construct the proxies for real earnings management (Cohen, Dey and Lys 2008; Kim, Lisic, Myers and Pevzner 2011; Roychowdhury 2006). I focus on the following three types of real earnings management activities.[3]

1. Timing the revenue recognition through cash flow from operations CFO.
2. Timing the recognition of the cost of goods sold COGS (i.e. property operating expenses for REITs).
3. Timing the property disposition.

I first estimate the normal level of CFO, property operating expenses and assets disposition by using the models implemented by Roychowdhury (2006). I express normal level of CFO as a linear function of sales in the last period and change in revenue in the last period. I estimate the following function by each year.

[3] There are other alternative real earnings management tools such as changing discretionary expenses including advertising, R&D, and SG&A expenses. However, they are not available to real estate firms.

$$\frac{CFO_{it}}{Assets_{i,t-1}} = k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{REV_{it}}{Assets_{i,t-1}} + k_3 \frac{\Delta REV_{it}}{Assets_{i,t-1}} + \varepsilon_{it}$$

(5)

Abnormal CFO (*ABCFO*) is the actual CFO minus the CFO estimated using the model.

I next model the property operating expenses as a linear function of contemporaneous revenue.

$$\frac{Xopr_{it}}{Assets_{i,t-1}} = k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{REV_{it}}{Assets_{i,t-1}} + k_3 D + k_4 \frac{REV_{it}}{Assets_{i,t-1}} D + \varepsilon_{it}$$

(6)

D is a dummy variable if revenue decreases compared with its last period.

Abnormal cost of goods sold (*ABEXP*) is the actual property operating expenses *Xopr* minus the *Xopr* estimated using the model.

For normal level of asset disposition, I model it as a linear function of market capitalization, fixed asset sales and capital expenditure.

$$\frac{GAIN_{it}}{Assets_{i,t-1}} = k_1 \frac{1}{Assets_{i,t-1}} + k_2 MV_t + k_3 \frac{ASALES_{it}}{Assets_{i,t-1}} + k_4 \frac{CAPX_{it}}{Assets_{i,t-1}} + \varepsilon_{it}$$

(7)

Abnormal property disposition (*ABDISP*) is Gain/Loss from the Sale of Property, Plant and Equipment and Investments minus the Gain/Loss estimated using the model.

All data used in the regressions are retrieved from COMPUSTAT, where CFO is the cash flow from operation, Assets is the total book value, REV is the total

revenue, ΔREV is the revenue growth, *Xopr* is the actual property operating expenses, GAIN is the gain from assets sales and income from assets sales/ disposition, *MV is* the market value, *Q* is Tobin-Q, *ASALES* is long-lived assets sales, and *CAPX* is long-lived investment sales.

I use abnormal CFO (*ABCFO*), abnormal cost of goods sold (*ABEXP*) and abnormal property disposition (*ABDISP*) as proxies for real earnings management in this paper. Given sales levels, REITs that manage earnings upwards are likely to have unusually low cash flow from operations, unusually high property operating expenses, and/or unusually low gain (even loss) from assets sales and income from assets sales/ disposition (Cohen and Zarowin 2010).

3.4.2 Liquidity-augmented CAPM

In a liquidity-augmented CAPM, the risk premium on stock i can be expressed as

$$E(R_{i,t}) - r_{f,t} = \beta_{m,t}[E(R_{m,t}) - r_{f,t}] + \beta_{liq,t}E(LIQ_t)$$

(8)

Where $E(R_{m,t})$ is the expected return of the market portfolio, $E(LIQ_t)$ is the expected value of the mimicking liquidity factor(Pástor and Stambaugh 2003), $\beta_{m,t}$ and $\beta_{liq,t}$ are firm i's market beta and liquidity beta, respectively.

To reflect the risk profile of each REIT, I calculate firm's betas prior SEO by regressing their past 36 month returns on market and liquidity factors obtained from WRDS website. Observations with less than 12 months return data in

their prior 36 months are excluded. In the primary results, I use the liquidity factor developed by Pástor and Stambaugh (2003) to estimate firm's pre-betas. For robustness check, I use the factors developed in Sadka (2006), which are based on the transitory-fixed and permanent-variable components of price impact.

3.4.3 Pre-SEO Misvaluation

To examine the impact of real earnings management on misvaluation before SEO, I decompose pre-issue market-to-book (m-b) ratios into misvaluation (m-v) and growth opportunities (v-b) following the methodology developed by Rhodes-Kropf, Robinson and Viswanathan (2005) (RKRV, thereafter), and utilized in several recent papers (Fu, Lin and Officer 2010; Hertzel and Li 2010; Hoberg and Phillips 2010) .

If investors overestimate the future cash flows or underestimate risks, market-to-value will capture the mispricing component of the market-to-book ratio. RKRV methodology estimates the firm value v by estimating both industry level accounting multiples and long run firm accounting multiples using the following equation.

$$m_{it} - b_{it} = m_{it} - v(\theta_{it}; \alpha_{jt}) + v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_{j}) + v(\theta_{it}; \alpha_{j}) - b_{it}$$

(9)

The first component $m_{it} - v(\theta_{it}; \alpha_{jt})$ measures the difference between market value and fundamental value estimated using firm-specific accounting data and the contemporaneous industry accounting multiples. This component is

the mispricing proxy I use in this paper. The third component $v(\theta_{it};\alpha_j)-b_{it}$ captures the growth opportunities.

To empirically separate mispricing component, RKRV (2005) adopt three different models to estimate firm value. I adopt RKRV's 3rd model to estimate the market value as follows[4]:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln(NI)^{+}_{it} + \alpha_{3jt} I_{(<0)} \ln(NI)^{+}_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it}$$

(10)

Where m is market value of equity, b is a book value of equity, $\ln(NI)^{+}_{it}$ is the natural logarithm of positive net income, I is an indicator function for negative net income observations, and LEV is leverage ratio.

To calculate the REITs industry wide accounting multiples, I run cross-sectional regressions for the REITs industry to obtain the estimated REITs industry accounting multiples $\hat{\alpha}_{jt}$ for each year t.

Hence, the estimated firm value is obtained in the following equation.

$$v(b_{it}, NI_{it}, LEV_{it}; \hat{\alpha}_{0jt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt}) = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt} b_{it} + \hat{\alpha}_{2jt} I_{(<0)} \ln(NI)^{+}_{it} + \hat{\alpha}_{3jt} LEV_{it}$$

(11)

[4] The 1st model includes book value and the 2nd model includes net income in addition to book value. Our results remain robust to either of these models. RKRV provides a detailed discussion of the rationale behind these models.

The difference between market value m_{it} prior to SEO issuance and the estimated firm value $v(b_{it}, NI_{it}, LEV_{it}; \hat{\alpha}_{0jt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt})$ is the proxy for stock mispricing.

3.4.4 Control Variables

I control for other determinants of SEO issuance and its price dynamics that have been documented in prior studies.

I include a set of control variables for firms' characteristics. I use the nature logarithm of firm's market capitalization (Size) to control for firm size. I also include REITs growth level (*Growth*), percentage change of total assets from last period. I calculate firms' market-to-book ratio (logMB) as the logarithm of firms' market value divided by its book value in the most recent quarter. Cash and short-term investment (Cash) and return on assets (ROA) are applied to control firm's financial slack.

The second set of control variables included are the SEO characteristics. *Uranking* is the underwriter reputation(Carter and Manaster 1990; Safieddine and Wilhelm Jr 1996). *SeqREIT* is constructed as the current SEO sequence regarding the REIT itself to account for the clustering and frequency of SEO (Ghosh, Nag and Sirmans 2000). *Age* is the number of years between the SEO year and the IPO year to measure the stage in firm life cycle as suggested in (DeAngelo, DeAngelo and Stulz 2010).

Lastly, I include variables for alternative explanations. Information asymmetry (InfoAs) is the abnormal return around earning announcement releases (Lowry, 2003). Investors' sentiment is also included to control for the possibility that

managers issue equities when investors are over-optimistic. Investors' sentiment index is constructed from University of Michigan's Consumer Sentiment Index, using the methodology described in Lemmon and Portniaguina (2006).

3.5 Empirical Results

3.5.1 Empirical Evidence of Real Earnings Management

Figure 3.1 descripts the average level of real earnings management activities in the SEO year and the years immediately preceding and following it using quarterly data. REITs that conduct SEOs generally exhibit unusually low cash flow from operations (negative), higher property operating expenses, and unusually low gain (negative) from assets sales and income from assets sales/ disposition prior issuance. Real earnings management activities increase significantly prior issuance and decline post issuance.

[Insert Figure 3.1]

I also report the average level of real earnings management activities of non-SEO REITs in the match period. Consistent with Cohen and Zarowin (2010), I find significant negative abnormal CFO and positive abnormal property operating expenses in the SEO year for REITs. And most importantly, I also find negative gains (loss) from abnormal assets sales and income from assets sales/ disposition in the SEO year for REITs, which has not been found in the study of general firms.

3.5.2 Determinants of Real Earnings Management

Unlike accrual earnings management, real earnings manipulations have direct cash flow consequences and could affect the stock volatility, thus impact stock prices. Ng (2011) evidence a negative relation between information quality and liquidity risk, which results in a reduction in the cost of equity. I analyze the determinants of real earnings management around SEO issuance in the following multivariate model.

$$REM_{jt} = \alpha_0 + \alpha_1 Liq\_beta_{jt} + \alpha_2 Mkt\_beta_{jt} + Controls_{jt} + Time + \varepsilon$$

(12)

Liquidity beta and market beta are calculated by regressing their past 36 month returns on market and liquidity factors using Liquidity Augmented CAPM model. The liquidity factor used is developed by Pástor and Stambaugh (2003) (WRDS website). Observations with less than 12 months return data in their previous 36 months are excluded.

Table 3.2 shows the determinants of real earnings management around SEOs. The coefficients for both liquidity risk and market risk are all with predicted signs and significant for the three real earnings management proxies. This indicates that REITs managers take the market risk and stock liquidity risk into consideration when they choose to manage earnings via real manipulation activities prior SEO. Firms with higher pre-beta, that is, more vulnerable to liquidity shocks and market turmoil, are more likely to manipulate their earnings via real earnings management activities (lower-than-average abnormal CFO, higher-than-average abnormal property operating expenses,

and lower-than-average negative gains (loss) from abnormal assets sales and income from assets sales/ disposition).

Table 3.2 also presents the relationship between the real earnings management and other variables. The coefficients for cash and short-term investment are negative, indicating that REITs are likely to manipulate earnings via timing the revenue and asset disposition around SEO when they are financially slack. Firm age affects differently across the three real earnings management proxies, suggesting that firms adopt different real earnings management tools based on their maturity.

Overall, my findings are consistent with the hypothesis that the decision by REITs to manage earnings via real activities manipulation around SEO is associated with its risk profile, supporting that REITs exploit the time-varying risk when conducting seasoned equity offerings.

[Insert Table 3.2]

3.5.3 Uninformed Trading and Real Earnings Management

As discussed in the previous section, firms with higher liquidity risk are more likely to engage in real earnings management activities. My next question is why real earnings management?

If certain firms manage earnings via real activities to increase their stock liquidity, this will result in a higher stock liquidity and an increasing presence of institutional investors. All these could attract more uninformed trading to further increase the liquidity as stated in Hypothesis 2.

I then test the impact of real earnings management activities on the investors trading activities. Using standard event study method, I calculate abnormal trading volume prior SEO. For each REIT, I use a maximum of 70 daily volume observations for the period around its respective SEO, starting at day -70 and ending at day -1 relative to the event. The first 65 days (three months) in this period (-70 through -5) is designated the 'estimation period', and the following 5 days (-5 through -1) is designated the 'event period'. The abnormal trading volume[5] prior SEO is estimated as

$$AV_{jt} = V_{jt} - \overline{V_j} \quad (13)$$

where V_{jt} and $\overline{V_j}$ are average trading volume for REIT j during the event period and the estimation period, respectively.

I analyze the impact of real earnings management around SEO issuance on uninformed trading in the following multivariate model.

$$AV_{jt} = \alpha_0 + \alpha_1 REM_{jt} + Controls_{jt} + Time + \varepsilon \quad (14)$$

where REM are the proxies for real earnings management.

Table 3 documents that the level of real earnings management is positive related with the uninformed trading in the market. The coefficients the three real earnings management proxies are with predicted signs and significant,

[5] In robustness test, I measure the abnormal trading volume using 22 days (one month), 44 days (two months) prior to SEO as the event period. A difference-in-difference analysis is also performed based on REITs pre-SEO liquidity.

indicating that less liquid firms are more likely to manipulate earnings prior equity offerings and uninformed trading is higher following the real earnings management. Increased uninformed trading will reduce the liquidity costs during seasoned equity offerings, which is exactly wanted by illiquid firms.

[Insert Table 3.3]

3.5.4 Real Earnings Management and SEO Price Dynamics

3.5.4.1 Pre SEO Stock Valuation

Based on the discussion in section 3.3, Hypothesis 1 predicts that pre-SEO stock mispricing is positively related with the level of real earnings management, since the REITs managers are induced to invest inefficiently by engaging in real earnings management activities to attempt to fool the market into overestimating the project's NPV before seasoned equity issuance. As described in the previous section, I adopt RKRV methodology to calculate the mispricing (*PreMis*) using firm stock closing price the day prior to SEO issuance. I analyze the relation between real earnings management and pre-issuance mispricing of SEO firms in the following multivariate model.

$$\Pr eMis_{jt} = \alpha_0 + \alpha_1 REM_{jt} + Controls_{jt} + Time + \varepsilon \quad (15)$$

REM are the three proxies for real earnings management.

Table 3.4 shows the results. The coefficients for real earnings management proxies are all significant with predicted signs. Real earnings management activities deviate stock price from the fundamental value, showing that

managers manipulate earnings to issue the equity at the expense of potential investors. The mispricing story hinges on the motivation for managers to take advantage of pre-existing exposures to systematic risks (liquidity, market). Intuitively, REM could result in additional information about the issuer which would information flow and liquidity trading, thereby pushing up stock price. Model's explanatory power (adjusted R square) significantly increases after incorporating real earnings management variables.

I document a negative relationship between mispricing level and information asymmetry (*InfoAs*), but this relationship is insignificant. Mispricing is higher for older firms and frequent equity issuers, implying that the market is deceived repeatedly by real earnings management activities. Overall, my findings are consistent with the hypothesis that pre-SEO stock mispricing is positively correlated with the real earnings management activities, lending support to the window of opportunity/behavioral hypothesis of seasoned equity offerings.

[Insert Table 3.4]

3.5.4.2 Real Earnings Management and SEO Discounting

Next I examine the relationship between the level of real earnings management and discounting. I specify the following regression.

$$Discounting_{jt} = \alpha_0 + \alpha_1 REM_{jt} + Controls_{jt} + Time + \varepsilon$$

(16)

Table 3.5 shows the results. The coefficients for real earnings management proxies are all significant with predicted signs. I observe that firms set the offer price at a smaller discount after engaging in real earnings management. Since Real earnings management should be attributable to good pre-filing stock performance, it results in a higher stock liquidity and an increasing presence of institutional investors. All these could attract more uninformed trading to issuing firms. As a consequence, SEO firms with real earnings management are less prone to market liquidity shocks, and investors will require a lower liquidity risk premium at and after the SEOs.

[Insert Table 3.5]

I am aware that in the sample, there are observations with zero discounting, which mean that firm simply sets the offer price at the market price. To investigate the impact of real earnings management on this phenomenon, I specify the following probit test.

$$DisATM_{jt} = \alpha_0 + \alpha_1 REM_{jt} + Controls_{jt} + Time + \varepsilon$$

(17)

$DisATM$ is a binary variable, indicating if the firm sets the offer price at the market price.

Shown from Table 3.6, the coefficients for real earnings management proxies are all significant with predicted signs. Firms are more likely to set the offer price at the market price if they engage in real earnings management prior SEO.

[Insert Table 3.6]

As for other control variables, sentiment is positively related with SEO discounting level, consistent with behavioral explanations for seasoned equity offerings. Besides, Loderer, Sheehan and Kadlec (1991) argue that many of IPO theories based on asymmetric information can be applied to seasoned equity offerings. Corwin (2003) provides analysis of these theories in the context of SEOs, whereas Goodwin (2011) examines the information asymmetry theories in the context of REIT SEOs. All these theories predict a positive relationship between the level of information asymmetry and discounting. The positive and significant relation between *InfoAs* and discounting is consistent with this reasoning. This also demonstrates that my proxies for real earnings management do not capture the effect of information asymmetry.

Above all, results show that firms set the offer price as a lower discount after engaging in real earnings management as a result of liquidity service cost (floatation) reduction.

3.5.4.3 Real Earnings Management and Long-run Stock Return

Finally, I look at the long run performance after REITs equity offerings. I define long-run abnormal return as SEO risk adjusted return for 3, 6, and 12 months using Fama-French four factor model.

$$R_{i,t} = \alpha + r_{f,t} + \beta_{1t}[E(R_{m,t}) - r_{f,t}] + \beta_{2t}SMB + \beta_{3t}HML + \beta_{4t}UMD + \varepsilon \quad (18)$$

Where $R_{i,t}$ is the REIT's rate of return, $r_{f,t}$ is the risk-free return rate, $R_{m,t}$ is the return of the stock market, SMB stands for return of "small minus big" portfolio, HML stands for return on "high book-to-market minus low book-to-market" portfolio, and UMD stands for momentum factor (MOM), which is long prior-month winners and short prior-month losers.

Since real earnings management activities disguise firm's performance and intend to fool the investors, I expect to observe lower long-run underperformance after seasoned equity offerings (Loughran and Ritter 1995) as real earnings management deviates firm from optimal business practice.

I specify a following multivariate regression to test the impact of real earnings management on long run returns.

$$Lret_{jt} = \alpha_0 + \alpha_1 REM_{jt} + Controls_{jt} + Time_t + \varepsilon$$

(19)

Shown in Table 3.7, stock returns decline in the long run with the level of real earnings management, consistent with previous findings on post-SEO underperformance on operating (Cohen and Zarowin 2010). Since the level of mispricing is greater for older and frequent equity issuers as found in the previous analysis, the underperformance of stock return in the long run lines up with the concept that the post-SEO price corrects price based on how much real earnings management took place prior to the SEO.

Furthermore, model's explanatory power (adjusted R square) increases after incorporating real earnings management variables.

[Insert Table 3.7]

3.6 Robustness Test

I am mindful that the equity issuance clustering effect might bias the estimates. I address this issue by clustering error terms (Petersen 2009). I estimate the models after clustering standard errors in unreported analysis.

For the key variables measurement, I include industry-based real earnings management proxies, calculated as the difference in each measure between the REIT and its industry average. I also estimate the liquidity risk loadings by using the factors developed in Sadka (2006), which are based on the transitory-fixed and permanent-variable components of price impact. As for the abnormal trading volume, I measure the abnormal trading volume using 22 days (one month), 44 days (two months) prior to SEO as the event period in the unreported analysis. And the result remains significant and robust.

3.7 Conclusions

The evidence of accrual based earnings management around seasoned equity offerings (DuCharme, Malatesta and Sefcik 2004; Rangan 1998; Teoh, Wong and Rao 1998) suggest that firms distort earnings report to inflate the share prices. Meanwhile, SEO firms are also found to engage in real earnings management during seasoned equity offerings and the decline in post-SEO firm performance is more severe compared to accrual manipulation (Cohen

and Zarowin 2010). The finding is intriguing, since while real earnings management activities could distort the information quality to inflate prices like accrual-based earnings management, real earnings manipulations also have direct cash flow consequences and could affect the stock volatility, thus impact stock prices. However, there is no study examining how real earnings management affect the stock return and cost of equity around seasoned equity offering. My research fills the gap.

In this paper, I examine the impact of real earnings management activities on the REITs SEO process to revisit the window of opportunity and risk-return trade-off hypotheses debated in the literature. Given the high dividend payout feature and restricted investment options on real estate assets, REITs managers are inclined to engage in real earnings management activities over accrual based manipulation compared to general firms. Particularly, I apply a recently developed liquidity-augmented asset pricing model to measure the liquidity risk and market risk for SEO firms. I focus on firms' exposures to liquidity risk and market risk in relation to the level of real earnings management around SEO to (1) test the role of real earnings management in SEO timing, and (2) examine whether real earnings management will impact SEO firms' stock return.

I find that REITs managers engage in real earnings management to attract more uninformed trading in order to provide the liquidity services at lower cost during seasoned equity offerings. I find less liquid firms are more likely to manipulate earnings prior equity offerings and uninformed trading is higher following the real earnings management. Firms set the offer price at a smaller

discount after engaging in real earnings management and stock returns decline in the long run. The findings are consistent with real option and liquidity explanations.

Overall, real earnings management seems to play an important role in REITs seasoned equity offerings. Future research will link up property disposition and acquisition with the real earnings management activities in the empirical analysis.

Table 3.1 Descriptive statistics for REITs firms conducting SEOs during 2000–2011

Panel A: REITs SEO Characteristics

Variable	Median	Mean	Std. Dev.
Asset	1935.76	2888.57	3131.39
Market Capitalization	2398.43	3505.82	3828.08
Leverage	0.46	0.48	0.16
Market to Book	1.16	1.21	0.30
Offer Amount	102.05	165.62	182.48

Panel B: Time Distribution

Year	Freq.	Percent%	Cum.%
2000	3	0.59	0.59
2001	29	5.71	6.30
2002	28	5.51	11.81
2003	50	9.84	21.65
2004	47	9.25	30.91
2005	39	7.68	38.58
2006	59	11.61	50.20
2007	25	4.92	55.12
2008	35	6.89	62.01
2009	60	11.81	73.82
2010	69	13.58	87.40
2011	64	12.60	100.00
Total	**508**		

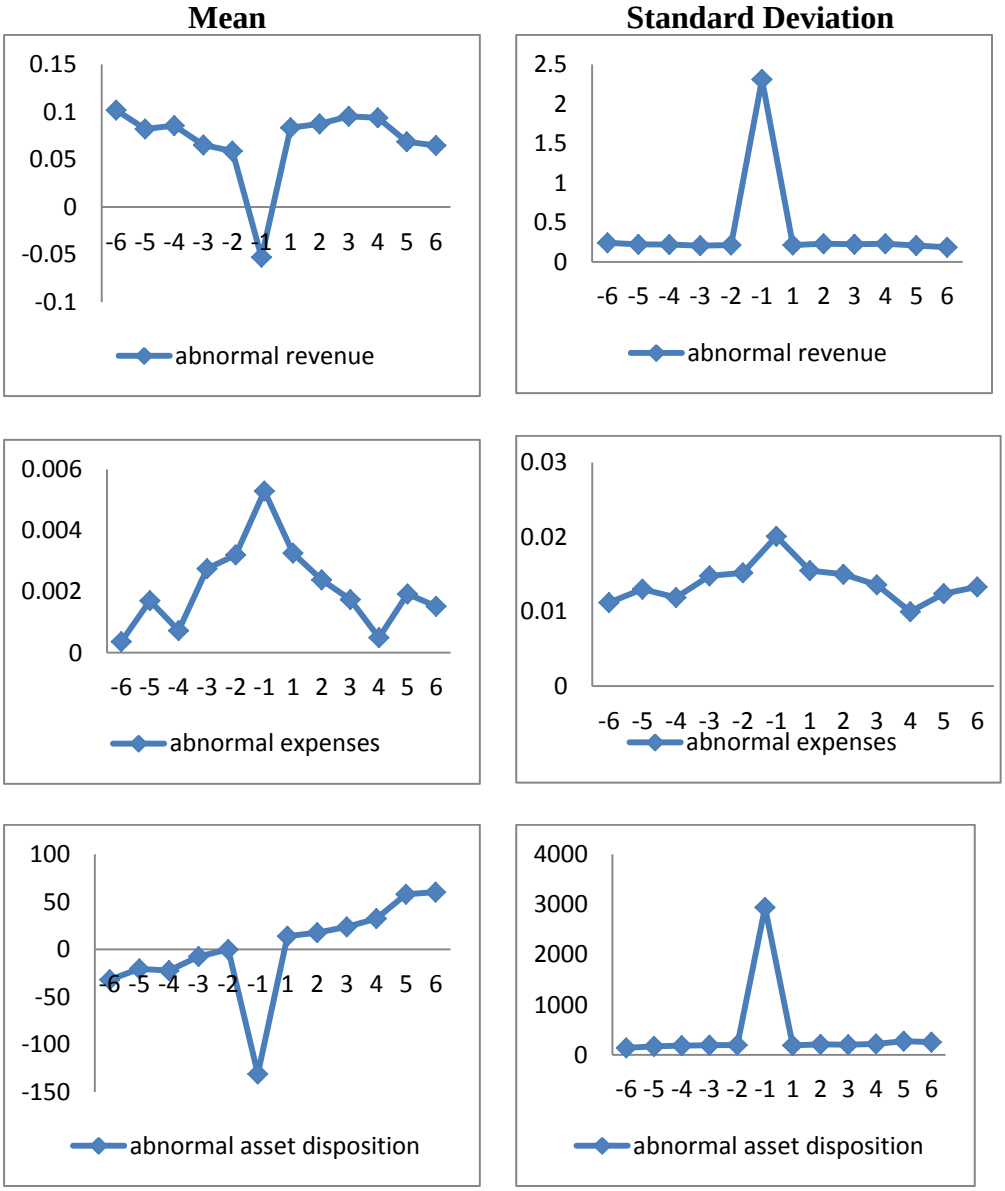
Panel C: Property Type Distribution

	Freq.	Percent	Cum.
Diversified	50	9.84	9.84
Health Care	83	16.34	26.18
Industrial/Office	116	22.83	49.02
Lodging/Resorts	69	13.58	62.60
Residential	46	9.06	71.65
Retail	118	23.23	94.88
Self-Storage	9	1.77	96.65
Specialty	17	3.35	100.00
Total	**508**		

Figure 3.1 Real Earnings Management around REITs SEOs

Figure 1 descripts the average level and standard deviation of real earnings management activities in the SEO year-quarter and the years immediately preceding and following it using quarterly data. Proxies for real earnings management are measured in acceleration of the timing of sales (abnormal sales), decreasing cost (abnormal cost) and abnormal asset disposition. In later analysis, I scale down abnormal cost by 10^{-1} and abnormal asset disposition by 10^{-5} for better explanation.

Panel A



Panel B

	Mean (SEO firm quarters)	Mean (non-SEO firm quarters)	Mean Difference	t-test
ABCFO	-0.09	0.058	-0.11	3.52***
ABEXP	0.0055	0.0023	0.0032	3.34***
ABDISP	-122.46	20.72	-143.18	3.54***

Table 3.2 Determinants of Real Earnings Management prior SEOs

This table presents the result of determinants of real earnings management around SEOs. Dependent variables are measures for real earnings management *ABCFO, ABEXP* and *ABDISP*, respectively. *Liq_beta* and *Mkt_beta* are liquidity beta and market beta estimated using liquidity augmented CAPM, respectively. Size is the nature logarithm of firm's market capitalization. Growth is percentage change of total assets from last period. logMB is the logarithm of firms' market value divided by its book value in the most recent quarter. Cash is Cash and short-term investment. ROA is return on assets. Age is the number of years between the observation year and the IPO year.*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

	Abnormal CFO(*ABCFO)*		Abnormal Operating Expense(*ABEXP)*		Abnormal Asset Disposition(*ABDISP)*	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Liq_beta		-0.139***		0.420**		-0.107*
		(-3.79)		(2.21)		(-1.87)
Mkt_beta		-0.0224**		0.0229***		0.0614***
		(-2.05)		(4.06)		(3.62)
Cash	-0.0169	-0.00711	-0.0405	-0.0739	-0.0379	-0.0553*
	(-0.38)	(-0.35)	(-0.39)	(-0.71)	(-1.19)	(-1.77)
Size	0. 101	-0. 0394	-0. 424	-0. 357	0.390	0. 457
	(0.07)	(-0.06)	(-1.27)	(-1.06)	(0.38)	(0.45)
LogMB	-0.00120	0.00159	0.000252	0.000714	0.0591	0.0816**
	(-0.23)	(0.68)	(0.21)	(0.59)	(1.59)	(2.25)
Growth	0.00704	0.0103***	0.00147	0.00137	-0.0692	-0.0581
	(0.89)	(2.85)	(0.79)	(0.73)	(-1.20)	(-1.03)
ROA	0.149	0.0167	-0.166***	-0.132***	-7.31***	-6.630***
	(0.84)	(0.20)	(-3.97)	(-3.12)	(-5.70)	(-5.22)
Age	-0.00037***	-0.000069	-0.000064**	-0.00003	0.00112	0.00175*
	(-2.88)	(-1.08)	(-2.09)	(-0.92)	(1.19)	(1.78)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Time Effect	Yes	Yes	Yes	Yes	Yes	Yes
Obs No,	499	499	499	499	499	499
Adjusted R^2	0.00761	0.0275	0.124	0.150	0.0993	0.161
F Stat	1.477	2.389	9.819	9.689	7.865	10.40

Table 3.3 Real Earnings Management and Abnormal Trading Volume prior SEO

This table presents the result of testing the effects of real earnings management on abnormal trading volume prior SEO. The dependent variable is abnormal trading volume prior SEO, which is calculated using standard event study method. *ABCFO*, *ABEXP* and *ABDISP* are the measures for real earnings management. *Size* is the nature logarithm of firm's market capitalization. *Growth i*s percentage change of total assets from last period. l*ogMB* is the logarithm of firms' market value divided by its book value in the most recent quarter. *Cash* is Cash and short-term investment. *ROA* is return on assets. *Uranking* is the underwriter reputation. *SeqREIT* is constructed as the current SEO sequence regarding the REIT itself to account for the clustering and frequency of SEO. *Age* is the number of years between the SEO year and the IPO year to measure the stage in firm life cycle. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Sentiment* is investors' sentiment index constructed from University of Michigan's Consumer Sentiment Index, using the methodology described in Lemmon and Portniaguina (2006)..*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

		Abnormal Trading Prior SEO(AV)				
	Predicted Signs	Model 1	Model 2	Model 3	Model 4	Model 5
ABCFO	-		-6.419**			-7.738***
			(-2.38)			(-2.77)
ABEXP	+			10.79***		14.88***
				(2.87)		(3.99)
ABDISP	-				-3.425***	-3.689***
					(-4.17)	(-4.57)
Cash		0.0576***	0.0566***	0.0565***	0.0557***	0.0550***
		(4.00)	(3.95)	(3.76)	(3.75)	(3.79)
Growth		-0.0870	-0.0683	-0.153	-0.176	-0.132
		(-0.60)	(-0.47)	(-0.87)	(-1.01)	(-0.77)
ROA		0.138	0.0800	0.548	-0.449	0.105
		(0.08)	(0.05)	(0.32)	(-0.27)	(0.06)
Age		0.00235	0.00236	0.00380	0.00349	0.00486
		(0.77)	(0.78)	(1.15)	(1.08)	(1.52)
SeqREIT		0.0142**	0.0125**	0.0151**	0.0126*	0.0120*
		(2.31)	(2.04)	(2.30)	(1.94)	(1.87)
Uranking		0.0247	0.0214	0.0349*	0.0288	0.0360**
		(1.44)	(1.25)	(1.89)	(1.59)	(2.01)
InfoAs		1.868***	1.742***	1.920***	1.797***	1.682***
		(3.35)	(3.13)	(3.28)	(3.10)	(2.96)
Sentiment		0.0184***	0.0181***	0.0168***	0.0168***	0.0153***
		(4.39)	(4.33)	(3.83)	(3.88)	(3.60)
Constant		Yes	Yes	Yes	Yes	Yes
Time effect		Yes	Yes	Yes	Yes	Yes
Number of Obs		499	499	499	499	499
Adjusted R^2		0.202	0.210	0.218	0.236	0.270
F Stat		13.07	12.46	11.80	12.98	12.99

Table 3.4 Real Earnings Management and PreSEO Valuation

This table presents the results of testing the relationship between stock mispricing prior issuance and real earnings management activities. Dependent variable is the mispricing level (*PreMis*) prior SEO issuance. *ABCFO, ABEXP* and *ABDISP* are the measures for real earnings management. *Size* is the nature logarithm of firm's market capitalization. *Growth i*s percentage change of total assets from last period. l*ogMB* is the logarithm of firms' market value divided by its book value in the most recent quarter. *Cash* is Cash and short-term investment. *ROA* is return on assets. *Uranking* is the underwriter reputation. *SeqREIT* is constructed as the current SEO sequence regarding the REIT itself to account for the clustering and frequency of SEO. *Age* is the number of years between the SEO year and the IPO year to measure the stage in firm life cycle. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Sentiment* is investors' sentiment index constructed from University of Michigan's Consumer Sentiment Index, using the methodology described in Lemmon and Portniaguina (2006)..*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

		Pre SEO Stock Mispricing				
	Predicted Signs	Model 1	Model 2	Model 3	Model 4	Model 5
ABCFO	-		-2.370***			-2.293***
			(-2.77)			(-2.60)
ABEXP	+			1.903**		2.100**
				(2.21)		(2.43)
ABDISP	-				-3.754***	-2.790**
					(-3.04)	(-2.21)
Cash		0.0237***	0.0206***	0.0225***	0.0237***	0.0193***
		(3.24)	(2.80)	(3.07)	(3.26)	(2.64)
Growth		-0.0502	-0.0913	-0.0910	-0.0754	-0.154
		(-0.07)	(-0.12)	(-0.12)	(-0.10)	(-0.20)
ROA		19.83	19.52	19.23	31.56*	27.59
		(1.06)	(1.05)	(1.03)	(1.67)	(1.47)
Age		0.0113	0.00814	0.0122	0.0152	0.0121
		(0.71)	(0.51)	(0.76)	(0.96)	(0.77)
SeqREIT		0.132***	0.130***	0.128***	0.123***	0.118***
		(4.13)	(4.08)	(4.02)	(3.86)	(3.75)
Uranking		-0.0288	-0.0250	-0.0288	-0.0459	-0.0379
		(-0.33)	(-0.29)	(-0.33)	(-0.53)	(-0.44)
InfoAs		-3.836	-3.135	-4.246	-4.087	-3.798
		(-1.35)	(-1.11)	(-1.50)	(-1.45)	(-1.36)
Sentiment		0.0478**	0.0272	0.0471**	0.0387*	0.0204
		(2.23)	(1.21)	(2.21)	(1.81)	(0.91)
Constant		Yes	Yes	Yes	Yes	Yes
Time effect		Yes	Yes	Yes	Yes	Yes
Number of Obs		499	499	499	499	499
Adjusted R^2		0.0912	0.105	0.0995	0.109	0.127
F Stat		5.313	5.603	5.321	5.765	5.807

Table 3.5 Real Earnings Management and SEO discounting

This table presents the result of testing the effects of real earnings management on SEO discounting. The dependent variable is discounting, which is the percentage change in the price between the offer price and the closing price of the day prior SEO issuance. *ABCFO, ABEXP* and *ABDISP* are the measures for real earnings management. *Size* is the nature logarithm of firm's market capitalization. *Growth i*s percentage change of total assets from last period. l*ogMB* is the logarithm of firms' market value divided by its book value in the most recent quarter. *Cash* is Cash and short-term investment. *ROA* is return on assets. *Uranking* is the underwriter reputation. *SeqREIT* is constructed as the current SEO sequence regarding the REIT itself to account for the clustering and frequency of SEO. *Age* is the number of years between the SEO year and the IPO year to measure the stage in firm life cycle. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Sentiment* is investors' sentiment index constructed from University of Michigan's Consumer Sentiment Index, using the methodology described in Lemmon and Portniaguina (2006)..*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

	SEO Discounting				
	Model 1	Model 2	Model 3	Model 4	Model 5
ABCFO		0.541**			0.425*
		(2.43)			(1.94)
ABEXP			-0.923***		-1.079***
			(-3.60)		(-4.15)
ABDISP				0.270***	0.351***
				(2.70)	(3.47)
Cash	-0.0779	-0.0821	-0.0766	-0.0564	-0.0518
	(-1.14)	(-1.20)	(-1.13)	(-0.82)	(-0.77)
Growth	-0.00871	-0.0107	-0.0118	-0.00840	-0.0135
	(-0.69)	(-0.84)	(-0.94)	(-0.67)	(-1.09)
ROA	0.115	0.136	-0.0651	0.183	0.00928
	(0.68)	(0.80)	(-0.37)	(1.08)	(0.05)
Age	0.000180	0.000227	0.0000674	0.000175	0.0000781
	(0.86)	(1.08)	(0.32)	(0.84)	(0.38)
SeqREIT	0.000713	0.000405	0.000757	0.000829	0.000673
	(0.93)	(0.52)	(1.00)	(1.09)	(0.89)
Uranking	-0.000389	-0.000236	-0.000348	-0.000463	-0.000316
	(-0.26)	(-0.16)	(-0.24)	(-0.31)	(-0.22)
InfoAs	0.108**	0.0958**	0.111**	0.102**	0.0954**
	(2.23)	(1.98)	(2.33)	(2.13)	(2.02)
Sentiment	0.000911***	0.000904***	0.000901***	0.00111***	0.00115***
	(2.83)	(2.82)	(2.83)	(3.37)	(3.57)
Constant	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes
Obs No.	508	508	508	508	508
Adjusted R^2	0.0278	0.0373	0.0505	0.0398	0.0782
F Stat	2.609	2.964	3.699	3.104	4.586

Table 3.6 Real Earnings Management and SEO Discounting (Probit Model)

This table presents the result of testing the effects of real earnings management on SEO discounting. The dependent variable is binary variable, indicating if the firm sets the offer price at the market price.. *ABCFO, ABEXP* and *ABDISP* are the measures for real earnings management. *Size* is the nature logarithm of firm's market capitalization. *Growth i*s percentage change of total assets from last period. l*ogMB* is the logarithm of firms' market value divided by its book value in the most recent quarter. *Cash* is Cash and short-term investment. *ROA* is return on assets. *Uranking* is the underwriter reputation. *SeqREIT* is constructed as the current SEO sequence regarding the REIT itself to account for the clustering and frequency of SEO. *Age* is the number of years between the SEO year and the IPO year to measure the stage in firm life cycle. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Sentiment* is investors' sentiment index constructed from University of Michigan's Consumer Sentiment Index, using the methodology described in Lemmon and Portniaguina (2006)..*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

	Model 1	Model 2	Model 3	Model 4	Model 5
ABCFO		-15.23**			-15.95**
		(-2.35)			(-2.47)
ABEXP			7.150**		7.181**
			(2.13)		(2.11)
ABDISP				-6.645**	-6.610**
				(-2.06)	(-2.04)
Cash	0.230	0.239	0.522	0.395	0.717
	(0.12)	(0.13)	(0.27)	(0.21)	(0.37)
Growth	0.266	0.364	0.225	0.233	0.300
	(0.75)	(1.01)	(0.63)	(0.66)	(0.82)
ROA	-0.301	-2.079	1.621	-2.296	-2.361
	(-0.06)	(-0.43)	(0.33)	(-0.47)	(-0.46)
Age	-0.000350	-0.0000370	0.000139	-0.0000778	0.000767
	(-0.06)	(-0.01)	(0.02)	(-0.01)	(0.13)
SeqREIT	0.0417**	0.0426**	0.0378**	0.0338*	0.0310
	(2.18)	(2.22)	(1.96)	(1.73)	(1.58)
Uranking	-0.00859	-0.0106	-0.00842	-0.0125	-0.0150
	(-0.20)	(-0.25)	(-0.20)	(-0.29)	(-0.35)
InfoAs	0.137	0.143	0.153	0.103	0.0661
	(0.10)	(0.10)	(0.11)	(0.07)	(0.05)
Sentiment	0.0136	0.0141	0.00868	0.0185*	0.0142
	(1.47)	(1.53)	(0.91)	(1.94)	(1.44)
Obs No.	508	508	508	508	508
Pseudo R^2	0.0129	0.0226	0.0202	0.0198	0.0372

Table 3.7 Real Earnings Management and SEO Long-run Performance

This table presents the effects of real earnings management on SEO long run adjusted return. The dependent variable is the post SEO adjusted return in 3 month, 6month and 12 month *ABCFO*, *ABEXP* and *ABDISP* are the measures for real earnings management. *Size* is the nature logarithm of firm's market capitalization. *Growth i*s percentage change of total assets from last period. l*ogMB* is the logarithm of firms' market value divided by its book value in the most recent quarter. *Cash* is Cash and short-term investment. *ROA* is return on assets. *Uranking* is the underwriter reputation. *SeqREIT* is constructed as the current SEO sequence regarding the REIT itself to account for the clustering and frequency of SEO. *Age* is the number of years between the SEO year and the IPO year to measure the stage in firm life cycle. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Sentiment* is investors' sentiment index constructed from University of Michigan's Consumer Sentiment Index, using the methodology described in Lemmon and Portniaguina (2006)..*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses.

Long Run Risk Adjusted Stock Return						
	3 Month		6 Month		12 Month	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
ABCFO		0.870**		1.007*		1.905**
		(1.97)		(1.73)		(2.42)
ABEXP		-1.101***		-1.735***		-2.143***
		(-2.92)		(-3.47)		(-3.14)
ABDISP		0.764***		0.917**		1.146**
		(2.69)		(2.43)		(2.25)
Cash	0.314	0.321*	0.548**	0.544**	0.818**	0.833**
	(1.60)	(1.65)	(2.11)	(2.12)	(2.33)	(2.40)
Growth	-0.0545	-0.0452	-0.0499	-0.0363	-0.110*	-0.0939
	(-1.48)	(-1.25)	(-1.03)	(-0.76)	(-1.67)	(-1.45)
ROA	0.542	0.755	0.196	0.326	0.252	0.461
	(1.11)	(1.44)	(0.30)	(0.47)	(0.28)	(0.48)
Age	0.00112*	0.000994	0.00172**	0.00162**	0.00203*	0.00190*
	(1.83)	(1.63)	(2.11)	(2.01)	(1.84)	(1.74)
SeqREIT	-0.000474	0.000812	0.000991	0.00281	0.00199	0.00451
	(-0.24)	(0.41)	(0.38)	(1.07)	(0.56)	(1.27)
Uranking	0.000566	0.000484	-0.00352	-0.00265	0.00162	0.00108
	(0.13)	(0.11)	(-0.62)	(-0.45)	(0.20)	(0.14)
InfoAs	0.565***	0.552***	0.842***	0.818***	0.937***	0.906***
	(4.04)	(3.99)	(4.54)	(4.47)	(3.74)	(3.66)
Sentiment	-0.0021**	-0.0016*	-0.004***	-0.004***	-0.0035**	-0.0026*
	(-2.27)	(-1.78)	(-3.43)	(-2.99)	(-2.09)	(-1.75)
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes
Obs No.	508	508	508	508	508	508
Adjusted R^2	0.0488	0.0794	0.0701	0.102	0.0473	0.0799
F Stat	4.219	4.921	5.730	6.188	4.069	4.910

CHAPTER 4 INVESTOR SENTIMENT AND SEO PRICING: EVIDENCED FROM REITS

Using Real Estate Investment Trusts as a unique laboratory, I investigate the impact of investor sentiment on SEO price dynamics. Evidence indicates that investor sentiment is positively related with pre-SEO overpricing and probability of issuance, but negatively related with announcement returns. SEOs issued in high sentiment periods have larger discounts and higher first day returns. I also find that high sentiment periods are followed by low long-run returns, suggesting that sentiment does not proxy for unobservable fundamentals. Overall, my findings are consistent with market timing and behavioral explanations for equity offerings.

Keywords: Real estate investment trusts, market timing, investor sentiment, equity offering

4.1 Introduction

Price dynamics around seasoned equity offerings (SEOs) challenge the traditional view that stock prices are rationally set. Behavioral models suggest that managers will balance the marginal cost from issuing equity with the direct market timing gains from over-confident investors and stock mispricing (Stein 1996). In this paper, I define investor sentiment as a misguided belief about a firm's risks or future cash flows based on the available information(Baker and Wurgler 2006) and examine its impact on the SEO pricing process in a particular type of firm: the Real Estate Investments Trust (REIT).

REITs are the ideal setting for my analysis because they have several characteristics ideally suited to capture the impact of investor sentiment on SEO pricing. First, legislative considerations force a REIT to distribute a minimum 90% of their taxable income to investors as dividends (Boudry 2011), thus limiting the possibility of free cash flow and all but eliminating the free cash flow problem suggested by Jensen (1986). Second, restrictions on investment options for real estate assets and regulations on dividend pay-outs force REITs to rely primarily on external financing to fund investments; they use external financing far more often than general firms do (Boudry, Kallberg and Liu 2011; Ott, Riddiough and Yi 2005). These frequent forays to the market result in the disclosure of more information about the firm, and thus reduce information asymmetry. Third, REITs are effectively tax-exempt, which rules out tax-based theories of capital structure(Boudry, Kallberg and

Liu 2011). Fourth, because REITs are highly leveraged in comparison with general firms, REIT managers have strong incentives to monitor the equity capital market to balance the costs of different types of capital. Thus, REITs' seasoned equity issuance decisions and pricing are likely to be market driven, which also rules out the pecking order theory of capital structure as another potential explanation. Indeed, Ghosh, Roark, and Sirmans (2011) report that the deterioration in operating performance of REITs after SEO is largely influenced by these firms' timing behavior. Overall, REIT capital structure is more consistent with market timing theory than with traditional capital structure theories because the key drivers behind traditional capital structure theories are partially silent in REITs (Ooi, Ong and Li 2010). This alignment enables us to circumvent capital structure issues that might contaminate equity issuance studies. Finally, REITs are ideal for analyzing the rationality of SEO pricing because, in the real estate market, existing evidence indicates that investor sentiment also influences acquisition prices in both private and public commercial real estate markets (Ling, Naranjo and Scheick 2013) .

Recent advances in behavioral finance suggest that investor sentiment contributes to stock mispricing. In a seminal paper, Delong, Shleifer, Summers, and Waldamann (1990) argue that overlapping generations of sentiment investors arrive to the market together and trade in the same direction.[6] The correlated trading of sentiment investors deters rational arbitrageurs and exerts pressure on asset prices, causing them to deviate from

[6] See Kumar and Lee (2006) for empirical evidence.

fundamental values even in the absence of fundamental risk.[7] The deviation from fundamental prices (i.e., overvaluation) is often stated as one of the main motives for equity issuance. For example, Graham and Harvey(2001) report that two thirds of CFOs claim that overvaluation is an important or very important consideration in the equity issuance decision. In agreement with survey evidence, Jung, Kim, and Stulz (1996) empirically show that equity issuance is positively associated with ex ante indicators of overvaluation such as market-to-book ratio and market indices. This positive relation between equity issuance and its ex ante indicators of overvaluation is hard to reconcile with the predictions of trade-off theory and the pecking-order theory of capital structure (Myers and Majluf 1984). In addition, evidence of earnings management before equity issuance (Teoh, Welch and Wong 1998), post-issue long- run underperformance (Loughran and Ritter 1995), and decline in operating performance after SEO(Ghosh, Roark and Sirmans 2011; Loughran and Ritter 1997) suggest that managers attempt to sell overpriced shares to investors if the market permits(Baker and Wurgler 2002). Baker and Wurgler (2006) document that the aggregate fraction of equity issues is higher during high sentiment periods. Chiu and Kini (2013) find that aggregate equity mutual fund flows influence the firm decision to conduct SEOs and initial returns, which they interpret it as the impact of investor sentiment. However, Howe and Zhang (2010) report an insignificant impact on SEO decisions using consumer sentiment index from the Conference Board.

[7] Research has shown that investor sentiment contributes to mispricing in stock and options markets. For example, Brown and Cliff (2004) provide evidence that market pricing errors are positively related to sentiment, and Lemmon and Portniaguina (2006) argue that investor sentiment explains size premium. In the options market, Han (2008) and Lemmon and Ni (2010) show that investor sentiment impacts the slope of the implied volatility smile of stock options.

Even though determinants of SEO pricing have been extensively examined in earlier studies, no research has considered the impact of investor sentiment. For example, Altinkiliç and Hansen (2003) find that unexpected SEO underpricing is related to information gathering and marketing activities, and Corwin (2003) argues that SEO underpricing is related to price pressure and uncertainty.[8] Similar findings are reported in the context of REITs. Ghosh, Nag, and Sirmans (2000) document that significant REIT SEO underpricing is related with institutional ownership, issue size, and underwriter reputation. Goodwin (2011) further argues that when there is high placement cost and value uncertainty with new REIT shares, investors will ask for a greater discount. These papers extensively examine determinants of SEO discounting and underpricing, but none of them examines the impact of investor sentiment -- the main variable in my analysis.[9]

While, to the best of my knowledge, this is the first paper to analyze the impact of investor sentiment on the seasoned equity pricing process of REITs. Several papers have examined the impact of investor sentiment on IPO pricing. These studies document a positive relationship between investor sentiment and IPO underpricing, and a negative relationship between sentiment and long- run returns (Cornelli, Goldreich and Ljungqvist 2006; Derrien 2005). However, SEO issues are very different from IPO issues. IPO firms arrive to the market for the first time with little or no track record, and

[8] Previous literature overwhelmingly uses the term "underpricing" to describe the percentage difference between SEO offer price and first day market price because most papers assume that the market price on the first day is the "true price." A more appropriate term would be "first day return." I will use “underpricing” and “first day return” interchangeably throughout the paper.

[9] Corwin (2003) also reports that SEO underpricing is related to the concurrent level of underpricing in the IPO market, suggesting a common underlying factor influencing both IPO and SEO markets which may plausibly be investor sentiment. However, he does not elaborate on this factor nor does he pursue this enquiry further.

their valuations are notoriously difficult to estimate (Kim and Ritter 1999). There is a huge uncertainty about these firms, not only with regard to future cash flows and risks, but also with regard to institutional interest and liquidity. In short, perceptions about the IPO firm and the response of market participants to the newly traded firm cannot be predicted with a high degree of certainty. In contrast, seasoned firms are well established and their valuations are easily observable in the secondary market. Underwriters have a pretty good estimate about the level of institutional interest and the liquidity of these firms' shares. Hence, it remains an open question if the evidence of sentiment's impact on IPO pricing could be extended to seasoned equity markets. My study sample covers all US-listed equity REIT firms and spans a 24-year period from 1986 to 2009. The empirical results suggest that the SEO price formation is strongly influenced by sentiment investors. Consistent with market timing and behavioral finance explanations, I observe a strong positive relation between investor sentiment and pre-SEO mispricing, which further affects the probability of issuance. Sentiment is negatively related to the announcement abnormal returns. Further, I document that investor sentiment is positively related with SEO discounting and underpricing, but negatively related with long-run stock returns. Overall, investor sentiment seems to play an important role in the seasoned equity offerings pricing process.

My contributions are manifold. First, I contribute to the seasoned equity issuance literature by providing evidence that investor sentiment is positively related to pre-SEO mispricing levels, a relationship that further influences the REIT equity offering decision and thus supports the notion that managers time the market in the presence of investor sentiment. Second, I contribute to the

determinants of SEO discounting and underpricing by providing another important determinant--investor sentiment. Finally, this paper contributes to REIT literature by providing the most comprehensive analysis thus far of REIT SEO issuance.

I recognize that it is impossible to absolutely rule out unobservable fundamental risk factor as responsible for some of my results. However, I control for nine macroeconomic variables correlated with fundamental measures of risk, as well as factors such as time-varying growth opportunities, information asymmetry, and risk premia. While unobservable risk factor may conceivably account for some of my findings in isolation, investor sentiment explains my results in their entirety. Hence, I consider unobservable risk factor an unlikely explanation for my results.

The paper proceeds as follows. I review the relevant literature in Section II and construct the hypotheses in Section III. Section IV describes the data. Section V discusses the empirical results. Section VI presents the robustness test. Section VII concludes.

4.2 Literature Review

4.2.1 Investor Sentiment

Baker and Wurgler (2006) interpret investor sentiment as a misguided belief about a firm's risks or future cash flows based on the available information. Delong, Shleifer, Summers, and Waldamann (1990) develop a model in which overlapping generations of sentiment investors enter and exit the market

together and trade on the noisy information. The key feature of their model is limits to arbitrage. Specifically, the correlated trading of sentiment investors deters rational arbitrageurs from taking offsetting positions that would bring prices back to fundamental values. Hence, limits to arbitrage and correlated sentiment investor trading cause prices to deviate from fundamental values even in the absence of fundamental risk. Stein (1996) models the effect of investor sentiment and shows that the marginal cost of issuing equity, which arises from deviation from current capital structure, is balanced with marginal issuance benefit, i.e. the direct market timing gains from stock mispricing. This suggests that managers maximize the current price of the firm's securities by catering to sentiment investors. In so doing, managers capture the demand side surplus and exploit the current mispricing for the benefit of current investors by allowing them to sell the overvalued stocks to overconfident investors. Daniel, Hirshleifer, and Subrahmanyam (1998) further propose a theory to explain securities market under- and overreactions, arguing that overconfidence and self-attribution lead to negative long-lag autocorrelations and return predictability when managers take advantage of stock mispricing.

Prior literature utilizes several proxies for investor sentiment. Direct measures of investor sentiment are derived from surveys such as the Index of Consumer Sentiment (ICS) constructed by Thomson Reuters/University of Michigan, and the Conference Board Consumer Confidence Index (CBIND) constructed by the Conference Board (Lemmon and Portniaguina 2006). Qiu and Welch (2004) evaluate several sentiment measures and conclude that the Conference Board Consumer Confidence Index and Michigan Consumer Sentiment Index best represent the behavior of sentiment investors. The most prominent

indirect measure is the Baker and Wurgler (2006) index (B-W), which uses a "top-down" and macroeconomic approach to measure aggregate sentiment in the market. B-W is calculated as the principal component from closed end fund discount, dividend premium, NYSE turnover, first day IPO returns, number of IPOs, and proportion of equity offerings.

4.2.2 SEO Price Dynamics

Price dynamics of seasoned equity offerings are less studied and explored than those surrounding initial public offerings. Eckbo and Masulis (1992) find that SEO offer prices for firm commitments of industrial and utility issuers were on average underpriced by 0.44 percent over the 1963-1981 period. Altinkiliç and Hansen (2003) empirically estimate expected SEO discounting and find that unexpected SEO discounting is related to information gathering and marketing activities. Corwin (2003) argues that SEO underpricing is related to price pressure and uncertainty. Corwin (2003) also reports that SEO underpricing is related to the concurrent level of underpricing in the IPO market, a result which suggests that a common underlying factor influences both IPO and SEO underpricing, and this factor may plausibly be sentiment. However, neither Corwin (2003) nor Altinkilic and Hansen (2003) examine the impact of investor sentiment on SEO pricing.

The literature on REIT seasoned equity offerings is well established. A large literature provides estimates of the market reaction to security issue announcements. As with general stocks, there is a significant negative announcement reaction consistent with Myers and Majluf (1984). Using REIT data from 1970 to 1985, Howe and Shilling (1988) document a negative stock

price reaction to equity offerings and a positive stock price reaction to debt offerings. Ghosh, Nag, and Sirmans (1999) confirm those findings using REIT equity offerings in the 1990s.

Another strand of literature on REIT seasoned equity offerings addresses capital structure changes. Because trade-off and pecking order rationales do not apply to REITs thanks to their unique characteristics, previous literature on REIT capital structure largely focuses on the signaling effects of equity and debt offerings of REITs (Howe and Shilling, 1988; Brown and Riddiough, 2003). Recent empirical results show that REITs time market within a general targeted debt ratio environment. Ooi, Ong, and Li (2010) examine public offerings timing attempts in REITs and targeted debt ratios. They point out that REITs time market within a general targeted debt ratio environment. Boudry, Kallberg, and Liu (2010) and Ghosh, Roark, and Sirmans (2011) also document strong evidence in support of the market timing theory to explain REIT issuance decisions.

However, few studies examine REITs' SEO pricing. Ghosh, Nag, and Sirmans (2000) document that significant REIT SEO underpricing is associated with institutional ownership, issue size, and underwriter reputation. Goodwin (2011) further argues that when there is high placement cost and value uncertainty surrounding new REIT shares, investors will ask for a greater discount. Surprisingly, no study examines the relationship between investor sentiment and the REIT seasoned equity issuance and pricing process.

4.2.3 Investor Sentiment and Equity Offerings

Several studies examine the impact of sentiment in the IPO market. In Derrien (2005)'s model of IPO pricing, underwriters trade off the benefits of a higher offer price if high sentiment continues, against the cost of price support if sentiment investors leave the market and the aftermarket price falls below the offer price. Therefore, because investor sentiment is only partially incorporated into the offer price, it results in greater underpricing. Ljungqvist, Nanda, and Singh (2006) develop a model in which the optimal strategy for an underwriter is to place IPO shares with regular investors who hold onto them during the first stage and resell them to sentiment investors in the second stage. Issuers underprice the IPO to compensate regular investors for their possible loss if sentiment investors do not arrive in the second stage; this strategy leaves regular investors trapped with overpriced shares. Along these lines, Cornelli, Goldreich, and Ljungqvist (2006) and Dorn (2009) use "gray market" pre-IPO prices as a proxy for investor sentiment, and find evidence that sentiment is positively correlated with initial returns and negatively correlated with the long-run returns consistent with the impact of sentiment. Hrnjic and Sankaraguruswamy (2013) show that the positive relationship between sentiment and underpricing and the negative relationship between sentiment and long-run returns are a result of systematic (market-wide) sentiment, and that evidence of the impact of idiosyncratic sentiment is less compelling.

As for the SEO market, the implications on investor sentiment are mixed. Chiu and Kini (2013) find that aggregate equity mutual fund flows influence the

firm's decision to conduct SEOs, which they interpret it as the impact of investor sentiment. However, Howe and Zhang (2010) report an insignificant relation on SEO decisions using consumer sentiment index from the Conference Board.

4.3 Empirical Implications

Existing models in the literature (Cornelli, Goldreich and Ljungqvist 2006; Daniel, Hirshleifer and Subrahmanyam 1998; Ljungqvist, Nanda and Singh 2006; Stein 1996) allow us to make predictions about the relationship between investor sentiment and firms' seasoned equity offering price dynamics.

Managers issue equity in order to take advantage of the inflated share price. Investors in the market, who know that managers are opportunistic, take SEO announcement as a signal of overvaluation. Market participants revise the firm's valuation downward, which leads to the negative effect on the share price—that is, negative returns at the announcement day (Eckbo and Masulis 1995; Masulis and Korwar 1986). Markets in high sentiment periods are dominated by overoptimistic sentiment investors who cause market-wide deviation from fundamental values. In markets with unsophisticated investors, managers have even greater incentive to act opportunistically. Hence, I conjecture that opportunistic behavior is exacerbated during high sentiment periods, and I expect firms to have higher probability of SEO issuance and SEO firms to be more overpriced than non-SEO firms. At the same time, investors adjust for managers' opportunistic behavior and, therefore, the SEO

announcement conveys even more negative news during high sentiment periods. I conjecture that this results in more negative returns at the announcement. Overall, my reasoning leads to following hypotheses:

Hypothesis 1: Pre-SEO stock mispricing is positively correlated with investor sentiment.

Hypothesis 2: The probability of SEO issuance is positively correlated with investor sentiment.

Hypothesis 3: The SEO announcement return is negatively correlated with investor sentiment.

I have hypothesized that managers of SEO firms act opportunistically and issue equity when investor sentiment is high and shares are overpriced. However, it is not obvious how this behavior will influence pricing of the new issue. Managers and underwriters are aware that the market is dominated by sentiment investors; they may take advantage of that over-optimism and increase the SEO offer price, thus decreasing the discount from the previous day's closing price.[10] On the other hand, underwriters usually place new SEO shares with regular investors with whom they nurture long-term relationships, anticipating repeated interactions in future issues. Because underwriters know that shares are overpriced and will eventually revert to true value, they may decide to protect their regular investors from expected long-run declines in share price. In that case, underwriters will price SEO shares lower, that is at a larger discount. Ultimately, the impact of investor sentiment on discounting

[10] For ease of interpretation, we express discounting as a positive (percentage) value if offer price is lower than the previous day's closing price.

and underpricing (first day return) is an empirical issue. This reasoning leads us to following hypotheses.

Hypothesis 4A: Investor sentiment is positively correlated with SEO discounting.

Hypothesis 4B: Investor sentiment is negatively correlated with SEO discounting.

Hypothesis 5A: Investor sentiment is positively correlated with SEO underpricing.

Hypothesis 5B: Investor sentiment is negatively correlated with SEO underpricing.

According to Daniel, Hirshleifer, and Subrahmanyam (1998), investor sentiment implies negative long-lag autocorrelations and return predictability when managers take advantage of stock mispricing. During high sentiment periods, markets are dominated by overoptimistic investors who are willing to pay a price exceeding fundamental value and this leads to overpricing of SEO firms. Over the long run, valuations revert to the fundamental value as sentiment investors leave the market. Thus, I expect long-run returns to be negative following high sentiment periods.

Hypothesis 6: Long-run return is negatively correlated with investor sentiment.

4.4 Data

In this paper, I use SEOs issued by equity REIT firms (SIC code=6798) from January 1, 1986 to December 31, 2009, as reported in the Securities Data Company (SDC) database. I begin the study period in 1986, because the Tax Reform Act was introduced in that year, allowing REITs to engage in a variety of real estate activities that require them to resort to external financing more frequently. My sample ends in 2009, because I need one extra year of data for long-run returns. Accounting information and stock price data are retrieved from COMPUSTAT and the Center for Research in Security Prices (CRSP). I further restrict the SEO sample to common shares. My final sample consists of 840 US equity REIT SEOs. Due to availability of additional data, some of my findings are based on smaller samples.

4.5 Research Design

4.5.1 Survey-based Proxies for Investor Sentiment

Researchers use both direct and indirect proxies for investor sentiment. In this paper, I adopt the survey-based indices as proxies for investor sentiment. In a robustness test, I use the indirect measure of investor sentiment to verify the results.

I use sentiment indices from the Survey of Consumers constructed by Thomson Reuters/University of Michigan Survey Research Center and the Consumer Confidence Survey constructed by the Conference Board. Both indices are shown to be valid measures of investor sentiment in Qiu and

Welch (2004) and Lemmon and Portniaguina (2006).[11] The monthly surveys conducted by Thomson Reuters/University of Michigan use about 50 core questions that reflect respondents' attitudes and expectations about overall economic conditions and personal finances. Answers to interviews with 500 households across the US are aggregated into the popular and widely used Index of Consumer Sentiment (ICS). Likewise, the Conference Board's Index of Consumer Confidence (CBIND) is constructed monthly based on interviews about customers' perceptions of economic conditions in the United States, with a sample size of 5,000 households.

Because REITs bridge both financial and real estate markets, it is plausible that REITs' equity issuance is influenced by investor sentiment from the real estate as well as the financial market. I proxy for investor sentiment in the real estate market with the buying condition survey conducted by Thomson Reuters/University of Michigan. Respondents from a sample of 500 households are asked if it is a good time to purchase a property and why. These responses are aggregated into the relative value of buyers' perception of real estate market (BC).

It is plausible that the sentiment survey values convey information about sentiment as well as the economy fundamentals. To capture the excess optimism or pessimism, I remove the effect of economy fundamentals from the raw survey values by regressing the values against a set of variables suggested in Lemmon and Portniaguina (2006) as reported in Table 4.1.

[11] These measures are also used in numerous other papers (Lemmon and Ni 2011; Hrnjic and Sankaraguruswamy 2013; and McLean and Zhao 2012 among others).

$$ICS = \alpha_0 + \alpha_1 DIV_t + \alpha_2 DEF_t + \alpha_3 YLD3_t + \alpha_4 GDP_t + \alpha_5 CONS_t + \alpha_6 LABOR_t + \alpha_7 URATE_t + \alpha_8 CPI_t + \alpha_9 CAY_t + \alpha_{10} DIV_{t-1} + \alpha_{11} DEF_{t-1} + \alpha_{12} YLD3_{t-1} + \alpha_{13} GDP_{t-1} + \alpha_{14} CONS_{t-1} + \alpha_{15} LABOR_{t-1} + \alpha_{16} URATE_{t-1} + \alpha_{17} CPI_{t-1} + \alpha_{18} CAY_{t-1} + \varepsilon$$

(20)

Where DIV is the dividend yields, DEF is the yield spread between Moody's Aaa and Baa-rated bonds, YLD3 is the three-month Treasury bill yield, GDP is GDP growth deflated to 2005 dollars (in the natural logarithm), CONS is personal consumption expenditures growth (in the natural logarithm), LABOR is the labor income growth (in the natural logarithm) deflated by the PCE deflator, URATE is the adjusted unemployment rate reported by the Bureau of Labor Statistics, CPI is the inflation rate, and CAY is consumption-to-wealth ratio.[12] The residual from the above equation is labeled ICSR. If I use CBIND and BC as a proxy for sentiment, residuals are labeled CBINDR and BCR, respectively. ICSR and CBINDR measure the excess optimism or pessimism of consumers and are my proxies for investor sentiment. BCR measures the excess optimism or pessimism of housing buyers and is my proxy for investor sentiment in the real estate market.

[Insert Table 4.1]

4.5.2 Indirect Measure of Sentiment

Another widely used measure of sentiment is the Baker-Wurgler investor sentiment index (BW) (Baker and Wurgler 2006; Baker and Wurgler 2007; Campbell, Rhee, Du and Tang 2008; McLean and Zhao 2012; Mian and Sankaraguruswamy 2012; Sankaraguruswamy and Mian 2008). The Baker-

[12] Because our sentiment measure is taken monthly, for quarterly macro data we use the same value for all months in that quarter.

Wurgler investor sentiment index is calculated as the first principal component from the following variables: closed end fund discount, dividend premium, turnover, first day IPO returns, IPO number and proportion of equity offering.[13] I utilize the Baker-Wurgler investor sentiment index as the indirect measure for investor sentiment.

4.5.3 Pre-SEO Misvaluation

To examine the impact of investor sentiment on misvaluation before SEO, I decompose pre-issue market-to-book (m-b) ratios into misvaluation (m-v) and growth opportunities (v-b) following the methodology developed by Rhodes-Kropf, Robinson, and Viswanathan (2005) (RKRV, hereafter), and utilized in several recent papers (Fu, Lin and Officer 2010; Hertzel and Li 2010; Hoberg and Phillips 2010) .

If investors overestimate the future cash flows or underestimate risks, the market-to-value ratio will capture the mispricing component of the market-to-book ratio. RKRV methodology estimates the firm value v by estimating both industry level accounting multiples and long-run firm accounting multiples using the following equation.

$$m_{it} - b_{it} = m_{it} - v(\theta_{it}; \alpha_{jt}) + v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_{j}) + v(\theta_{it}; \alpha_{j}) - b_{it} \quad (21)$$

The first component $m_{it} - v(\theta_{it}; \alpha_{jt})$ measures the difference between market value and fundamental value estimated using firm-specific accounting data

[13] For more details on the construction of the index, see Baker and Wurgler (2006).

and the contemporaneous industry accounting multiples. This component is the mispricing proxy I use in this paper. The second component is the sector overvaluation. The third component $v(\theta_{it};\alpha_j)-b_{it}$ captures the growth opportunities.

To empirically separate the mispricing component, RKRV (2005) adopt three different models to estimate firm value. I adopt RKRV's third model to estimate the market value as follows[14]:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln(NI)^{+}_{it} + \alpha_{3jt} I_{(<0)} \ln(NI)^{+}_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it}$$

(22)

where m is market value of equity, b is a book value of equity, $\ln(NI)^{+}$, is the natural logarithm of positive net income, I is an indicator function for negative net income observations, and LEV is leverage ratio.

To calculate the REITs' industry-wide accounting multiples, I run cross-sectional regressions for the REIT industry to obtain the estimated REIT industry accounting multiples $\hat{\alpha}_{jt}$ for each year t. Table 4.2 presents the time-series averages (over fiscal years 1985–2010) of the annual regression coefficients for the equation (2).

Hence, the estimated firm value is obtained in equation (3) below.

[14] The first model includes book value and the second model includes net income in addition to book value. Our results remain robust to either of these models. RKRV provides a detailed discussion of the rationale behind these models.

$$v(b_{it}, NI_{it}, LEV_{it}; \hat{\alpha}_{0jt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt}) = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt} b_{it} + \hat{\alpha}_{2jt} I_{(<0)} \ln(NI)_{it}^{+} + \hat{\alpha}_{3jt} LEV_{it}$$

(23)

[Insert Table 4.2]

The difference between market value m_{it} prior to SEO issuance and the estimated firm value $v(b_{it}, NI_{it}, LEV_{it}; \hat{\alpha}_{0jt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt})$ is my proxy for stock mispricing.

4.5.4 SEO Announcement Return

I estimate the cumulative abnormal returns CAR using the standard market model event-study methodology over interval (-3 to +3)

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_j$$

(24)

where R_{jt} and R_{mt} are the period-t returns for security j and the market portfolio.

Daily returns for individual stock and the market index are obtained from CRSP. For the market index, I employ the Ziman REIT value-weighted market index.

4.5.5 SEO Discounting and Underpricing Variables

To analyze the price dynamics around SEOs, I define discounting as the (negative of) percentage difference between the offer price and the closing price on the prior trading day (Altinkilic and Hansen 2003; Corwin 2003;

Goodwin 2011). Note that this variable is positive if the offer price is lower than the previous day's closing price. I define underpricing as the percentage change from the offer price to the closing price on the first trading day after SEO (Ghosh, Nag, and Sirmans 2000; Goodwin 2011).

4.5.6 Long-run Abnormal Return

I define long-run abnormal return as SEO risk-adjusted return for 3, 6, and 12 months using Fama-French four factor model.

$$R_{jt} = \alpha_j + R_f + \beta_1(R_{mt} - R_f) + \beta_2 SMB + \beta_3 HML + \beta_4 UMD + \varepsilon_j$$

(25)

where r is the REIT's rate of return, Rf is the risk-free return rate, RM is the return of the stock market, SMB stands for return of "small minus big" portfolio, HML stands for return on "high book-to-market minus low book-to-market" portfolio, and UMD stands for momentum factor (MOM), which is long prior-month winners and short prior-month losers.

4.5.7 Control Variables

To analyze the impact of investor sentiment on SEO price dynamics, I control for other determinants of price dynamics that have been documented in prior studies. Information asymmetry (InfoAs) is measured as the abnormal return around earning announcement releases (Lowry, 2003). I control for time-

varying growth opportunities (Growth) using the growth component from RKRV decomposition (Yung, Çolak and Wei 2008).[15]

I am aware that market conditions influence price dynamics around SEOs. Because market return is correlated with investor sentiment, I compute the risk premium (Rpremia) over the past 1 month prior to issue date to capture the time-variant cost of equity. I use the 6-month government bond yield (Byield) to measure the attractiveness of the equity offering.

Offer size (Size) is the relative SEO offer size (number of shares offered multiplied by offer price) scaled by market capitalization of the issuing firm (Altinkiliç and Hansen 2003; Brounen and Eichholtz 2001). Underwriter ranking (Uranking) is defined in Carter and Manaster (1990), and updated by Carter, Dark, and Singh (1998) and Loughran and Ritter (2004); it serves as a proxy for the underwriter reputation (Ghosh, Nag, and Sirmans 2000; Goodwin 2011).[16] I add total assets (Asset) to control for firm size. Leverage (Lev) allows us to separate the impact of leverage documented by (Brounen and Eichholtz 2001). SeqREIT is constructed as the current SEO sequence of the REIT to account for the clustering and frequency of SEO (Ghosh, Nag and Sirmans 2000). Yearslisted is the number of years between the SEO year and the IPO year to measure the stage in firm life cycle as suggested in (DeAngelo, DeAngelo and Stulz 2010). NASDAQ equals 1 if the firm is listed on NASDAQ, and 0 otherwise (Mola and Loughran 2004).

[15] I do not use Tobin-Q or market-to-book ratio because it contains information in addition to firm growth opportunities.
[16] Underwriter reputation is available from Jay Ritter's website, http://bear.warrington.ufl.edu/ritter/ipodata.htm.

4.6 Empirical Results

4.6.1 Descriptive Statistics

Table 4.3 shows the summary statistics and the description of all variables used in this paper.[17] In general, the mean pre-SEO mispricing level is 3.16, which shows that SEO stocks are on average overvalued before issuance compared to their peers. The mean accumulative abnormal return around announcements is -1.75%. In comparison, the average abnormal return is -2% for SEOs by US general firms (Altinkiliç and Hansen 2003; Asquith and Mullins Jr 1986; Eckbo and Masulis 1992). The mean Discounting and Underpricing are 2.77% and 1.64% respectively. In comparison, the average underpricing level is 2.92% in the 1990s and 1.3% in the 1980s for SEOs by US general firms (Corwin 2003). Given the high payout ratio, it is not surprising that REIT firms conduct equity offerings at a higher frequency (mean SeqREIT is 4.45) and have a relatively high leverage ratio (mean 53.9%). The mean Yearlisted is 8.83 years, suggesting that SEO firms are on average in their pre-mature stage.

[Insert Table 4.3]

4.6.2 Sentiment and Pre-SEO Misvaluation

Based on the discussion in Section 4.3, hypothesis 1 predicts that pre-SEO stock mispricing is positively related with investor sentiment. As described in

[17] I also calculate the correlation matrix for the independent variables in the unreported analysis. The magnitude of the variance-inflating factors (VIF) suggests that the independent variables are not highly collinear.

Section 4.5, I adopt RKRV methodology to calculate the mispricing (PreMis), using firm stock closing price the day prior to SEO issuance. I analyze the relation between sentiment and pre-issuance mispricing of SEO firms in the following multivariate model.

$$\begin{aligned}\mathrm{Pr}eMis &= \alpha_0 + \alpha_1 Sentiment + \alpha_2 Rpremia + \alpha_3 InfoAs + \alpha_4 Byield + \alpha_5 Growth \\ &+ \alpha_6 SeqREIT + \alpha_7 Yearslisted + \alpha_8 NASDAQ + \alpha_9 Time + \alpha_{10} \mathrm{Pr}opertyType + \varepsilon\end{aligned}$$

(26)

Table 4.4 shows the results. The coefficients for investor sentiment proxies are all significant and positive. Stock mispricing increases as sentiment increases, indicating that periods of high sentiment might be a good time for managers to time the market and issue the equity to exploit prevailing sentiment. My model's explanatory power (adjusted R square) increases after incorporating sentiment variables.

I document a negative relationship between mispricing level and risk premium, but this relationship is insignificant. Information asymmetry (InfoAs) is also insignificant. Surprisingly, mispricing is higher for older firms and frequent equity issuers. I find a positive relationship between mispricing and Byield.

Overall, my findings are consistent with the hypothesis that pre-SEO stock mispricing is positively correlated with investor sentiment.

[Insert Table 4.4]

4.6.3 Sentiment and SEO Probability

In order to test hypothesis 2, I specify a discrete choice probability model to analyze the impact of sentiment on the decision to issue SEO. The probit model identifies an equity issuance for every REIT in my sample on a monthly basis. The dependent variable equals 1 if an SEO is observed, 0 otherwise.

Table 4.5 reports the results from the probit model for SEO issuance. All coefficients have predicted signs. All coefficients for investor sentiment proxies are positive. Coefficient on ICSR is not significant at the conventional levels; coefficients on CBINDR, BCR, and BW are significant at a 1% level of confidence. A higher level of investor sentiment tends to increase the probability of SEO issuance, consistent with the market-timing theory of SEO (Loughran and Ritter 1997).[18]

Yearslisted, which proxies for corporate life stage cycle, is significant and negatively related with SEO issuance probability. This lends support to the lifecycle theory that predicts young firms sell stock to fund investment (DeAngelo, DeAngelo, and Stulz 2010). A positive relationship between sentiment and firms listed on NASDAQ, which are usually younger firms, is also consistent with life-cycle theory. I document the positive coefficient on Growth, suggesting that an increase in the growth opportunities increases the likelihood of SEO. This finding is consistent with the investment-based explanation for SEO issuance that managers issue equity by timing the

[18] In unreported analysis, I document that a higher level of investor sentiment tends to increase the SEO issuance amount and firms revise their target proceeds to account for the time variant sentiment.

investment (Carlson, Fisher and Giammarino 2006). Risk premia is positively related to the equity issuance.

Overall, findings in Table 4.5 support hypothesis 2 that investor sentiment positively affects the probability of SEO issuance.

[Insert Table 4.5]

4.6.4 Sentiment and SEO Announcement Effect

I calculate the cumulative abnormal returns CAR using cumulative excess return over interval (-3 to +3) for a subsample of 714 SEO issues with the announcement date available in SDC. I observe a statistically significant decline of 1.75% in the cumulative abnormal returns (CAR) associated with the SEO announcements. It seems that when investors interpret an equity issuance announcement as an indicator of stock overvaluation, the stock price declines. This evidence is consistent with the negative price reaction documented by previous studies and Myers and Majluf (1984) pecking order theory.

Hypothesis 3 predicts that high sentiment periods will be associated with lower (more negative) announcement abnormal returns. Hence, I examine the impact of investor sentiment on the announcement effect (CAR) in a multivariate regression specified below.

$$CAR = \alpha_0 + \alpha_1 Sentiment + \alpha_2 Growth + \alpha_3 Size + \alpha_4 Asset + \alpha_5 Lev + \alpha_6 Byield + \alpha_7 SeqREIT + \alpha_8 Yearslisted + \alpha_9 NASDAQ + \alpha_{10} Time_t + \alpha_{11} \mathrm{Pr}opertyType + \varepsilon \quad (27)$$

Table 4.6 presents the results. I note that ICSR, BCR, and BW are significantly negatively related to cumulative abnormal return, suggesting that a higher level of investor sentiment exacerbates managers' incentives and price decline is amplified. I note that an increase in the growth opportunities significantly decreases the REIT announcement return, consistent with the investment-based explanation for SEO issuance that managers issue equity by timing the investment as a real option (Carlson, Fisher and Giammarino 2006). I also observe that SEO size (Size) has a positive impact on abnormal returns. Larger REITs (Asset) tend to perform better as evidenced by the positive and significant coefficient. REITs with lower leverage are associated with a more positive, but insignificant, effect on announcement abnormal returns.

Overall, Table 4.6 supports hypothesis 3 that high sentiment periods are associated with lower (more negative) announcement abnormal returns.

[Insert Table 4.6]

4.6.5 Sentiment and SEO Discounting

In Section 4.3, I argue that investor sentiment exerts two opposite effects on SEO discounting. The direct market timing gains would predict a negative relationship, whereas the reputational effects and the catering to regular investors would predict a positive relationship. Hence, it is an empirical issue to determine which effect dominates. I specify the following regression to examine the investor sentiment impact on SEO discounting.

$$Discounting = \alpha_0 + \alpha_1 Sentiment + \alpha_2 Rpremia + \alpha_3 InfoAs + \alpha_4 Growth + \alpha_5 Size + \alpha_6 Uranking + \alpha_7 Asset + \alpha_8 Lev + \alpha_9 Byield + \alpha_{10} SeqREIT + \alpha_{11} Yearslisted + \alpha_{12} NASDAQ + \alpha_{13} Time_t + \alpha_{14} \text{Pr}opertyType + \varepsilon$$

(28)

Table 4.7 reports the results of the impact of sentiment on SEO discounting. I note that all direct measures of investor sentiment are statistically significant and positive, indicating that investor sentiment positively impacts the discounting level consistent with hypothesis 4A. In high sentiment periods, firms tend to set offer price lower relative to the previous day's closing price. This pattern further suggests that firms do not fully incorporate the effect of prevailing sentiment when setting the offer price.

Next, I discuss other control variables. Discounting is likely to be lower for small firms (Asset) and firms with a higher risk premium, which is a proxy for the cost of equity. Firms tend to discount more when there is more information asymmetry between SEO firm managers and outside investors, consistent with pecking order theory. Underwriter reputation (Uranking) is negative but insignificant, consistent with Goodwin (2011). Coefficient on relative offer size (Size) is negative, consistent with Corwin (2003), but insignificant.

Overall, results strongly support hypothesis 4A that investor sentiment is positively correlated with SEO discounting.

[Insert Table 4.7]

4.6.6 Sentiment and SEO Underpricing

Next, I estimate the following regression to examine the impact of investor sentiment on SEO underpricing.

$$Underpricing = \alpha_0 + \alpha_1 Sentiment + \alpha_2 Rpremia + \alpha_3 InfoAs + \alpha_4 Growth + \alpha_5 Size + \alpha_6 Uranking + \alpha_7 Asset + \alpha_8 Lev + \alpha_9 Byield + \alpha_{10} SeqREIT + \alpha_{11} Yearslisted + \alpha_{12} NASDAQ + \alpha_{13} Time_t + \alpha_{14} \text{Pr}opertyType + \varepsilon$$

(29)

Table 4.8 shows the results. I observe that all direct measures of investor sentiment are significant and positive, implying that an increase in investor sentiment leads to increase in the underpricing consistent with hypothesis 5A. As sentiment investors bid up the stock price, underpricing is positively related to the level of sentiment, consistent with a similar finding in the IPO market (Ljungqvist, Nanda and Singh 2006).

Loderer, Sheehan, and Kadlec (1991) argue that many of the IPO theories based on asymmetric information can be applied to seasoned equity offerings. Corwin (2003) provides analysis of these theories in the context of SEOs, whereas Goodwin (2011) examines the information asymmetry theories in the context of REIT SEOs. All of these theories predict a positive relationship between the level of information asymmetry and underpricing. The positive and significant relation between InfoAs and underpricing is consistent with this reasoning (coefficient=0.0637, t-stat=2.09).

Next, I discuss control variables. Firms with a higher risk premium have greater underpricing. The coefficient on leverage (Lev) is positive and

significant, suggesting that highly leveraged firms have greater underpricing. The coefficient on the offer size of the SEO (Size) is significantly negative, consistent with Ghosh, Nag, and Sirmans (2000). Ghosh, Nag, and Sirmans (1998) and Goodwin (2011) find a negative, but insignificant, relationship. The coefficient on underwriter's reputation (Uranking) is negative and significant, consistent with Ghosh, Nag, and Sirmans (1998, 2000). Goodwin (2001) reports an insignificant coefficient. Firms listed on NASDAQ have less significant underpricing. Overall, Table 4.8 supports hypothesis 5A that investor sentiment is positively correlated with SEO underpricing.

[Insert Table 4.8]

4.6.7 Sentiment and SEO Long-run Return

Finally, to test hypothesis 6 I examine the impact of investor sentiment on long-term stock performance. If managers time the market, I expect to observe lower long-run underperformance after seasoned equity offerings (Loughran and Ritter 1995) as the sentiment investors leave the market and prices revert to their fundamental values. Hence, a negative correlation between investor sentiment and long-run SEO performance is consistent with a behavioral explanation (Cornelli, Ljungqvist, and Goldreich, 2006). Although I have controlled for fundamentals in the SEO decision and pricing, it is not impossible that my sentiment variables may proxy for some underlying unobservable fundamentals. If my sentiment variables proxy for the unobservable fundamentals, SEO prices will stay at the new level and I expect future performance to be unrelated with sentiment at issuance.

I calculate the SEO long-term risk adjusted return (ALret) for 3, 6, and 12 months using Fama-French four factor model. I specify a following multivariate regression to test the impact of investor sentiment on long run returns.

$$ALret = \alpha_0 + \alpha_1 Sentiment + \alpha_2 Lev + \alpha_3 Infoas + \alpha_4 Size + \alpha_5 Growth + \alpha_6 Uranking + \alpha_7 NASDAQ + \varepsilon$$

(30)

Table 4.9 reports that all sentiment variables have significantly negative coefficients. This result suggests that the market corrects the overvaluation and SEOs revert to their fundamental values as sentiment investors leave the market, consistent with hypothesis 6. Furthermore, the model's explanatory power (adjusted R square) increases after incorporating sentiment variables.

Control variables which explain the short-run price dynamics are insignificant in explaining the long-run return. Specifically, information asymmetry (InfoAs) has no effect on SEO long-run return, reinforcing the notion that the sentiment explanation is different from information asymmetry explanations for equity issuance. Overall, my findings support hypothesis 6 that long-run returns after SEO are more negative after high sentiment periods.

[Insert Table 4.9]

4.7 Robustness Tests

In this section, I conduct the robustness tests by analyzing the asymmetric effect of sentiment, the hot market effect, and alternative measures of investor sentiment.

4.7.1 Asymmetric Effect of Sentiment

Cornelli, Goldreich, and Ljungqvist (2006) suggest that the impact of sentiment on stock price is asymmetric between high and low sentiment periods (Hrnjić and Sankaraguruswamy 2011 ; Ljungqvist, Nanda and Singh 2006). In high sentiment periods sentiment investors are overoptimistic and bid the price above the fundamental value. However, in low sentiment periods when sentiment investors are excessively pessimistic, they leave the market and regular investors set the price at fundamental value. Hence, I expect a stronger relationship between sentiment and discounting in high sentiment periods and a weaker relationship in low sentiment periods. Similarly, I expect a stronger relationship between sentiment and underpricing in high sentiment periods and a weaker relationship in low sentiment periods. I test the asymmetric relationship between sentiment and SEO pricing by interacting CBINDR with CBINDR –AB66, where CBINDR –AB66 proxies for high sentiment periods. I report in Table 4.10 that the coefficient on interaction variable HighSentiment is positive and significant for both discounting and underpricing, suggesting that the relationship between sentiment and SEO pricing is asymmetric.

[Insert Table 4.10]

4.7.2 Hot Market Effect

A possible concern is that SEOs issued in high sentiment periods are of lower quality than those issued in low sentiment periods. One way to address this concern is to compare SEOs issued in high sentiment periods vs. low

sentiment periods following (Helwege and Liang 2004). Conditional on issuing, I estimate the probability that firms conduct SEOs during high sentiment periods. From Table 4.11, I observe that high sentiment and low sentiment periods do not differ much in quality of REIT SEOs. While I observe that REITs that decide to issue SEO in high sentiment periods have lower growth potential, they are also larger and have lower leverage. Hence, it seems that Table 11 does not support the notion that SEOs issued in high sentiment periods are of lower quality.

[Insert Table 4.11]

4.8 Conclusions

I examine the impact of investor sentiment on SEO pricing. Behavioral models argue for the arrival of overlapping generations of sentiment investors to the market characterized with limits-to-arbitrage. Correlated trading of sentiment investors exerts upward pressure on prices, causing deviation from fundamental value and managers' rationally respond to the overvaluation by issuing overvalued equity. This setting provides an opportunity to test a rich set of hypotheses about the impact of investor sentiment on SEO pricing, but empirical literature thus far has remained silent on the topic. This paper fills the gap in the literature.

To the best of my knowledge, this is the first paper to analyze the impact of investor sentiment on seasoned equity offerings price dynamics. My empirical results suggest that investor sentiment is positively correlated with pre-SEO mispricing and the probability of SEO issuance. I also find that announcement

returns are negatively related to sentiment, which indicates that the market interprets SEO announcements in high sentiment periods as a more negative signal than similar announcements in low sentiment periods. More important, I document that investor sentiment is positively related with SEO discounting; that is, the higher the sentiment, the larger the discount from the previous day's closing price. Similarly, high sentiment periods are correlated with higher first day returns. Finally, because I find that post-SEO long-run returns are more negative in high sentiment periods, I propose that sentiment does not proxy for unobservable risk characteristics.

My paper contributes to several strands of literature. First, market timing theory predicts that firms conduct equity issuance when the shares are overvalued. In this paper, I examine the extent to which investors' sentiment contributes to equity decisions and SEO price dynamics and report that managers issue more often when sentiment is high and shares are overpriced. Second, my paper contributes to the determinants of SEO discounting and underpricing. Altinkilic and Hansen (2003), Corwin (2003), Mola and Lughran (2004), Ghosh, Nag, and Sirmans (2000), and Goodwin (2011) empirically examine determinants of SEO discounting and underpricing, but none of these papers examines the impact of investor sentiment. This is the first paper to document the significant impact of investor sentiment on SEO pricing process. Third, I contribute to sentiment literature by providing an additional setting in which behavioral biases affect price formation process. Finally, this paper contributes to REIT literature by providing the most comprehensive analysis of REIT SEO and pricing to date.

Overall, investor sentiment seems to play an important role in seasoned equity offerings price patterns. My findings are consistent with market timing and behavioral explanations for the equity offering.

Table 4.1 Estimation of Investor Sentiment Proxies

This table presents the results of estimating investor sentiment proxies. Dependent variables are the raw investor sentiment measures, i.e. the Index of Consumer Sentiment, the Index of Consumer Confidence, and the Index of Buying Condition. Independent variables are macroeconomic variables and their lag term, Where *DIV* is the dividend yields, *DEF* is the yield spread between Moody's Aaa and Baa-rated bonds, *YLD3* is the three-month Treasury bill yield, *GDP* is GDP growth deflated to 2005 dollars (in the natural logarithm), *CONS* is personal consumption expenditures growth (in the natural logarithm), *LABOR* is the labor income growth (in the natural logarithm) deflated by the PCE deflator, *URATE* is the adjusted unemployment rate reported by the Bureau of Labor Statistics, *CPI* is the inflation rate, and *CAY* is consumption-to-wealth ratio. The residuals are *ICSR*, *CBINDR*, and *BCR*, respectively.

	ICS	*CBIND*	*BC*
DIV	-1515.5*	-1507.7	-1345.0
	(-1.67)	(-1.05)	(-0.84)
DEF	-3.013	-11.72*	2.411
	(-0.67)	(-1.66)	(0.31)
YLD3	12.44***	17.68***	5.224
	(6.55)	(5.88)	(1.56)
GDP	0.635	2.468	2.723
	(0.54)	(1.32)	(1.31)
CONS	2.739***	4.286**	1.805
	(2.60)	(2.57)	(0.97)
LABOR	0.000660	-1.434	0.219
	(0.00)	(-1.10)	(0.15)
URATE	-7.321**	-14.76***	-7.541
	(-2.58)	(-3.29)	(-1.51)
CPI	-149.9	-588.6***	-211.1
	(-1.06)	(-2.63)	(-0.85)
CAY	132.7	270.2*	307.6*
	(1.32)	(1.70)	(1.73)
LDIV	-1165.4	-2752.1*	-2539.7
	(-1.24)	(-1.86)	(-1.54)
LDEF	3.284	20.65***	-1.543
	(0.76)	(3.02)	(-0.20)
LYLD3	-9.936***	-11.48***	-7.058**
	(-5.40)	(-3.94)	(-2.17)
LGDP	2.677**	4.259**	4.330**
	(2.26)	(2.27)	(2.07)
LCONS	1.502	1.977	3.867**
	(1.38)	(1.15)	(2.01)
LLABOR	0.486	0.395	0.639
	(0.58)	(0.30)	(0.43)
LURATE	5.488*	3.129	11.87**

	(1.96)	(0.70)	(2.40)
LCPI	-581.7***	-421.8**	-450.7*
	(-4.35)	(-1.99)	(-1.91)
LCAY	-99.67	-272.6*	11.98
	(-1.00)	(-1.73)	(0.07)
CONSTANT	98.20***	143.1***	143.5***
	(26.10)	(24.02)	(21.61)
Number of Obs	288	288	288
Adjusted R^2	0.719	0.848	0.524
F stat	41.42	89.60	18.44

Table 4.2 Time-Series Average Conditional Regression Coefficients

This table reports the time-series average coefficients from regression equation (2) using RKRV methodology. The dependent variable is the natural log of market value. The independent variables are the natural log of book value, the natural log of the absolute value of net income, a dummy variable indicating a negative NI, and market leverage. The regression is estimated cross-sectionally from fiscal years 1986–2009.

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln(NI)^{+}_{it} + \alpha_{3jt} I_{(<0)} \ln(NI)^{+}_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it}$$

Parameter	Mean
E(α0)	0.321692
E(α1)	0.118095
E(α2)	0.910888
E(α3)	-0.12349
E(α4)	0.119123
Number of Obs	24
Adjusted R^2	0.960607

Table 4.3 Descriptive Statistics

This table reports the statistics of all variables used in this paper.

Variables	Mean	Std.Dev.
Dependant Variables		
PreMis	3.15508	2.98131
CAR	-0.0175	0.1697
Discounting	0.0277	0.0685
Underpricing	0.0164	0.0390
Lret3	0.01075	0.04926
Lret6	0.00832	0.03478
Lret12	0.00728	0.02145
Investor Sentiment Proxies		
ICSR	0.409	6.521
CBINDR	2.558	10.40
BCR	0.894	12.15
BW	-0.0122	0.884
Control Variables		
Rpremia	-0.299	0.247
InfoAs	0.000858	0.0431
Growth	4.679	3.237
Size	0.000322	0.00241
Uranking	8.149	1.412
Asset	20.83	1.055
Lev	0.539	0.184
Byield	0.00343	0.00165
SeqREIT	4.445	3.898
Yearslisted	8.830	9.013
NASDAQ	0.135	0.341

Table 4.4 Investor Sentiment and pre-SEO Valuation

This table presents the results of testing the relationship between stock mispricing prior to issuance and investor sentiment. Dependent variable is the mispricing level (*PreMis*) prior to SEO issuance. *ICSR*, *CBINDR*, and *BCR* are the investor sentiment measures from the Index of Consumer Sentiment, the Index of Consumer Confidence, and the Index of Buying Condition, all orthogonalized on macroeconomic variables. *BW* is Baker-Wurgler Index. *Rpremia* is the firm risk premium in the prior observation month. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Growth* is the component of RKRV market-to-book decomposition to control for growth/investment opportunities. *Byield* is the short-term government bond yield prior to the observation month. *SeqREIT* is the current SEO sequence of the REIT itself. *Yearslisted* is the number of years between the SEO year and the IPO year. *NASDAQ* equals to one if the firm is listed on NASDAQ, zero otherwise. *, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses and errors are clustered.

	Mispricing				
Variables	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		0.0411***			
		(2.62)			
CBINDR			0.0263***		
			(2.77)		
BCR				0.0339***	
				(4.01)	
BW					0.659***
					(3.22)
Rpremia	-0.189	-0.252	-0.222	-0.324	0.130
	(-0.33)	(-0.44)	(-0.39)	(-0.57)	(0.22)
InfoAs	-3.583	-3.499	-3.566	-2.579	-3.923*
	(-1.59)	(-1.56)	(-1.59)	(-1.15)	(-1.75)
Growth	-0.0459	-0.0481	-0.0442	-0.0413	-0.0486
	(-1.38)	(-1.45)	(-1.33)	(-1.25)	(-1.47)
Byield	377.3***	407.0***	365.4***	385.5***	296.9***
	(3.87)	(4.16)	(3.76)	(3.99)	(2.97)
SeqREIT	0.169***	0.162***	0.163***	0.147***	0.175***
	(5.66)	(5.43)	(5.45)	(4.87)	(5.87)
Yearslisted	0.0288**	0.0305**	0.0290**	0.0299**	0.0245**
	(2.32)	(2.46)	(2.34)	(2.42)	(1.97)
NASDAQ	-0.271	-0.251	-0.250	-0.226	-0.291
	(-0.85)	(-0.79)	(-0.78)	(-0.71)	(-0.92)
Constant	-90.42	-126.1**	-87.28	-137.9**	-82.59
	(-1.55)	(-2.11)	(-1.50)	(-2.34)	(-1.42)
Time Effect	Yes	Yes	Yes	Yes	Yes
Property Type	Yes	Yes	Yes	Yes	Yes
Obs No.	840	840	840	840	840
Adjusted R^2	0.0911	0.0975	0.0984	0.107	0.101
F stat	6.247	6.325	6.378	6.934	6.558

Table 4.5 Investor Sentiment and the Probability of SEO Issuance

This table presents the results from the probit model for SEO issuance. Dependent variable equals one if an SEO is observed, zero otherwise. *ICSR*, *CBINDR* and *BCR* are the investor sentiment measures from the Index of the Index of Consumer Sentiment from Thomson Reuters/University of Michigan, the Index of Consumer Confidence from the Conference Board, the Index of Buying Condition from Thomson Reuters/University of Michigan, all orthogonalized on macroeconomic variables. *BW* is Baker-Wurgler Index. *Rpremia* is the firm risk premium in the prior observation month. *Byield* is the short-term government bond yield prior observation month. *Asset* is total asset. *Clev* is change in leverage ratio prior observation month. *Lev* is leverage ratio prior observation month. *Growth* is the third component of RKRV market-to-book decomposition to control for the market reaction associated with growth/ investment opportunities. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Size* is the relative SEO shares offering size scaled by market capitalization. *Uranking* is the underwriters' reputation. *Yearslisted* is the number of years between the observation year and the IPO year. *NASDAQ* equals to one if the firm is listed on NASDAQ, zero otherwise. Accounting data are available on quarterly basis from Compustat. *, ** and *** represents the 10%, 5%, and 1% significance levels respectively. T-statistics are included in parentheses and errors are clustered.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		0.00280			
		(1.19)			
CBINDR			0.00587***		
			(3.85)		
BCR				0.00461***	
				(3.23)	
BW					0.124**
					(2.08)
Rpremia	0.767***	0.772***	0.759***	0.755***	0.934***
	(5.73)	(5.75)	(5.66)	(5.66)	(4.00)
InfoAs	-0.134	-0.137	-0.184	-0.109	0.615
	(-0.46)	(-0.47)	(-0.64)	(-0.38)	(1.15)
Growth	0.0215***	0.0211***	0.0205***	0.0206***	0.0697***
	(4.37)	(4.27)	(4.14)	(4.16)	(4.81)
Lev	0.00369	0.00398	0.000488	0.0108	0.338
	(0.04)	(0.04)	(0.01)	(0.12)	(1.36)
Asset	0.00222	0.00350	0.00137	0.00616	-0.0173
	(0.11)	(0.18)	(0.07)	(0.31)	(-1.42)
Byield	44.73***	45.59***	43.72***	43.63***	54.23262***
	(2.93)	(2.98)	(2.85)	(2.86)	(3.46)
NASDAQ	0.102**	0.100**	0.0989**	0.0941*	0.187
	(2.11)	(2.07)	(2.04)	(1.94)	(1.02)
Yearslisted	-0.0108***	-0.0106***	-0.0104***	-0.0105***	-0.0321***
	(-5.74)	(-5.61)	(-5.50)	(-5.59)	(-4.96)
Constant	Yes	Yes	Yes	Yes	Yes
Property Type	Yes	Yes	Yes	Yes	Yes
Obs No.	26463	26463	26463	26463	26463
Pseudo R^2	0.0184	0.0186	0.0205	0.0198	0.0194

Table 4.6 Investor Sentiment and SEO Announcement Effect

This table presents the results on investor sentiment and the announcement effect (CAR).The dependent variable is the cumulative abnormal returns (CAR) around announcement date. ICSR, CBINDR, and BCR are the investor sentiment measures from the Index of Consumer Sentiment from Thomson Reuters/University of Michigan, the Index of Consumer Confidence from the Conference Board, the Index of Buying Condition from Thomson Reuters/University of Michigan, all orthogonalized on macroeconomic variables. *BW* is Baker-Wurgler Index. Growth is the component of RKRV market-to-book decomposition to control growth/ investment opportunities. Size is the SEO proceeds scaled by market capitalization. Asset is total assets. Lev is leverage ratio prior to the observation month. Byield is the short-term government bond yield prior to the observation month. SeqREIT is the current SEO sequence of the REIT itself. Yearslisted is the number of years between SEO year and the IPO year. NASDAQ equals to one if the firm is listed on NASDAQ, zero otherwise. *, ** and *** represents the 10%, 5%, and 1% significance levels respectively. T-statistics are included in parentheses and errors are clustered.

	CAR				
Variable	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		-0.000718*			
		(-1.90)			
CBINDR			0.000140		
			(0.61)		
BCR				-0.000887***	
				(-3.93)	
BW					-0.0138***
					(-5.87)
Growth	-0.00168**	-0.00166**	-0.00168**	-0.00206***	-0.00151**
	(-2.21)	(-2.18)	(-2.20)	(-2.71)	(-2.02)
Size	1.916**	2.065**	1.870**	2.223**	1.910**
	(2.11)	(2.27)	(2.05)	(2.46)	(2.15)
Asset	0.00533*	0.00578*	0.00513	0.00711**	0.00511*
	(1.69)	(1.83)	(1.61)	(2.25)	(1.65)
Lev	-0.00389	-0.00560	-0.00338	-0.00812	-0.00299
	(-0.28)	(-0.41)	(-0.25)	(-0.60)	(-0.22)
Byield	0.724	-0.0847	0.634	-0.312	0.787
	(0.39)	(-0.04)	(0.34)	(-0.17)	(0.44)
SeqREIT	0.0000386	0.0000904	0.0000310	0.0000686	0.0000369
	(0.06)	(0.13)	(0.04)	(0.10)	(0.05)
Yearslisted	0.000171	0.000131	0.000179	0.000211	0.000111
	(0.63)	(0.48)	(0.66)	(0.79)	(0.42)
NASDAQ	0.0000332	0.000106	-0.000199	-0.000713	-0.00244
	(0.00)	(0.01)	(-0.03)	(-0.10)	(-0.35)
Constant	Yes	Yes	Yes	Yes	*Yes*
Time Effect	Yes	Yes	Yes	Yes	*Yes*
Property Type	Yes	Yes	Yes	Yes	*Yes*
Obs No.	714	714	714	714	714
Adjusted R^2	0.0290	0.0326	0.0281	0.0487	0.0735
F stat	2.251	2.336	2.145	3.029	4.141

Table 4.7 Investor Sentiment and SEO Discounting

This table presents the result of testing the effects of investor sentiment on SEO discounting. The dependent variable is discounting, which is the percentage change between the offer price and the closing price on the day prior to SEO issuance. ICSR, CBINDR and BCR are the investor sentiment measures from the Index of Consumer Sentiment, the Index of Consumer Confidence, and the Index of Buying Condition, all orthogonalized on macroeconomic variables. *BW* is Baker-Wurgler Index. Rpremia is the firm risk premium in the prior observation month. InfoAs is the abnormal return around earning announcement releases as a proxy for information asymmetry. Growth is the component of RKRV market-to-book decomposition to control for growth/investment opportunities. Size is the SEO proceeds scaled by market capitalization. Uranking is the underwriters' reputation available from Jay Ritter's website. Asset is total asset. Lev is leverage ratio prior to observation month. Byield is the short-term government bond yield prior to the observation month. SeqREIT is the current SEO sequence of the REIT itself. Yearslisted is the number of years between the observation year and the IPO year. NASDAQ equals to one if the firm is listed on NASDAQ, zero otherwise.*, ** and *** represents the 10%, 5%, and 1% significance levels respectively. T-statistics are included in parentheses and errors are clustered.

	Discounting				
Variable	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		0.00101***			
		(2.67)			
CBINDR			0.000916***		
			(4.00)		
BCR				0.000864***	
				(4.26)	
BW					0.00355
					(1.31)
Rpremia	-0.00056**	-0.00066***	-0.00069***	-0.000637***	-0.00062**
	(-2.31)	(-2.69)	(-2.77)	(-2.65)	(-2.51)
InfoAs	0.101*	0.108**	0.104*	0.119**	0.105*
	(1.84)	(1.97)	(1.92)	(2.18)	(1.90)
Growth	-0.000157	-0.0000201	0.000146	0.000263	-0.000178
	(-0.18)	(-0.02)	(0.17)	(0.30)	(-0.20)
Size	0.233	0.130	0.286	0.0405	0.269
	(0.23)	(0.13)	(0.28)	(0.04)	(0.26)
Uranking	-0.00304*	-0.00272	-0.00194	-0.00185	-0.00313*
	(-1.78)	(-1.60)	(-1.13)	(-1.08)	(-1.83)
Asset	0.00964***	0.00781**	0.00693*	0.00624*	0.00998***
	(2.66)	(2.12)	(1.89)	(1.70)	(2.74)
Lev	0.0149	0.0166	0.0175	0.0206	0.0148
	(0.95)	(1.06)	(1.12)	(1.32)	(0.94)
Byield	-2.160	-1.238	-2.352	-1.521	-2.022
	(-1.11)	(-0.63)	(-1.22)	(-0.79)	(-1.04)
SeqREIT	-0.000705	-0.000696	-0.000666	-0.000948	-0.000718
	(-0.88)	(-0.87)	(-0.84)	(-1.19)	(-0.90)
Yearslisted	0.0000166	0.0000698	0.0000402	0.0000489	0.0000253
	(0.06)	(0.24)	(0.14)	(0.17)	(0.09)
NASDAQ	-0.0107	-0.0108	-0.0107	-0.0104	-0.0103
	(-1.42)	(-1.43)	(-1.43)	(-1.39)	(-1.36)
Constant	-0.932	-2.129	-1.302	-2.634*	-0.829
	(-0.61)	(-1.34)	(-0.86)	(-1.69)	(-0.54)

Time Effect	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Property Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Obs No.	840	840	840	840	840
Adjusted R^2	0.0645	0.0715	0.0813	0.0837	0.0653
F stat	3.893	4.075	4.538	4.648	3.793

Table 4.8 Investor Sentiment and SEO Underpricing

This table presents the results of testing the effects of investor sentiment on SEO underpricing. The dependent variable is underpricing, which is the percentage change in the price between the offer price and the first-day closing price. *ICSR*, *CBINDR* and *BCR* are the investor sentiment measures from the Index of Consumer Sentiment, the Index of Consumer Confidence, and the Index of Buying Condition, all orthogonalized on macroeconomic variables. *BW* is Baker-Wurgler Index. *Rpremia* is the firm risk premium in the prior observation month. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Growth* is the component of RKRV market-to-book decomposition to control growth/ investment opportunities. *Size* is the SEO proceeds scaled by market capitalization. *Uranking* is the underwriters' reputation. *Asset* is total asset. *Lev* is leverage ratio prior to the observation month. *Byield* is the short-term government bond yield prior observation month. *SeqREIT* is the current SEO sequence of the REIT itself. *Yearslisted* is the number of years between the SEO year and the IPO year. *NASDAQ* equals to one if the firm is listed on NASDAQ, zero otherwise.*, ** and *** represents the 10%, 5%, and 1% significance levels respectively. T-statistics are included in parentheses and errors are clustered.

	Underpricing				
Variable	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		0.00107***			
		(5.15)			
CBINDR			0.000589***		
			(4.62)		
BCR				0.000680***	
				(6.04)	
BW					0.00125
					(0.83)
Rpremia	0.0514***	0.0474***	0.0472***	0.0465***	0.0503***
	(4.89)	(4.57)	(4.53)	(4.51)	(4.75)
InfoAs	0.0637**	0.0679**	0.0646**	0.0771**	0.0646**
	(2.09)	(2.26)	(2.14)	(2.57)	(2.11)
Growth	-0.000869*	-0.000715	-0.000667	-0.000532	-0.00088*
	(-1.75)	(-1.46)	(-1.36)	(-1.09)	(-1.76)
Size	-2.874***	-2.675***	-2.553***	-2.715***	-2.786***
	(-3.74)	(-3.53)	(-3.35)	(-3.60)	(-3.59)
Uranking	-0.0051***	-0.0047***	-0.0043***	-0.004***	-0.005***
	(-5.29)	(-4.99)	(-4.53)	(-4.33)	(-5.31)
Asset	0.0054***	0.00333	0.00356*	0.00264	0.0055***
	(2.64)	(1.63)	(1.74)	(1.29)	(2.69)
Lev	0.0150*	0.0167*	0.0165*	0.0193**	0.0150*
	(1.71)	(1.92)	(1.90)	(2.23)	(1.70)
Byield	4.587***	5.258***	4.131***	4.704***	4.553***
	(3.31)	(3.84)	(3.01)	(3.47)	(3.29)
SeqREIT	0.0000473	0.0000562	0.0000747	-0.000140	0.0000429
	(0.11)	(0.13)	(0.17)	(-0.32)	(0.10)
Yearslisted	0.0000292	0.0000826	0.0000447	0.0000566	0.0000320
	(0.18)	(0.51)	(0.28)	(0.35)	(0.19)
NASDAQ	-0.0126***	-0.0126***	-0.0126***	-0.0124***	-0.012***
	(-2.96)	(-3.02)	(-3.00)	(-2.98)	(-2.93)
Constant	0.193	-1.121	-0.100	-1.213	0.216
	(0.22)	(-1.26)	(-0.12)	(-1.38)	(0.25)

Time Effect	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Property Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Number of Obs	840	840	840	840	840
Adjusted R^2	0.0929	0.120	0.115	0.131	0.0925
F stat	5.295	6.462	6.183	7.001	5.074

Table 4.9 Investor Sentiment and SEO Long-run Risk Adjusted Return

This table presents the result of testing the effects of investor sentiment on SEO long run risk adjusted return. The dependent variable is SEO risk adjusted return for 3, 6, and 12 months, respectively. *ICSR*, *CBINDR* and *BCR* are the investor sentiment measures from the Index of Consumer Sentiment, the Index of Consumer Confidence, and the Index of Buying Condition, all orthogonalized on macroeconomic variables. *BW* is Baker-Wurgler Index. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Growth* is the component of RKRV market-to-book decomposition to control for growth/ investment opportunities. *Size* is the SEO proceeds scaled by market capitalization. *Uranking* is the underwriters' reputation. *Asset* is total asset. *Lev* is leverage ratio prior observation month. *Byield* is the short-term government bond yield prior observation month. *SeqREIT* is the current SEO sequence of the REIT itself. *Yearslisted* is the number of years between the SEO year and the IPO year. *NASDAQ* equals to one if the firm is listed on NASDAQ, zero otherwise.*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses and errors are clustered.

Panel A 3 months

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		-0.000335			
		(-1.32)			
CBINDR			-0.0005***		
			(-3.28)		
BCR				-0.000299**	
				(-2.15)	
BW					-0.0041**
					(-2.17)
InfoAs	-0.00202	-0.00295	-0.00132	-0.00736	-0.00808
	(-0.06)	(-0.08)	(-0.04)	(-0.20)	(-0.22)
Growth	-0.0000915	-0.000141	-0.000275	-0.000245	-0.000118
	(-0.15)	(-0.23)	(-0.46)	(-0.41)	(-0.20)
Size	0.186	0.190	0.0966	0.221	0.0825
	(0.28)	(0.29)	(0.15)	(0.33)	(0.12)
Uranking	-0.00177	-0.00187	-0.00238**	-0.00217*	-0.00169
	(-1.53)	(-1.61)	(-2.04)	(-1.85)	(-1.46)
Asset	0.00781***	0.00844***	0.00936***	0.00901***	0.00744***
	(3.14)	(3.34)	(3.72)	(3.55)	(3.00)
Lev	-0.000959	-0.00136	-0.00239	-0.00274	-0.000880
	(-0.09)	(-0.13)	(-0.23)	(-0.26)	(-0.09)
Byield	-3.814***	-4.118***	-3.701***	-4.023***	-3.851***
	(-2.89)	(-3.08)	(-2.82)	(-3.05)	(-2.93)
SeqREIT	-0.0025***	-0.0025***	-0.0025***	-0.0024***	-0.0024***
	(-4.63)	(-4.63)	(-4.68)	(-4.46)	(-4.33)
Yearslisted	-0.0000437	-0.0000596	-0.0000522	-0.0000522	-0.0000739
	(-0.22)	(-0.30)	(-0.27)	(-0.26)	(-0.37)
NASDAQ	-0.00279	-0.00281	-0.00284	-0.00294	-0.00373
	(-0.54)	(-0.55)	(-0.56)	(-0.57)	(-0.72)
Constant	4.642***	5.042***	4.837***	5.247***	4.536***
	(4.52)	(4.71)	(4.73)	(4.93)	(4.42)
Time Effect	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*

Property Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Obs No,	840	840	840	840	840
Adj. R^2	0.0495	0.0503	0.0607	0.0536	0.0538
F stat	3.297	3.222	3.709	3.378	3.383

Panel 6 months

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		-0.000120			
		(-0.76)			
CBINDR			-0.00023**		
			(-2.32)		
BCR				-0.00026***	
				(-3.04)	
BW					-0.00208*
					(-1.77)
InfoAs	0.0169	0.0166	0.0172	0.0122	0.0138
	(0.75)	(0.73)	(0.76)	(0.54)	(0.61)
Growth	0.000452	0.000435	0.000372	0.000318	0.000439
	(1.21)	(1.16)	(0.99)	(0.85)	(1.18)
Size	-0.0186	-0.0174	-0.0581	0.0114	-0.0713
	(-0.05)	(-0.04)	(-0.14)	(0.03)	(-0.17)
Uranking	-0.000483	-0.000519	-0.000749	-0.000833	-0.000443
	(-0.67)	(-0.72)	(-1.03)	(-1.15)	(-0.62)
Asset	-0.000537	-0.000310	0.000146	0.000519	-0.000724
	(-0.35)	(-0.20)	(0.09)	(0.33)	(-0.47)
Lev	0.00741	0.00727	0.00678	0.00585	0.00745
	(1.15)	(1.13)	(1.06)	(0.91)	(1.16)
Byield	-2.836***	-2.944***	-2.786***	-3.019***	-2.855***
	(-3.47)	(-3.55)	(-3.42)	(-3.70)	(-3.50)
SeqREIT	-0.00109***	-0.00109***	-0.00110***	-0.00101***	-0.00102***
	(-3.25)	(-3.24)	(-3.28)	(-3.02)	(-3.00)
Yearslisted	-0.000137	-0.000143	-0.000141	-0.000145	-0.000153
	(-1.12)	(-1.16)	(-1.15)	(-1.18)	(-1.24)
NASDAQ	0.0000919	0.0000852	0.0000711	-0.0000367	-0.000380
	(0.03)	(0.03)	(0.02)	(-0.01)	(-0.12)
Constant	1.782***	1.926***	1.868***	2.312***	1.729***
	(2.80)	(2.90)	(2.93)	(3.51)	(2.71)
Time Effect	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Property Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Obs No,	840	840	840	840	840
Adj. R^2	0.0365	0.0360	0.0416	0.0461	0.0390
F stat	2.671	2.565	2.821	3.026	2.701

Panel C 12 months					
Variable	Model 1	Model 2	Model 3	Model 4	Model 5
ICSR		-0.000235***			
		(-2.71)			
CBINDR			-0.000110**		
			(-2.06)		
BCR				-0.0000238	
				(-0.50)	
BW					-0.00289***
					(-2.63)
InfoAs	0.0151	0.0144	0.0152	0.0146	0.0159
	(1.21)	(1.16)	(1.22)	(1.17)	(1.27)
Growth	0.000542***	0.000507**	0.000502**	0.000530**	0.000540**
	(2.63)	(2.47)	(2.43)	(2.55)	(2.63)
Size	0.0763	0.0787	0.0570	0.0791	0.0582
	(0.34)	(0.35)	(0.25)	(0.35)	(0.26)
Uranking	0.000274	0.000203	0.000144	0.000242	0.000243
	(0.69)	(0.51)	(0.36)	(0.60)	(0.61)
Asset	-0.00205**	-0.00161*	-0.00172**	-0.00196**	-0.00184**
	(-2.42)	(-1.86)	(-1.99)	(-2.25)	(-2.17)
Lev	0.00484	0.00455	0.00453	0.00469	0.00464
	(1.36)	(1.29)	(1.28)	(1.32)	(1.31)
Byield	0.501	0.289	0.526	0.485	0.969**
	(1.11)	(0.63)	(1.17)	(1.07)	(2.01)
SeqREIT	-0.0000813	-0.0000788	-0.0000841	-0.0000741	-0.000128
	(-0.44)	(-0.43)	(-0.45)	(-0.40)	(-0.69)
Yearslisted	0.0000183	0.00000720	0.0000165	0.0000177	0.0000332
	(0.27)	(0.11)	(0.24)	(0.26)	(0.49)
NASDAQ	0.0000367	0.0000234	0.0000265	0.0000250	0.000229
	(0.02)	(0.01)	(0.02)	(0.01)	(0.13)
Constant	-1.017***	-0.737**	-0.975***	-0.969***	-0.999***
	(-2.89)	(-2.02)	(-2.77)	(-2.66)	(-2.85)
Time Effect	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Property Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Obs No,	840	840	840	840	840
Adjusted R^2	0.0303	0.0378	0.0341	0.0294	0.0373
F stat	2.381	2.646	2.482	2.272	2.624

Table 4.10 Asymmetric Effect of Investor Sentiment

This table presents the asymmetric effect of sentiment on SEO pricing. High sentiment is the interaction variable between sentiment and high sentiment defined as the sentiment above 66 percentile. Dependent variable in column [1] is *Discounting.* Dependent variable in column [2] is *Underpricing. Rpremia* is the firm risk premium in the prior observation month. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Growth* is the market-to-book decomposition component to control for growth/ investment opportunities. *Size* is the SEO proceeds scaled by market capitalization. *Uranking* is the underwriters' reputation. *Asset* is total assets. *Lev* is leverage ratio prior to the observation month. *Byield* is the short-term government bond yield prior to the observation month. *SeqREIT* is the current SEO sequence for the REIT itself. *Yearslisted* is the number of years between the SEO year and the IPO year. *NASDAQ* equals to one if the firm is listed on NASDAQ, zero otherwise.*, ** and *** represents the 10%, 5%, and 1% significance levels respectively. T-statistics are included in parentheses and errors are clustered.

Variables	Discounting	Underpricing
HighSentiment	0.00154**	0.00119***
	(2.31)	(3.24)
CBINDR	0.000176	0.0000101
	(0.45)	(0.05)
Rpremia	-0.000743***	0.0450***
	(-3.06)	(4.34)
InfoAs	0.117**	0.0726**
	(2.14)	(2.41)
Growth	0.000264	-0.000574
	(0.30)	(-1.17)
Size	0.218	-2.439***
	(0.22)	(-3.21)
Uranking	-0.00140	-0.00392***
	(-0.81)	(-4.08)
Asset	0.00650*	0.00319
	(1.78)	(1.57)
Lev	0.0208	0.0190**
	(1.33)	(2.19)
Byield	-1.937	4.289***
	(-1.01)	(3.14)
SeqREIT	-0.000525	0.000185
	(-0.66)	(0.42)
Yearslisted	0.0000155	0.0000242
	(0.05)	(0.15)
NASDAQ	-0.0118	-0.0135***
	(-1.59)	(-3.23)
Constant	-1.220	-0.0557
	(-0.81)	(-0.07)
Time Effect	*Yes*	*Yes*
Property Type	*Yes*	*Yes*
Number of Obs	840	840
Adjusted R^2	0.0865	0.125
F stat	4.615	6.446

Table 4.11 Decision to Issue in High Sentiment Period

This table presents the result of possibility that REITs of different risk levels conduct SEOs during high/low sentiment. Low sentiment is defined as below 33 percentile. High sentiment is defined as above 66 percentile. Dependent variable equals one if an SEO is observed in high sentiment period, zero otherwise. *Rpremia* is the firm risk premium in the prior observation month. *InfoAs* is the abnormal return around earning announcement releases as a proxy for information asymmetry. *Growth* is the market-to-book decomposition component to control growth/ investment opportunities. *Size* is the SEO proceeds scaled by market capitalization. *Uranking* is the underwriters' reputation. *Asset* is total asset. *Lev* is leverage ratio prior observation month. *Byield* is the short-term government bond yield prior observation month. *SeqREIT* is the current SEO sequence for the REIT. *Yearslisted* is the number of years between the SEO year and the IPO year. *NASDAQ* equals to one if the firm is listed on NASDAQ, zero otherwise.*, ** and *** represents the 10%, 5% and 1% significance level respectively. T-statistics are included in parentheses and errors are clustered.

Variables	Probability of High Sentiment SEO
Rpremia	0.302
	(1.19)
InfoAs	-0.0398
	(-0.04)
Growth	-0.0415**
	(-2.46)
Lev	-0.776***
	(-2.59)
Asset	0.339***
	(4.93)
Byield	69.18
	(1.59)
SeqREIT	-0.0130
	(-0.86)
Yearslisted	0.000596
	(0.11)
NASDAQ	0.0988
	(0.68)
Constant	46.02
	(1.56)
Time Effect	Yes
Property Type	Yes
Number of Obs	840
Pseudo R2	0.0431

CHAPTER 5 CONCLUSIONS

5.1 Background

Real estate composes a significant part of firm's portfolio, which is often deployed for project financing in the capital market. The development of securitized real estate has further bridged the capital market and the real estate market, which makes the real estate strategies feasible for both corporate and individual investors. This thesis deepens the understanding of real estate in capital market by addressing following three questions (1) how real estate risk influences corporate policies; (2) how securitized real estate manages the liquidity risk; (3) how investors' behaviour affects the pricing in securitized real estate market.

5.2 Summary of Major Findings and Implications

In the first essay, I ask how capital heterogeneity influences corporate investment given that an option to grow the company through investment is subject to the riskiness of the firm's asset. Specifically, I examine how real estate risk impacts corporate policies. Previous studies identify real estate factor that explains much of the underlying risk inherent in classic asset pricing models via its collateral effects and its irreversibility. If investors understand the firm's exposure to real estate risk, real estate risk should be correlated closely with both corporate investment and financing decisions made by firms. Using the US general firm data from 1985 to 2010, I include shocks to the real estate market as a proxy for state-variable risk in the asset

pricing model and construct the real estate risk factor at the firm level. Evidence shows that real estate risk is negatively associated with firms' long-term investments and long-term external financing in both equity and debt. However, the leverage depends on both the measure of risk and types of assets. Overall, in contrast to previously documented effect of the real estate value, risk exposure exhibits the mostly opposite effects on investment, financing, and capital structure.

In the second essay, I look into the characteristics of the securitized real estate, Real Estate Investment Trusts (REITs). I explore how REITs manage the liquidity risk in the equity market considering that real estate is less liquid compared with other asset classes in nature. The empirical corporate finance literature claims that information asymmetries would induce market frictions, which reduce the liquidity of the firm's securities. However, real activities manipulation may reduce the concern given its cash flow consequences. Given the high dividend payout feature and restricted investment options on real estate assets, REITs managers are inclined to engage in real earnings management activities over accrual based manipulation compared to general firms. Particularly, I apply a recently developed liquidity-augmented asset pricing model to measure the liquidity risk and market risk for SEO firms to revisit the window of opportunity and risk-return trade-off hypotheses debated in the literature. I show that REITs managers engage in real earnings management to attract more uninformed trading in order to provide the liquidity services at lower cost during seasoned equity offerings. I find less liquid REITs are more likely to manipulate earnings prior equity offerings, and uninformed trading is higher following the real earnings management. REITs

set the offer price at a smaller discount after engaging in real earnings management and stock returns decline in the long run. The findings are consistent with real option and liquidity explanations for equity offerings.

In the third essay, I study the pricing of securitized real estate market from a behavioural perspective. I answer whether investor sentiment contributes to the price anomaly in REITs equity offerings, empirically addressing that REITs managers time the market to issue equity by timing the sentiment investors and the behaviour of investors impacts price formation around seasoned equity offerings. Consistent with the notion that market interprets SEO announcement in high sentiment periods as more negative signal, I find that announcement returns are negatively related to sentiment. Further, I document that investor sentiment is positively related with the SEO discounting and first day returns. Finally, sentiment does not seem to proxy for unobservable risk characteristic as I find that post-SEO long run returns are more negative in high sentiment periods.

Overall, this thesis emphasizes the importance of real estate in corporate investment and corporate financing strategies. This research provides significant information on real estate values from novel perspectives as well as guidance to the corporate policy decisions making for different firm managers.

5.3 Limitations and Further Research

No research is free from limitations. In this section, the discussion of future research of every essay is presented.

The first essay shed light on the importance of real estate risk in firm's investment and financing decisions. However, there are some limitations that may cause potential problems in the empirical results. First, not every firm hold corporate real estate, there are some firms that lease the corporate real estate instead hold the corporate real estate, which are excluded in this research's study sample. So the unobserved heterogeneity might bias the empirical results. Second, due to the data unavailability, geographic characteristics of real estate might affect the empirical results. Future research will try to address these issues, while explore the effect of real estate risk on other areas of corporate policies like the use of private placements and tax shields.

In the second essay, I show that real earnings management plays an important role in REITs seasoned equity offerings. Recent research indicates that security issuers often exercise large real investment options around equity offering, suggesting endogenous corporate investment/financing decision determined by firm's asset in place. Considering the transparency of REITs, REITs managers may have more freedom on CAPEX allowances. One line of future research will be to link up property disposition and acquisition with the real earnings management activities in the empirical analysis.

In the third essay, despite my best efforts to control for fundamentals like time-varying growth opportunities and risk premia, it is not impossible that there is unobservable fundamental risk factor responsible for some of my results. Future work may focus on identifying these factors and integrating them in the analysis. Meanwhile, given that REITs pay dividends in excess of

90% minimum threshold, it would also be interesting to consider the alternative external capital resources other than equity offerings for REITs during different sentiment periods in my future research.

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APPENDIX

Appendix 4.1 Variables Definition

Variable Name	Definition	Data Sources
Panel A: Variables of Interests		
PreMis	The mispricing level prior to SEO issuance using RKRV methodology	Stock price: CRSP Accounting data: Compustat
CAR	Cumulative abnormal return around SEO announcement(-3,+3) estimated by market model	Stock price: CRSP
Discounting	The percentage change in the price between the offer price and the previous-day closing price.	Offer price: SDC; Previous day closing price: CRSP
Underpricing	The percentage change in the price between the offer price and the first-day closing price.	Offer price: SDC; First-day closing price: CRSP
Lret	Post-SEO long run return	Stock price: CRSP
Panel B: Sentiment Measures		
ICS	Index of Consumer Sentiment constructed by University of Michigan Survey Research Centre, beginning in 1947 on a quarterly basis (month 2, 5, 8, 11) and changing to monthly basis in 1978.	Michael Lemmon share the data and I update it by Bloomberg
ICSR	Residual sentiment measure obtained by orthogonalizing ICS on a set of macroeconomic variables, following Lemmon and Portniaguina (2006).	Michael Lemmon share the data and I update it by Bloomberg
CBIND	Index of Consumer Confidence constructed by the Conference Board, beginning on a bimonthly basis in 1967 (month 2, 4, 6, 8, 10) and changing to a monthly survey in 1977.	Michael Lemmon share the data and I update it by Bloomberg
CBINDR	Residual sentiment measure obtained by orthogonalizing CBIND on a set of macroeconomic variables, following Lemmon and Portniaguina (2006).	Michael Lemmon share the data and I update it by Bloomberg
BC	The buying condition survey conducted by Thomson Reuters/University of Michigan	University of Michigan Survey Research Centre
BCR	Residual sentiment measure obtained by orthogonalizing BC on a set of macroeconomic variables, following Lemmon and Portniaguina (2006).	University of Michigan Survey Research Centre
BW	The Baker and Wurgler Index, based on the dividend premium, closed-end fund discount and NYSE turnover.	Wurgler's website
Panel C: Macroeconomic Variables (as defined in Lemmon and Portniaguina (2006))		
DIV	Dividend yield is measured as the total cash ordinary dividend of the CRSP value-weighted index over the last three months and divided by the value of the index at the end of the current month, calculated with the CRSP value-weighted returns monthly index with and without dividend, as in Fama and French (1998) and Lemmon and Portniaguina (2006).	CRSP

DEF	Default spread, monthly, is measured as the difference between the yields to maturity on Moody's Baa-rated and Aaa-rated bonds.	Federal Reserve Bank of St. Louis
YLD3	The yield on three-month Treasury bills, monthly.	Federal Reserve Bank of St. Louis
GDP	GDP growth, measured as 100 times the quarterly change in the natural logarithm of chained (2005 dollars) GDP.	Federal Reserve Bank of St. Louis
CONS	Consumption growth, measured as 100 times the quarterly change in the natural logarithm of personal consumption expenditures.	Federal Reserve Bank of St. Louis
LABOR	Labor income growth, measured as 100 times the quarterly change in the natural logarithm of labor income, computed as total personal income minus dividend income, per capita and deflated by the PCE deflator.	Federal Reserve Bank of St. Louis
URATE	Unemployment rate, monthly and seasonally adjusted.	Bureau of Labor Statistics
CPI	The inflation rate from CRSP, monthly (variable CPIRET)	CRSP
CAY	Consumption-to-wealth ratio, from Lettau and Ludvigson (2001).	Martin Lettau or Sydney Ludvigson's website
Panel D: SEO Characteristics		
Sales	The sales of the prior fiscal year before offering	Compustat
Rpremia	firm risk premium in the prior observation month	CRSP
InfoAs	The abnormal return around earning announcement releases as a proxy for information asymmetry.	
Growth	Market-to-book decomposition component to control growth/ investment opportunities using RKRV methodology	Compustat
Size	SEO shares offering size scaled by market capitalization	SDC
Uranking	the underwriters' reputation	Jay Ritter's Website
Asset	Asset is total asset in natural logarithm	Compustat
Lev	Leverage ratio prior observation month	Compustat
Byield	The short-term government bond yield prior observation month.	CRSP
SeqREIT	The current SEO sequence regarding the REIT itself.	SDC
Yearslisted	The number of years between the observation year and the IPO year	SDC,SNL
NASDAQ	*NASDAQ* equals to one if the firm is listed on NASDAQ, zero otherwise.	CRSP