CEO Optimism and the Cost of Debt:
Evidence from U.S. REITs

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A Thesis
In the Department of
Finance

Presented in Partial Fulfillment of the Requirements
for the Degree of
Master of Science (Finance) at
Concordia University
Montreal, Québec, Canada

March 2021

CONCORDIA UNIVERSITY

School of Graduate Studies

This is to certify that the thesis prepared

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Entitled: CEO Optimism and the Cost of Debt: Evidence from U.S. REITs

and submitted in partial fulfillment of the requirements for the degree of

Master of Science (Finance)

complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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March 19, 2021 _____

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Abstract

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This paper investigates the impact of CEO optimism level on the cost of debt in Real Estate Investment Trusts (REITs) in the U.S. market. CEO optimism is measured by following Malmendier and Tate's (2005) approach using the average moneyness of vested options held by the CEO. Then using the spread between the yield of the bond at the end of every year following origination and the treasury rate with the same or closest time to maturity, the cost of debt is calculated. After controlling for other variables including fixed effects, firm and CEO characteristics, the results show that high(low) CEO optimism level conveys a markup of 31(13) basis points on average on the cost of debt encountered by REITs.

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1.Introduction

Many papers in the recent literature examine the effect of psychological biases and characteristics of managers on their corporate policies. Overconfidence is one of the predominant players found in the behavioral biases explored in the behavioral finance literature, and many studies documented this phenomenon and especially its effects on firm decisions and thereby performance.

By definition, an overconfident person believes his/her decision is better and it will result in a better outcome. Certo, Connelly, & Tihanyi (2008) prove that irrational actions are widespread amongst financial managers.

In relevant terms, overoptimistic managers overestimate their potential and underestimate their probability of failure, so they end up improperly identifying negative NPV projects as profitable and hence leading to bad firm performance. For example, Hirshleifer and Luo (2001) find that overconfident investors will trade more frequently as they undervalue the risk associated with their investments. Also, Heaton (2002) affirms this result in his paper and shows that overoptimistic managers dismiss positive NPV projects for alternatives that they believe would do better.

Malmendier and Tate (2005), Malmendier and Tate (2008) show that overconfident managers are correlated with corporate investment distortions and value-destroying mergers. Also, with higher firm leverage according to Ben-David, Graham, & Harvey (2007). Furthermore, Griffin, Nardari, and Stulz (2007) find that investors consistently trade too frequently. Barber et al. (2009), Kuo and Lin (2013) say that active trading behavior is substantially linked to inferior investment performance. And Barber and Odean (2001), Odean (1998) confirm this by finding that overconfidence is the simple and compelling reason for excessive trading activity.

Daniel, Hirshleifer, and Subrahmanyam (1998) say that people demonstrate more accuracy about their own information but less towards public information hence leading to detrimental investment decisions.

Many papers focus on CEO overconfidence effects on firm trading and investment activities, while I decide to work with Real estate investment trusts (REITs) in a different scope to study the effects of CEO optimism on the cost of debt.

I choose to investigate REITs for the reason that the literature usually excludes them because of the regulatory environment that these corporations carry. The motivation to study REITs comes through the uniqueness of these firms. For example, according to the tax-exempt regulations that these firms follow, they should pay 90% of income to shareholders. Hence, debt is useless as a tax shield. In addition, REITs differ from stock markets in geographical dispersions and transparency. Hardin, Highfield, Hill, & Kelly (2009) show that in REITS, the effect of managerial decisions greatly impacts REIT cash holdings and dividend payout. Moreover, REITs offer a distinct edge where we can identify their investments separately and we can study the performance on the level of the assets in addition to the firm level, hence this is usually not feasible in ordinary corporations.
From the investor perspective, the high returns in this industry people made before the housing bubbles appeared and led to the 2008 crisis made them purchase more and more houses and according to Clayton(1997), housing booms are driven by investors' irrational anticipation instead of fundamentals.
Moreover, Fu and Ng (2001), Byrne et al.(2013) show that real estate markets are usually slower in absorbing market news thus reducing their efficiency. And these markets, according to Ling et al.(2014) are considered illiquid and involve information asymmetry, which leads to judgmental biases.
Therefore, overconfidence will have a greater effect in such markets and on their performance and executive decision-making.

To study this effect on the cost of debt of Real Estate Investment Trusts (REITs), I adapt Malmendier and Tate (2005) method of measuring overconfidence, which is the most common and approved method of measuring CEO overconfidence. The main idea revolves around measuring the average moneyness of vested options held by the CEO. Hence the overoptimistic CEOs will delay exercising the in-the-money options anticipating a better profit, but this does not always end up to their side and it negatively affects firm

performance as shown by many studies. Therefore, I study the effect on the cost of debt to acknowledge if creditors take CEO overconfidence into consideration and use it as means to adjust their required return.

This study contributes to the literature in different ways. First, according to my knowledge, no other study examines the effect of CEO overconfidence on the cost of debt in REITs. Several studies including Eichholtz and Yönder (2015) show that overconfidence affects stock performance. Malmendeir et al (2011) show that overconfident CEOs perceive external financing as overpriced, particularly equity financing. Thus, they issue less equity than their counterparts.

Meanwhile, this study investigates the other part of the conundrum which is the debt aspect. In addition, the amount of unexercised vested options held by CEOs is used to calculate the moneyness instead of using the CEOs' net purchase method. And my method is used very often in research papers studying CEO overconfidence effects on firms and is proved to show consistent results by many papers including Hall & Murphy (2002) and many others.

Another contribution is to the REIT markets and specifically the behavioral finance aspect, as the literature shows research in this area is very limited. And my findings prove that behavioral biases effect reaches every corner of the financial world, including the real estate markets, where illiquidity and lack of short selling opportunities provide favorable conditions for these biases.

I find that CEOs having high overconfidence in Real Estate Investment Trusts will cause a 31-basis points increase in the cost of debt when compared to their non-overconfident peers. In addition, CEOs characterized by low overconfidence will be also penalized by a 13-basis point markup. Therefore, not only investors but also creditors will penalize a CEO if he/she is portrayed as high overconfident or low overconfident.

Other variables that show consistent significant effects include some financial characteristics such as the debt ratio of a firm, where it proved to increase the cost of debt. Also, some profitability measures such as return on assets, have a negative correlation with the cost of debt. And some property types held by REITs also prove to affect the cost of

debt. In addition, the percentage of stock ownership by the CEO of a REIT affects the cost of debt.

The remainder of the paper is structured as follows. In section 2, we examine some of the major research in this field. In section 3 we explain the sample, methodology, and data sources. In section 4 we explain the model and variables. In section 5 we show the results. Section 6 is the conclusion.

***Note:** For clarification and ease of use, the terms "overoptimism" and "overconfidence" are interchangeably used throughout this paper. Similarly in Hirshleifer et al. (2012) and Malmendier et al.(2011). Overoptimism and overconfidence are the main motivation behind the overestimation of ones' abilities and researchers use the same proxy to measure these traits. (the same proxy used in this paper).

2. Previous Literature

Many papers define overconfidence in different ways, but they all revolve around the same idea which is the overestimation of one's abilities.

Menkhoff and Nikiforow (2009) prove that behavioral finance biases are embedded in the person's character and it occurs by nature and not nurture, namely not as a result of the market.

Benos (1998) defines investors as overconfident when they believe that their verdicts are more efficient than others, thus making them think that they always are correct when making decisions.

Another overconfidence definition by Hirshleifer and Luo (2001) states that it happens when investors do not take into consideration the risk associated.

Later, researchers began to look for methods to quantify this bias and to study its effects. Before Malmendier and Tate (2005) proposed their measure of overoptimism that became the universal approach for these studies, behavioral finance papers such as Benos (1998), Hirshleifer and Luo (2001) used gender and other measures like experience to measure overconfidence. Then, Malmendier and Tate (2005) came up with a more plausible method which basically revolved around the idea that overconfident executives will expose themselves to more unwanted risk believing that they could reap better return.

The studies in this literature include Hackbarth (2008) who shows that overconfident managers are detrimental to the firm whereas moderately optimistic ones will make better decisions.

Deaves, Luders and Luo (2009), Barber and Odean (2001) show that investors who are overconfident tend to trade more frequently and end up being not profitable.

Likewise, Benos (1998) creates a model based on investors who are overconfident and proves they trade more.

Pikulina et al. (2017) show that high (low) overconfidence leads to over (under) investment decisions.

Odean (1998) tries to develop a model assuming rationality of investors and proves that the most consistent effect of overconfidence is the increased volume of trading.

Adding to these findings, Odean(1999) does an additional study and shows that overconfident investors trade more than they're supposed to, relative to how much they rationally should. Hence proving that overconfidence is the reason for their increased trading.

A joint study done on options by Bauer, Cosemans and Eichholtz (2009) confirm the results of Barber and Odean (2001) where they prove that men traded more than women and thus ending up with lower returns. Hence building upon the fact that men are more overconfident than women.

Barber and Odean (2002) confirm that overconfident investors traded more frequently and performed worse by studying the switch of accounts from telephone to online trading where investors can easily trade and with lower trading costs and hence the overconfident investors traded more and performed worse.

Chuang and Lee (2006) find that overconfident investors traded riskier stocks and believed that they have superior information than others.

Malmendier and Tate (2005) show that overconfident CEOs invest more when they have ready to use cash and hence making corporate investments more cash flow sensitive.

Billett and Qian (2008) show that if CEOs had successful acquisitions, then they will be more confident and thus engage in unprofitable acquisitions after.

Moreover, Hilary & Hsu (2011) affirm Billett and Qian's (2008) conclusion that overconfident CEOs who made successful forecasts will tend to be more overconfident in future forecasts, leading to underperformance of the firm.

Ahmed & Duellman (2012) finds that CEOs who are overconfident interpret negative NPV projects as positive ones to delay loss recognition.

More on corporate finance literature, Deshmukh et al. (2013) say that when CEOs are overconfident, the dividend payout is usually lower because these CEOs are inclined to allocate profits to more investments instead of dividends.

Likewise, Yung et al. (2015) adds to Deshmukh et al. (2013) and find that firms that have overconfident CEOs will have smaller dividend payouts and they tend to use more debt than equity financing.

In summary, findings suggest that overconfidence inefficiently affects CEOs decisions.

On the other side of the spectrum, some researchers such as Galasso & Simcoe (2010), believe that overconfident CEOs bring a positive impact to the firm, where these CEOs are more innovative, and they can obtain more citations and patents. And in another paper, Galasso & Simcoe (2010) find that they could be better leaders since they can handle more strategic changes and difficult situations.
Furthermore, Hirshleifer et al. (2012) claim that overconfident CEOs could benefit shareholders by investing in more risky and innovative projects, but this may hold only in some industries that require a high level of innovation.

Concerning REITs, Eichholtz and Yonder (2015) find a negative relation between firm performance and overconfidence, and they proved that this negative effect is the cause of shortcomings made by the overconfident CEOs.
Usually, not many studies discuss the role of CEOs in REITs as it is a highly regulated industry and rational behavior of management is assumed.
But REITs are tax-exempt if they pay 90% of their earnings, so rationally this kills the benefit of leverage tax shield. Yet, Feng, Ghosh, & Sirmans (2007) show that REITs carry around a 65% debt ratio. Thus, following the pecking order model, the only reason to pursue debt in this case is to evade the adverse selection carried with the equity, according to Myers & Majluf (1984).
Furthermore, Malmendier et al. (2011) say that CEOs that are overconfident will issue less equity and more debt as they see the cost of equity to be unreasonably expensive.

This study expands the literature by completing the puzzle of the effect of overconfidence on the cost of capital of REITs. I assess the impact of CEO overconfidence on the cost of debt financing and find that the two extremities of the optimism spectrum will be negatively perceived by creditors and hence leading to a higher cost of debt for the firm.

3. DATA + Methodology

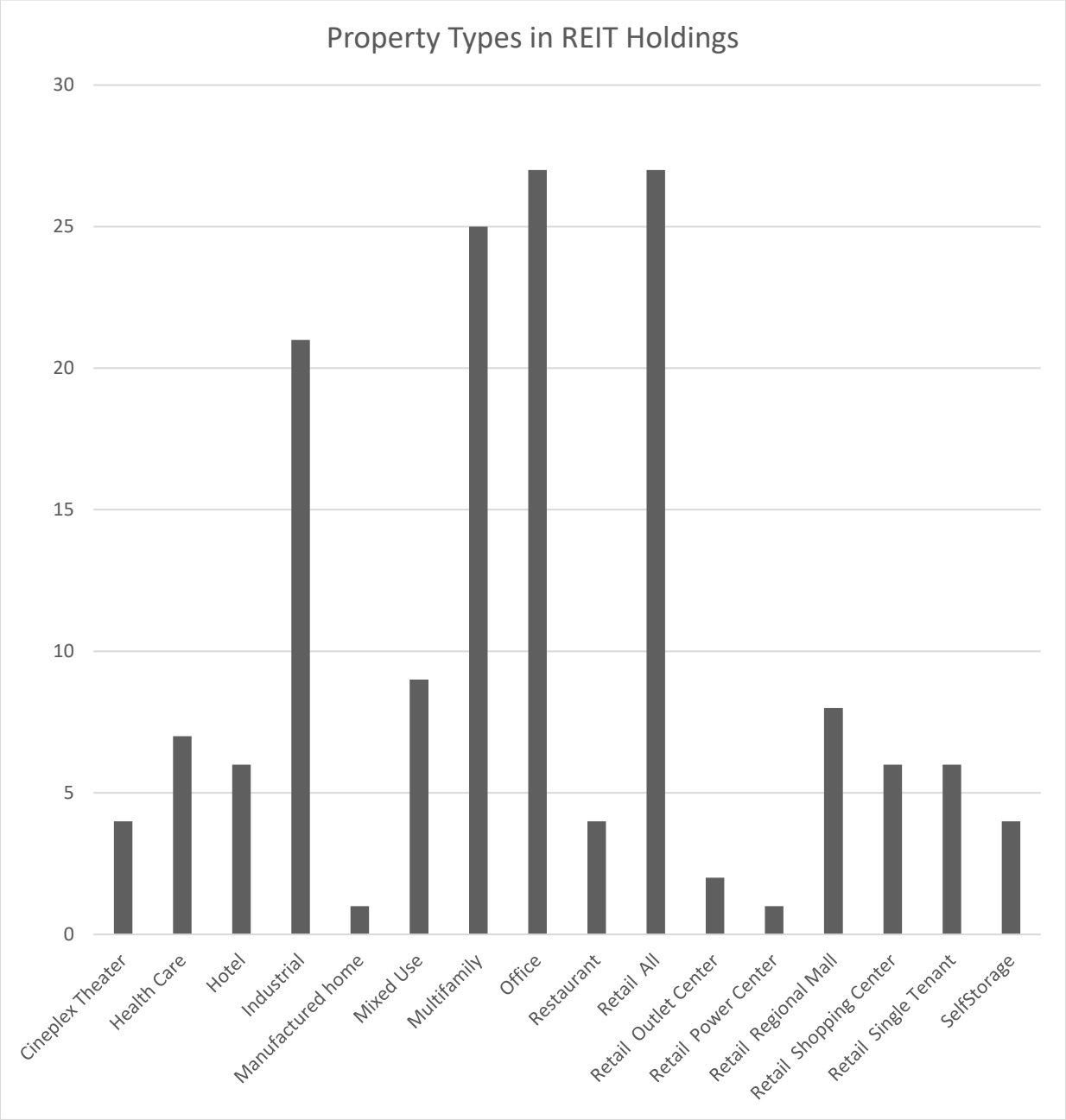
The sample used in this study is U.S. Real Estate Investment Trusts (REITs) from 2002 to the end of 2019 as TRACE database data starts in 2002.

First, I obtain bond data from TRACE FINRA database using access through WRDS and by using REITs Ticker symbols. After that, I obtain CEO information from ExecuComp database also through WRDS access. Then the two data files are merged based on date and ticker symbol. Then the data is cleaned to keep annual bond observations and I remove all CEO observations that are missing. I end up with a sample of 763 bond annual observations for 79 REITs.

After that, I get REITs financial information such as total debt, assets, market capitalization, and other variables from CompuStat Fundamentals Annually section under North America-Daily.

Moreover, from SPGlobal Market Intelligence database, I get REITs detailed property information such as the number of properties, occupancy rate, total area, and the property types owned by each REIT and the number of properties under each type and specific details related to the type of property. Property types are classified into 16 categories that include: Cineplex Theater, Health Care, Hotel, Industrial, Manufactured home, Mixed-Use, Multifamily, Office, Restaurant, Retail – All, Retail - Outlet Center, Retail - Power Center, Retail - Regional Mall, Retail - Shopping Center, Retail - Single Tenant, Self-Storage. I consider in my study only the types that are held by the highest number of REITs. i.e the most common types. The number of REITs investigated is 79, and most REITs hold more than one type of property. Hence, to study the effect of property types on the cost of debt, I choose the most common property types held by REITs. And according to Figure 1., I decide to use four property types which are Industrial, Multifamily, Office, and Retail – All.

Figure 1. REIT Holdings



This figure shows the number of REITs in the sample that own a respective property type.

Table 1. Property type descriptive statistics

Property Types	Mean	Std. Dev.	Count
Industrial			
Number of Properties: Industrial (actual)	241.543	605.811	21
Industrial Portfolio: Area (million sq. ft.)	43.351	112.659	20
Occupancy Rate: Industrial (%)	94.799	5.311	16
Rent: Industrial ($/sq ft/yr)	10.425	6.037	10
Multifamily			
Number of Properties: Multifamily (actual)	76.571	120.588	25
Units: Multifamily (units)	24585.5	34076.2	25
Occupancy Rate: Multifamily (%)	92.997	6.043	20
Avg. Rent per Unit: Multifamily ($/unit/mo)	1225.639	1001.632	15
Office			
Number of Properties: Office (actual)	60.566	132.927	27
Office Portfolio: Area (million sq. ft.)	13.128	24.498	26
Occupancy Rate: Office (%)	81.851	27.554	21
Rent: Office ($/sq ft/yr)	30.869	27.318	17
Retail-All			
Number of Properties: Retail (actual)	270.796	570.893	27
Retail Portfolio: Area (million sq. ft.)	29.875	47.595	28
Occupancy Rate: Retail (%)	94.853	3.069	22
Rent: Retail ($/sq ft/yr)	19.334	10.811	15

Table 1 shows the details of the properties owned by the REIT sample. Each type reported is owned by at least 20 REITs out of the 79 in the sample. And we can see that the highest number of properties are industrial and retail properties. In addition, the occupancy rate is above 90% for all types except office properties.

After that, to find bond spreads needed to calculate the cost of debt, I get detailed bond data from FactSet, where I manually linked the CUSIPs of the bonds individually and got the maturity dates, origination dates, coupon rates, and issue amounts. After getting maturity dates, I got the constant maturity treasury rates from the U.S Department of the Treasury, and to find bond spread, I subtract the treasury rate having the same or closest time to maturity from the yield of the bond at the end of every year after origination.

And to measure CEO optimism, the previous studies generally used several methods to do it. The most common one used is the one based on CEOs' option-holding behavior by Malmendier and Tate (2005) and Campbell et al. (2011). Another measure is derived from the earnings forecasts of the CEOs because overconfident CEOs will overestimate their firm's future performance and end up making extremely high earnings forecasts. The others include portrayals of CEOs in the press by measuring the count of overconfidence-related keywords like "optimism", "confident", "optimistic" and other similar terms. And another measure used by Menkhoff et al. (2006) is surveys and psychological questions to get a numerical score of overconfidence.

The main idea of the option holding behavior method was that risk-averse CEOs are supposed to exercise options before expiration that are in-the-money and that is to reduce their exposure to unsystematic risk which is the risk that can be avoided. Hence, according to Malmendier and Tate (2005 & 2008), overoptimistic CEOs overestimate their firms' value and end up delaying exercising their options.
So, I calculate the moneyness of the option holdings of a CEO by dividing the value of exercisable unexercised options by the number of exercisable unexercised options to obtain the average value per option. After that, I get the estimated strike price subtracting the average value per option from the stock price at fiscal year-end. And finally, I get the moneyness of a CEO's options by dividing the average value per option by the estimated strike price minus one.

In ExecuComp variable terms, the realizable value per option will be calculated as OPT_UNEX_EXER_EST_VAL divided by OPT_UNEX_ EXER_NUM and the estimated exercise price would be calculated by subtracting the realizable value per option from PRCCF. And eventually, the moneyness will be calculated by dividing the realizable value per option by the estimated exercise price.

After I calculate the moneyness percentages of the CEOs options, Holder67 measure, as called by Malmendier et al (2011), is based on the idea that a CEO will hold willingly in the money options and if the average vested option is at least 67% in the money then Holder67 measure will be equal one. In other terms, if a CEO fails to exercise vested options that are at a minimum of 67% in-the-money, then he/she is classified as overconfident. The ratio of 67% corresponds to a constant relative risk aversion value of 3 following Hall and Murphy (2002).

Finally, I follow Campbell et al (2011) categorization where CEOs are categorized into different groups based on their moneyness percentages.

First, highly optimistic CEOs are the CEOs that hold stock options that are greater than 67% in-the-money.

Second, low optimism CEOs are the ones that exercise stock options that are less than 30% in-the-money and at the same time they do not hold exercisable options that are more than 30% in-the-money.

4. Model

4.1 The Control Variables

Bond Spread: As explained in section 3, the bond spread is the difference between the treasury rate having the same or closest time to maturity and the yield of the bond at the end of every year after origination.

DUMMY67: Following Malmendier et al (2011), I denote DUMMY67 as a dummy variable being equal to 1 if the CEO is highly optimistic and equal to 0 otherwise.

DUMMY30: Similar to DUMMY67, this dummy variable represents low optimism CEOs and it is equal to 1 if it satisfies the 30% cutoff as specified in section 3 and equals 0 otherwise.

Size: Size is computed as a natural log of the total assets. Usually, large firms will be able to obtain a lower cost of debt and fewer restrictions because of reputation and more stable cash flows. For instance, Malitz (1986) finds a negative relation between covenant restrictions and firm size.

Tobin's Q: Sánchez-Ballesta and García-Meca (2010) say that high firm performance leads to a lower cost of debt, so I use Tobin's Q as an indicator of firm performance since it shows if a stock is undervalued or overvalued.

Tobin's Q is calculated as the ratio of the market value of a company over the replacement value of the firm's assets.

Debt ratio: Insolvency is one of the main factors affecting the cost of debt, as Carey et al. (1998), Merton (1974) proves that cost of debt and debt ratio are positively related.

Debt ratio is the amount of total debt divided by total assets.

ROA: I calculate ROA as Earnings Before Interest & Taxes (EBIT) divided by total assets. And this gives us an idea about the efficiency of a firm in utilizing its assets. Santosuosso (2013) finds that the cost of debt is negatively correlated to different proxies of profitability.

Hence, weak firm performance will increase the cost of debt.

Time to maturity (1 and 2 years): I include dummy variables for bonds that are in the last years of maturity (1 and 2 years) to study how creditors perceive the behavior of the firm when it's time to pay the face value of the bond. Another reason is because I am focusing on the secondary markets and not at origination. Hence, the CEOs at bond issuance are most likely not the ones I investigate in the secondary markets.

Issue Amount: I use the natural logarithm of the issue amount and it is included it as a control variable in the OLS at origination.

Gender: Barber and Odean (2001) in their article titled "Boys Will Be Boys: Gender, Overconfidence, And Common Stock Investment" show that men are usually more overconfident than women. Thus, they are involved in more excessive trading activity when compared to women.

Usman, Farooq, Zhang, Makki, Khan (2019) find that lenders charge 4% less from firms having at least one female board member than they do from firms with no female board members.

I use a dummy variable for gender which implies 1 if a CEO is a male and 0 if a CEO is a female.

Age: Sundaram, Yermack (2007) state that the financing balance shifts towards debt and away from equity as CEOs grow older.

Compensation: Compensation is used as the natural logarithm of salary and bonus. There exists extensive literature discussing agency costs and how a CEO's behavior impacts firms performance and investments.

%Ownership: I include the percentage of company shares owned by the CEO, and this is used to mitigate agency costs and the type of investments that a CEO undertakes. Hence, I study how it may affect the cost of debt of the firm.

Figure 2.

Correlation Matrix

This Pearson Correlation Coefficient matrix shows that there is no sign of multicollinearity between the variables.

Pearson Correlation Coefficients

	BondSpread	Dummy67	Dummy30	TimeToMaturity(1year)	TimeToMaturity(2year)	TobinsQ	Size	ReturnOnAssets	DebtRatio	Age	Gender	Compensation	Ownership%
BondSpread	1	0.28765	-0.08097	-0.18122	-0.20149	-0.06233	-0.06339	0.03175	-0.05386	-0.04415	0.0281	0.088	0.2839
Dummy67	0.28765	1	-0.36774	0.05626	-0.03713	0.11143	0.11592	0.08139	-0.05638	0.05583	0.08546	0.17515	0.18148
Dummy30	-0.08097	-0.36774	1	-0.06805	0.03706	-0.11682	0.00938	-0.09057	-0.01548	-0.02447	0.02887	0.09122	-0.04262
TimeToMaturity(1year)	-0.18122	0.05626	-0.06805	1	-0.05998	0.02672	-0.04875	0.06508	-0.00685	0.01071	-0.00698	-0.02129	0.03053
TimeToMaturity(2year)	-0.20149	-0.03713	0.03706	-0.05998	1	-0.02257	0.07644	-0.05059	0.0172	0.0024	-0.04592	0.02782	-0.01334
TobinsQ	-0.06233	0.11143	-0.11682	0.02672	-0.02257	1	-0.13013	0.68481	0.24811	0.03967	0.09194	-0.00774	-0.05635
Size	-0.06339	0.11592	0.00938	-0.04875	0.07644	-0.13013	1	-0.25784	-0.09451	0.10534	-0.06295	0.44594	-0.00083
ReturnOnAssets	0.03175	0.08139	-0.09057	0.06508	-0.05059	0.68481	-0.25784	1	0.25428	0.02555	0.02854	0.06694	0.03424
DebtRatio	-0.05386	-0.05638	-0.01548	-0.00685	0.0172	0.24811	-0.09451	0.25428	1	-0.18026	-0.0257	-0.03258	0.00203
Age	-0.04415	0.05583	-0.02447	0.01071	0.0024	0.03967	0.10534	0.02555	-0.18026	1	0.0252	0.16265	0.22771
Gender	0.0281	0.08546	0.02887	-0.00698	-0.04592	0.09194	-0.06295	0.02854	-0.0257	0.0252	1	0.06457	0.04026
Compensation	0.088	0.17515	0.09122	-0.02129	0.02782	-0.00774	0.44594	0.06694	-0.03258	0.16265	0.06457	1	0.08243
Ownership%	0.2839	0.18148	-0.04262	0.03053	-0.01334	-0.05635	-0.00083	0.03424	0.00203	0.22771	0.04026	0.08243	1

4.2 Regression Model

I use an ordinary least squares regression to study the effects of CEO overconfidence levels on the cost of debt of Real Estate Investment Trusts (REITs).

The dependent variable is the bond spread which represents the cost of debt of a REIT. And I use two dummy variables to indicate the level of CEO optimism. The first one being 1 if the moneyness of the CEO's vested options is greater than 67% and 0 otherwise. The other dummy is used for low confidence CEOs and is equal to 1 if the moneyness of the CEO's vested options is less than 30% and 0 otherwise.

Some control variables that may affect the cost of debt are also utilized. I include some firm characteristics such as Tobin's Q, firm size, debt ratio, return on assets, and the types of properties owned by the firm. In addition to a few CEO personal characteristics such as age, gender, compensation, percentage of ownership. And finally, some bond characteristics such as time to maturity and issue date.

Hence, the model becomes:

$$BondSpread = \alpha_0 + \beta_1 CEOOptimsim_{i,t} + \Sigma_T \beta_t CEOCharacteristics_{i,t} + \Sigma_T \beta_t FirmCharacteritcs_{i,t-1} + \Sigma_T \beta_t BondCharacteritcs + \mathcal{E}_{i,t}$$

5. Results

Table 2. Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum	Count
Panel A. Financials					
Assets - Total	8559.7	7631.4	328.2	42802	762
EBIT	437.4	495	-555	3368.4	762
Market Value - Total	9723.5	11323	144.8	101785	498
Firm's Q	0.757	0.830	0	6.278	762
Debt Ratio	0.495	0.153	0.05	1.675	762
Panel B. CEO Characteristics					
Total Compensation(Salary+Bonus)	1123.1	791.277	242.2	5787.5	762
% of Total Shares Owned (as reported)	0.993	2.486	0.003	43.4	614
Age	55.444	7.243	35.000	80.000	762
Male					743
Female					20
Panel C. CEO Optimism Level					
High Optimism CEO	0.298	0.458	0	1	527
Low Optimism CEO	0.167	0.374	0	1	406
Panel D. Bond Characteristics					
Coupon rate	5.147	1.559	0.375	10	763
Issue amount (million USD)	382.634	261.938	15	1750	754
Time to Maturity(years)	7.148	4.651	0	30	762
Bond Spread	2.30	1.199	0.03	5.10	762

This table shows the descriptive statistics for the variables. Panel A shows the mean, standard deviation, minimum, maximum, and number of observations of the financial information of the REITs in the sample. Panel B and Panel C shows the CEO characteristics and optimism level, respectively. And Panel D describes the bond characteristics.

In table 2, I report the mean, standard deviation, minimum, maximum, and number of observations in each variable in the sample. In Panel A, I discuss the financial information used in the control variables. Total assets averaged $8.5 billion with a standard deviation of $7.6 billion for the sample consisted of 762 observations. The mean EBIT(earnings before interest and tax) was $437 million with a standard deviation of $495 million. The REITs had an average market value of $9.7 billion with a standard deviation of $11.3 billion for 498 observations. The average firm's Q was 0.757 with a 0.83 standard deviation and the REITs had a debt ratio of almost 50% with a 15.3% deviation.

Next, we move to Panel B, where I discuss the characteristics of the CEOs under investigation. I find that the average compensation which includes salary and bonus was $1.12 million per fiscal year with a standard deviation of $791000. On average, these CEOs owned 1% of their firms with a standard deviation of 2.48%. Moreover, the mean age was around 55 years with a standard deviation of 7.2 years. And coming to gender, we notice that the REITs in the sample are mainly male dominant executives, with only 2.6% of the CEOs being females.

In Panel C, I denote the average CEO optimism levels. And in Panel D, we can see that the bonds in the sample have an average coupon rate of about 5.147% with a mean issue amount of $382 million and a 7-year time to maturity. Standard deviations are 1.55%, $261 million, and 4.6 years, respectively. And finally, the average bond spread was 2.3%, with a standard deviation of 1.2%.

In **figure 3**, we can see that the highly optimistic CEOs have the highest bond spread, indicating the highest cost of debt among their peers. In addition, low confidence CEOs also face a markup in the cost of debt.

In **figure 4**, we can see how the average bond spread varies throughout the years in the sample. Notably the drop in 2008 from 4.77% to 1.8%.

Figure 3. Bond spread and optimism level.

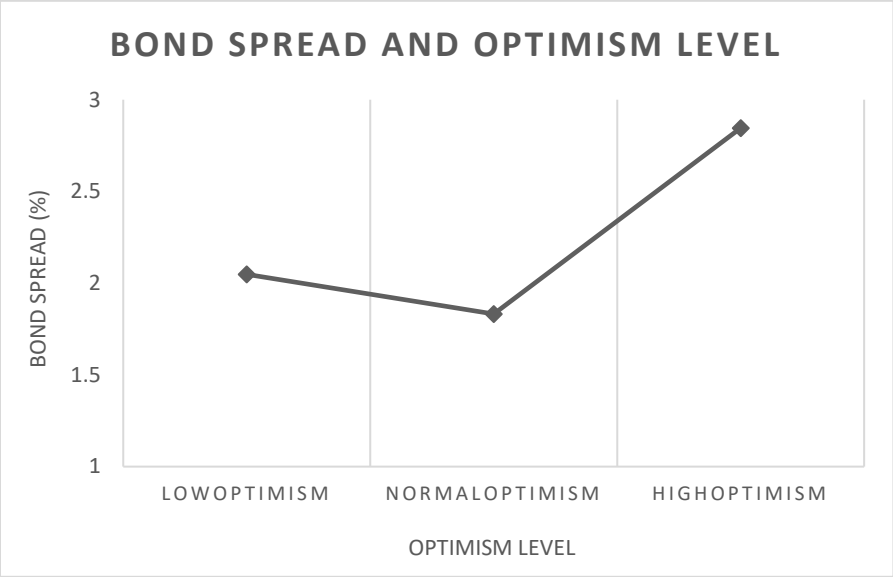
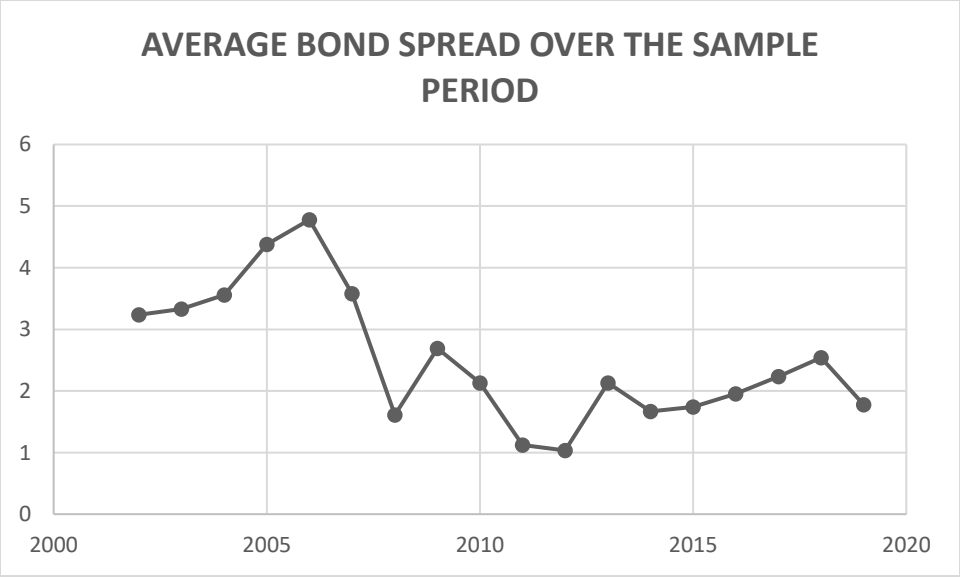


Figure 4. Average Debt Spread Over the Sample Period



In **table 3**, I use the model in section 4.2 to investigate if the optimism level of a CEO affects the cost of debt of the REIT. I include several control variables as defined in section 4.1.

In column (1), I exclude the main independent variables which represent the level of the CEO optimism. DUMMY67 is the dummy variable that specifies if a CEO is over-optimistic or not (according to the 67% moneyness cutoff mark as elaborated in section 3) and similarly to DUMMY30 which indicates if a CEO is low optimistic or not. I find significant results for the last 2 years before maturity, where the cost of debt decreases by 1.3% and 1% respectively. Also, the debt ratio may affect the cost of debt as we find that when debt ratio increases by 10%, it decreases the cost of debt by 2% at the 10% significance level.

Now, in column (2), I include the main predictors .i.e., the optimism indicators, but I do not account for firm type fixed effects. We find that if a CEO is overoptimistic, this will increase the cost of debt by around 27 basis points and by 19.3 basis points in the case he has a low optimism level. These results are significant at the 1% and 5% level, respectively. Notably, the time to maturity also decreases the cost of debt and significant at the 1% level. A 10% increase in debt ratio also will increase the cost of debt by 1.6%, significant at the 10% level.

In column (3), I account for property type effects, but I remove the financial information variables from the regression. We find that a highly optimistic CEO will increase the cost of debt by 25.7 bps whereas a low optimistic one will increase it by 17 bps correspondingly. The respective significance levels are 1% and 10%. Time to maturity is also significant at 1% and yields results similar to the previous columns.

In column (4), I include the property type effects that I omitted in column (2) and the financial information variables that I excluded in column(3). I find that a high optimism CEO will lead to a markup of 28.2 bps in the cost of debt of the firm and similarly a 19.4bps for a low optimism CEO. Significance is at 1% and 5% successively. Time to maturity has a similar effect to the preceding columns. And notably, a 10% increase in debt ratio will have an impact of a 1.05% increase in cost of debt, significant at the 5% level. And some property types also could affect the cost of debt in this regression. If the property is a

multifamily type or an office, it could increase the cost of debt by 15bps and 8.8 bps respectively, with a significance of 10% and 5%.

Finally, in column (5), I cluster standard error based on firm, and it gives almost the same results as in column(4), but I end up with smaller standard errors. And this is used as a robustness to account for the number of observations for each REIT.

In **table 4**, I repeat the same regressions I did in table 3. But with adding control variables for CEO characteristics, such as age, gender, compensation, and the percentage of shares owned by the CEO in the REIT. Variable definitions are found in section 3.1.

In column (1) of table 4, I exclude the main predictor variables which are the optimism indicators, we can see that time to maturity is also significant at the 1% level. ROA proves to have an effect as well, significant to the 5% level, where a 10% increase in ROA leads to a 7.4% decrease in cost of debt.

In column (2), similar to table 3, I exclude the property types but, in this table, I include CEO characteristics as well. We find that a high optimistic CEO will cause a 28.4bps markup on the cost of debt.

In column(3), I include property type effects and exclude financial information variables. I find that a high optimistic CEO will increase the cost of debt by 30.4bps with high significance (1%) and a low optimistic one will increase it by 13 bps with a 10% significance level. Time to maturity has a significant effect similar to the other columns. And surprisingly, if the property was an office, this will increase the cost of debt by 18.7bps with a 1% significance.

Moving on to column (4), I include every variable, hence this serves as the main regression in the paper. We find that a high optimistic CEO causes a 31.7bps increase in the cost of debt with a 1% significance level, and a low optimistic one causes a 12.3bps increase also at the 5% significance level. Moreover, time to maturity is also significant with similar results as discussed earlier. On financial characteristics, Tobin's Q and ROA impact the cost of debt as well, as it shows that a 10% increase in ROA causes a 10% decrease in the cost of debt

and it is significant at the 5% level. CEO stock ownership also has a significant effect on the cost of debt. And if the property type is an office, it will increase the cost of debt by 23 bps.

In column (5), similarly to table 3, I cluster standard error based on firm.

And in **table 5,** I perform the same procedure as in tables 3 and 4, but I do it at bond origination, not in secondary markets. The main drawback in this study is that I don't have an abundance of data at origination, hence I ended up with 62 observations compared to 384 and 325 in tables 3 and 4. I also include the issue amount of the bond as this may have an effect. And instead of using the indicators for the last 2 years to maturity, I include the full time to maturity as this is done at origination.

In column (4), when I include all the variables, we find that a highly optimistic CEO will cause a 28.2bps increase in cost of debt and a low optimistic one will have a 19.4 bps increase successively. Significance levels were 5% and 10% respectively. We also find that a 10% increase in debt ratio will cause an increase of 1.05 % in the cost of debt. Moreover, an increase in the CEO compensation will also cause an increase in the cost of debt by 26bps.

Table 3. OLS Regression without CEO characteristics

Variables	(1)	(2)	(3)	(4)	(5)
Dummy67		0.269***	0.257***	0.282***	0.282***
		(0.080)	(0.079)	(0.081)	(0.062)
Dummy30		0.193**	0.170*	0.194**	0.194**
		(0.093)	(0.094)	(0.094)	(0.071)
TimeToMaturity(1year)	-1.345***	-1.390***	-1.373***	-1.404***	-1.404***
	(0.118)	(0.130)	(0.131)	(0.131)	(0.098)
TimeToMaturity(2year)	-1.006***	-0.954***	-0.963***	-0.951***	-0.951***
	(0.087)	(0.107)	(0.108)	(0.108)	(0.091)
Size	-0.026	-0.071*		-0.077*	-0.077
	(0.028)	(0.041)		(0.041)	(0.032)
DebtRatio	-0.202*	0.161*		0.105**	0.105
	(0.067)	(0.225)		(0.231)	(0.021)
ReturnOnAssets	0.077	0.164		0.143	0.143
	(0.158)	(0.937)		(0.966)	(1.012)
TobinsQ	0.034	0.018*		0.032*	0.032
	(0.041)	(0.057)		(0.056)	(0.051)
Age					
Gender					
Compensation					
Ownership%					
Industrial	0.019		0.038	0.102	0.102
	(0.083)		(0.131)	(0.134)	(0.092)
Multifamily	0.009		0.114	0.150*	0.150*
	(0.064)		(0.086)	(0.081)	(0.105)
Office	0.059*		0.141	0.088**	0.088
	(0.073)		(0.109)	(0.115)	(0.181)
Retail-All	0.010		0.064	0.096	0.096
	(0.066)		(0.093)	(0.094)	(0.099)
Intercept	2.097***	2.118***	1.561***	2.125***	2.133***
	(0.288)	(0.453)	(0.187)	(0.192)	(0.523)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	No	Yes
Obs	742	384	384	384	384
Adjusted R sq	73.85%	74.56%	76.22%	79.56%	

This table shows the result of the OLS regression. It reports the effect of CEO optimism levels on the cost of debt denoted by the bond spreads as defined in section 4. Column(1) shows the effects of bond and firm characteristics on the cost of debt without taking optimism into consideration. Column(2) shows the effects of CEO optimism in addition to taking bond characteristics, firm characteristics. In column(3), I remove firm characteristics and add the property types. In column(4), I include everything. In column(5) I cluster the standard error by firm. *,**, and *** imply statistical significance at 10%, 5%, and 1% levels, respectively.

Table 4. OLS Regression with CEO characteristics

Variables	(1)	(2)	(3)	(4)	(5)
Dummy67		0.284***	0.304***	0.317***	0.317***
		(0.089)	(0.086)	(0.091)	(0.107)
Dummy30		0.136	0.130*	0.123**	0.123**
		(0.105)	(0.104)	(0.105)	(0.095)
TimeToMaturity(1year)	-1.403***	-1.486***	-1.476***	-1.512***	-1.512***
	(0.123)	(0.147)	(0.145)	(0.139)	(0.103)
TimeToMaturity(2year)	-1.072***	-0.993***	-1.004***	-0.998***	-0.998***
	(0.091)	(0.125)	(0.123)	(0.126)	(0.105)
Size	-0.068	-0.120		-0.134	-0.134
	(0.031)	(0.054)		(0.057)	(0.042)
DebtRatio	-0.018*	0.203		0.046**	0.046
	(0.172)	(0.253)		(0.263)	(0.231)
ReturnOnAssets	-0.739*	-0.827		-1.061**	-1.061
	(0.724)	(1.082)		(1.086)	(1.041)
TobinsQ	0.071	0.067		0.090*	0.090*
	(0.044)	(0.065)		(0.063)	(0.053)
Age	-0.002	-0.002	-0.004	-0.003	-0.003
	(0.003)	(0.005)	(0.006)	(0.005)	(0.005)
Gender	-0.093	-0.205	-0.168	-0.312	-0.312
	(0.163)	(0.200)	(0.198)	(0.204)	(0.170)
Compensation	0.042	0.007	-0.138	-0.003	-0.003
	(0.057)	(0.083)	(0.072)	(0.093)	(0.123)
Ownership%	0.004*	0.014	0.014**	0.018***	0.018*
	(0.011)	(0.012)	(0.011)	(0.012)	(0.007)
Industrial	0.043*		0.126	0.180	0.180
	(0.091)		(0.169)	(0.171)	(0.129)
Multifamily	-0.016		0.103	0.193	0.193
	(0.069)		(0.101)	(0.104)	(0.124)
Office	0.077		0.187***	0.237**	0.237
	(0.080)		(0.128)	(0.139)	(0.212)
Retail-All	0.036		0.147	0.205	0.205
	(0.071)		(0.102)	(0.105)	(0.112)
Intercept	2.289***	2.810***	2.879***	3.134***	3.134***
	(0.448)	(0.655)	(0.620)	(0.695)	(0.748)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	No	Yes
Obs	648	325	325	325	325
Adjusted R sq	70.231%	72.452%	71.734%	75.59%	

Similar to Table 2. , this table shows the result of the OLS regression with adding CEO characteristics as control variables. It reports the effect of CEO optimism levels on the cost of debt denoted by the bond spreads as defined in section 4. Column(1) shows the effects of bond, firm, and CEO characteristics on the cost of debt without taking optimism into consideration. Column(2) shows the effects of CEO optimism in addition to taking bond, firm, and CEO characteristics. In column(3), I remove firm characteristics and add the property types. In column(4), I include everything. In column(5) I cluster the standard error by firm. *,**, and *** imply statistical significance at 10%, 5%, and 1% levels, respectively.

Table 5. OLS regression at origination

Variables	(1)	(2)	(3)	(4)
Dummy67		0.079*	0.182*	0.282**
		(0.021)	0.136	(0.233)
Dummy30		0.086	0.170	0.194*
		(0.076)	0.153	(0.166)
TimeToMaturity	0.034*	0.052	0.029*	0.061*
	(0.021)	(0.061)	0.018	(0.051)
Issue_Amount	0.219	0.243	0.227	0.302
	(0.176)	(0.222)	0.213	(0.287)
Size	-0.069	-0.214		-0.077
	(0.041)	(0.198)		(0.031)
DebtRatio	0.189**	0.161		0.105**
	(0.203)	(0.098)		(0.102)
ReturnOnAssets	-0.342	-2.499		0.143
	(0.235)	(2.134)		(0.102)
TobinsQ	0.089	0.018		0.032*
	(0.072)	(0.021)		(0.029)
Age	0.004	0.003	-0.002	-0.003
	(0.012)	(0.011)	(0.010)	(0.015)
Gender	0.097	0.110	0.370	0.182
	(0.081)	(0.911)	(0.321)	(0.261)
Compensation	0.066	0.051*	-0.046	0.264**
	(0.081)	(0.071)	(0.030)	(0.218)
Ownership%	-0.007*	0.00718	-0.006	0.007*
	(0.041)	(0.039)	(0.039)	(0.038)
Industrial	0.131		0.138	0.102
	(0.124)		(0.129)	(0.095)
Multifamily	0.106		0.114	0.150
	(0.095)		(0.097)	(0.103)
Office	-0.176*		0.141	0.088*
	(0.114)		(0.129)	(0.131)
Retail-All	0.138		0.064	0.096
	(0.093)		(0.076)	(0.081)
Intercept	1.620**	2.867	1.688*	2.370
	(0.632)	(1.203)	(1.243)	(1.263)
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	121	62	62	62
Adjusted R sq	71.893%	72.331%	76.227%	77.771%

Similar to Table 4. , this table shows the result of the OLS regression with the CEO characteristics as control variables but it is done at bond origination and not via secondary markets. It reports the effect of CEO optimism levels on the cost of debt denoted by the bond spreads as defined in section 4. Column(1) shows the effects of bond, firm, and CEO characteristics on the cost of debt without taking optimism into consideration. Column(2) shows the effects of CEO optimism in addition to taking bond, firm, and CEO characteristics. In column(3), I remove firm characteristics and add the property types. In column(4), I include everything. In column(5) I cluster the standard error by firm. The coefficients are calculated at bond origination. *,**, and *** imply statistical significance at 10%, 5%, and 1% levels, respectively.

6.Conclusion

The main purpose of this paper is to bridge the gap of studies on the effect of CEO overconfidence on REITs' cost of capital.

REITs are an interesting environment as the uniqueness of the regulations and their tax policies makes them less susceptible to agency problems, which makes investigating these firms fairly less biased.

Prior studies such as Eichholtz and Yönder (2015) prove that overconfidence negatively affects stock performance and investment activity.

Hence, I investigate the effect of overconfident CEOs on the debt aspect of the firm, particularly the cost of debt.

We discover that behavioral biases affect even the most regulated industries, where illiquidity and lack of short selling opportunities were assumed to diminish such influence.

I find that CEOs that are considered to be overoptimistic will cause a 31bps markup to the cost of debt encountered by the REIT compared to their non-overconfident peers. On the other hand, CEOs categorized as low optimism executives will also be negatively perceived by creditors and that will cause a 13bps markup on the cost of debt.

I investigate the effect of optimism on the cost of debt and I control for firm, property type, CEO characteristics, and time fixed effects. And then I try excluding some control variables and using different combinations of these controls, yet the results were highly significant in all different cases.

In addition, I investigate this effect using secondary market data in addition to using data at origination of the bond, where I also control for bond characteristics, and the results were also significant in all instances.

Eventually, we could ascertain that not only investors but also creditors will negatively perceive executives' behavioral biases such as overoptimism.

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