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The Cost of Debt for REITs: The Mortgage Puzzle

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ABSTRACT

Established, low-leverage equity REITs with access to the public debt market rely on both non-recourse mortgages and full recourse bonds/notes as sources of long-term debt. Interest rates on secured, non-recourse debt (mortgages) include a costly strategic default option premium and do not benefit from a firm's overall financial capacity. We find that use of non-recourse, mortgage debt is more likely for longer-term, smaller borrowings, and during recessionary periods, consistent with REITs valuing financial flexibility in their capital structure. The higher rates for property-level debt suggest a benefit to REITs versus single asset investors in terms of cost of capital. Since REITs also access debt at the corporate level, the spread between long-term non-recourse debt and long-term recourse debt implies a benefit to the REIT structure.

KEYWORDS

Strategic default; recourse debt; REIT; financial flexibility; interest rates; debt overhang; secured debt; portfolio risk

Why do REITs continue to rely on mortgage financing when they have access to lower-cost alternatives? We find that REITs continue to employ a mix of heterogeneous and expensive sources of financing despite their access to less costly debt instruments. Comparison of the interest rates on non-recourse, secured debt (mortgages) and recourse, unsecured debt (publicly traded notes) for each individual REIT shows that corporate level, unsecured, recourse debt is less costly. Mortgages are the most expensive source of financing and persist as a substantial component of the debt structure even for established, low-leverage REITs that have access to lower rates on public debt; hence, the mortgage puzzle. Our results suggest that REITs are willing to pay higher financing costs in order to secure the flexibility associated with access to non-recourse, long-term mortgage loans.

REITs utilize many available debt types, yet prior REIT capital structure literature has focused primarily on bonds and lines of credit.[1] We extend the analysis to the loan level. Augmenting standard databases with loan level data, we document the complexity and the surprisingly persistent central role of mortgages in REIT debt structure. Figure 1 shows that the two major components of REIT debt are mortgages and notes payable. The volume of financing from mortgages is approximately equal to concurrent issuances of notes payable, and is quite persistent and stable over time.[2]

Two major characteristics differentiate mortgages and notes payable: collateral and recourse status. Mortgages are collateralized, but generally non-recourse to overall firm

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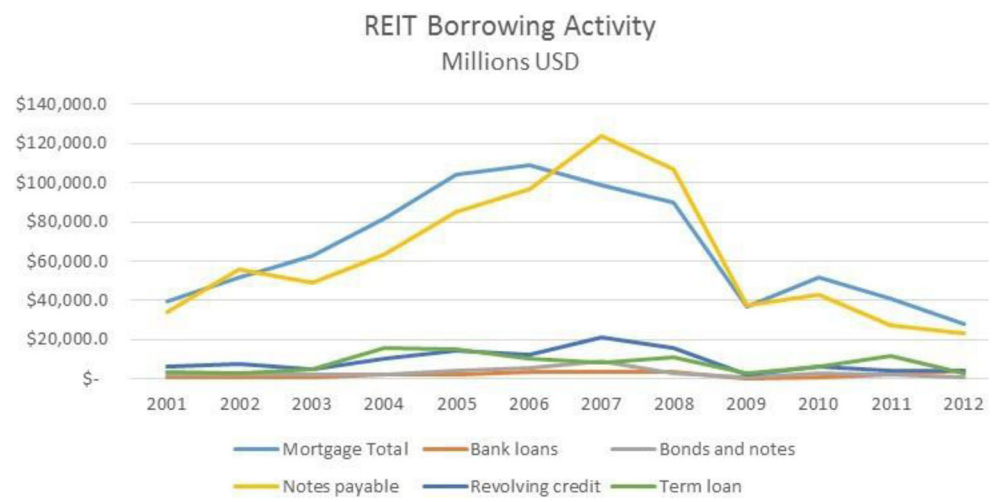

Figure 1. REIT debt issuance by debt type: 2001–2012.
Figure A depicts REIT borrowing activity over time, in millions of US dollars. Loan data is obtained from S&P Capital IQ. Mortgage borrowings have been a consistent source of debt for REITs, roughly evenly distributed by volume with senior unsecured bonds (Notes Payable on the graph).

assets, whereas notes payable are typically unsecured with recourse to firm assets and cash flow. We compare the financing costs of unsecured, recourse debt (e.g., notes payable) to collateralized mortgages.[3] The design of REIT debt securities allows us to disentangle the effects of collateral and recourse on financing costs. We find that mortgages represent the most expensive source of financing for REITs due to their secured, but non-recourse nature. This finding is consistent with studies that show a direct relationship between credit costs and collateral in debt financing (e.g., Berger & Udell, 1995). Indeed, recent empirical work has found support for a life cycle hypothesis in that collateralized or secured debt is associated with smaller, younger, financially-constrained firms without access to publicly-traded debt (Jiménez et al., 2006; Rauh & Sufi, 2010; Colla et al., 2013; Letdin, 2017). We find that younger REITs are less likely to have access to arms-length debt and rely more heavily on mortgage financing, consistent with the life cycle hypothesis.

However, under the life cycle hypothesis, one would expect to see REITs reducing and indeed eliminating their dependence on expensive mortgage financing as they age. This is not the case. Mortgages play a consistently large role in the debt structure of REITs of all ages. This finding is even more puzzling for REITs with access to the market for recourse, unsecured publicly-traded debt like notes payable, which is less costly than mortgage financing. Moreover, REITs pay a quasi-entrance tax when they obtain access to the public debt market in that REITs with debt ratings (market access) find their financing costs increase on all debt instruments. The puzzle is why REITs that have already paid their quasi-entrance tax by obtaining access to publicly-traded debt continue to utilize costly mortgage financing? We resolve this puzzle by observing that mortgages are issued for long-term, small-value loans. While we do not observe whether multiple properties were pledged as collateral, the smaller loan amounts of mortgages relative to bond issuances lead us to believe that mortgages are collateralized either by individual properties or small portfolios.

REITs are willing to incur the cost of the default option and pay for the flexibility associated with this form of debt in their capital structure.

We show that mortgage financing costs include a rate premium for strategic default risk. To measure the strategic default risk premium, we contrast each individual REIT's financing costs for its newly issued recourse (e.g., notes payable) and non-recourse (e.g., mortgage) debt issues. Notes payable are recourse to general REIT assets and cash flows, as opposed to mortgage debt, which only has access to the pledged collateral and related cash flows as a means of debt repayment[4] Thus, the mortgage borrower can strategically default if the market value of the property collateral is less than the mortgage face value or there is negative property-level cash flow. This is not possible for recourse debt. Indeed, default on recourse debt could trigger bankruptcy and loss of control of the entire firm. Results show that non-recourse secured debt (e.g., mortgages) carries a premium for strategic default, while recourse unsecured debt does not.[5] Although interest rates on recourse, unsecured debt do not include a strategic default premium, we show that initial access to the public debt market triggers an agency cost premium in financing costs. This second finding shows that REITs with access to the public debt market, allowing them to issue unsecured, recourse debt such as notes payable, experience increases in their overall financing costs despite the finding that interest rates on notes payable are lower than mortgage rates. This likely occurs because of agency costs associated with moral hazard and risk shifting behavior. Market concerns about managerial risk shifting, shirking, and a potential debt overhang lead to leverage limitations for REITs that have the ability to issue notes payable and other forms of recourse, unsecured debt. To reduce this risk and in order to access public debt markets, REITs may be required to limit overall firm leverage. Riddiough and Steiner (2018) show that REIT public bond covenants often have strict leverage restrictions, typically specifying a maximum 60% total debt-to-assets ratio and a maximum 40% secured debt-to-assets ratio (e.g., 2014 Wells Fargo REIT Covenant Report).

We explicitly measure this adverse selection effect by examining the impact of public debt market access, controlling for endogeneity in REIT issuance of unsecured recourse debt. We use a two-stage least squares model in which the first stage estimates the REIT's decision to obtain bond market issuance access. Utilizing the predicted likelihood of market access in the second stage, we find that access to the public debt market increases REITs borrowing costs on all debt issues. We resolve this puzzle by noting that even well-established REITs keep issuing new mortgages even after retaining access to public debt issuance. This suggests that the use of recourse, unsecured public debt incents REITs to preserve alternative financing opportunities, which have differing underwriting criteria and investor willingness to take on risk. We find that REITs use mortgages for long-term, relatively low value loans.

Motivation and Hypothesis Development

While recent capital structure studies acknowledge the heterogeneity of debt (e.g., Rauh & Sufi, 2010; Colla et al., 2013; Cvijanovic, 2014) the ramifications of debt composition have not been fully explored. Our focus is on two characteristics of the debt contract: collateral and recourse. REITs have a rich debt structure comprised of instruments that

include both of these characteristics. Hence, we use REITs to examine the relationship between interest rates and the individual characteristics of debt instruments.

The first objective of this paper is to document the complex REIT debt structure (Giambona et al., 2012). We rule out exogenous determinants of this debt structure since REITs are not impacted by issues such as the tax benefits of debt (Graham, 2000) and dividend policy (Miller & Modigliani, 1961). REITs do not pay taxes and are required to distribute the majority of their earnings as dividends. Moreover, the regulatory requirement that REITs distribute almost all of their taxable income and the majority of operating cash flow makes them heavily dependent on outside sources of capital.[6] The study of REITs provides an opportunity to study capital structure choice absent most dividend policy and tax considerations.

Equity REITs are considered highly leveraged firms. The tangible property assets on REITs' balance sheets support large amounts of debt, such as mortgage loans, that can be secured with property collateral. In contrast, Faulkender and Petersen (2006) show that leverage choices for non-financial firms are likely driven by credit market supply-side constraints. That is, although firm (demand) characteristics such as size and age impact the firm's optimal debt structure, non-financial firms may find access to debt limited by capital market (supply-side) constraints. The relative absence of these supply-side constraints for REITs distinguishes them from non-financial firms. REITs offer an opportunity to study the debt demand side in terms of both the amount of debt (leverage) and the composition of debt. REIT leverage decisions can be viewed as the outcome of the firm's demand-side optimization on the amount and type of debt issued.[7] For example, Ooi et al. (2010) examine secondary equity offerings and find evidence consistent with market timing as REITs tend to issue public debt rather than equity when interest rates are relatively low. Giacomini et al. (2016) show that REITs actively manage their leverage and proactively pursue a target leverage goal. Leverage decisions may also be timed to address a REIT's downside risk. Some industry professionals (NAREIT, 2014) contend that REITs with access to public debt performed better during the 2007–2009 financial crisis. That is, during liquidity crises and at times of distress, a REIT may not be able to roll over bank mortgage debt, but could still potentially have access to arms-length debt. During the 2007–2009 financial crisis, REITs' secured borrowing power would have been limited since mortgage lenders underwrite loans based on the market value of the property collateral.[8] While bond issuance has leverage conditions that are tied to both historical acquisition prices and current market values, Deng et al. (2015) show that REIT bond covenants have substantial slack at issuance and are very unlikely to be trip wires. Debt covenants limit a REIT's overall amount of leverage, (e.g., Boudry et al., 2010) showing that REITs with higher leverage are less likely to issue unsecured, recourse debt.

There is a substantial academic literature involving the role of collateral in debt financing and the cost of debt. Secured debt is collateralized by specified tangible collateral assets. In contrast, unsecured debt implies a corporate guarantee of repayment, but no specific assets are identified as collateral. Berger and Udell (1995) show that secured loans are higher risk, as assessed by the higher interest rate in their sample. Their study, however, excludes mortgages and only focuses on lines of credit. They also find that younger firms with shorter lending relationships are more likely to pledge collateral, which would imply that higher risk and more informationally opaque firms are more

likely to pledge collateral. Using small businesses in Spain, Jiménez et al. (2006) draw similar conclusions and find that borrowers of lower quality and higher risk are required by lenders to pledge more collateral. Giambona et al. (2012) find that higher use of secured mortgages indicates that a firm is of inferior quality, as proxied for by Tobin's Q. Further, Giambona et al. (2008) have shown the importance of collateral liquidation value. Rauh and Sufi (2010) show that secured debt is more prevalent for low-credit-quality firms, and has tight covenants. In contrast, REIT secured debt does not imply company level covenants, and it is the unsecured, recourse debt that introduces restrictions at the corporate level. Moreover, we find that low-risk, mature, and transparent REITs continue to rely on mortgages for a substantial portion of their financing.

Consistent with Berger and Udell (1995) and Graham (2000) we expect to find a positive relationship between secured status and the level of interest rates. However, we offer an additional explanation for this finding: the strategic default risk premium. In the U.S., mortgages are generally non-recourse to the overall assets of the borrowing firm. In contrast, recourse mortgages are more common in Europe. Even if the market value of the collateral property is unable to cover the mortgage balance upon default, recourse mortgage lenders can attach other borrower assets to recoup their losses. Non-recourse mortgage holders would optimally default if the market value of a property is less than the mortgage face value or loan balance, whereas recourse mortgage holders would optimally default only if the mortgage face value exceeds the sum of the property market value plus remaining borrower assets. Thus, debtors holding non-recourse mortgages are more likely to strategically default, ceteris paribus, than recourse debt borrowers. Strategic default occurs when borrowers default even though they have the financial resources to repay the loan. Gete and Zecchetto (2018) estimate that strategic default accounted for 30% of the recovery gap between the U.S. and Europe. That is, losses on mortgage default were substantially larger in the U.S. as compared to Europe as a result of the prevalence of strategic default on non-recourse mortgages in the U.S. Similarly, Mayer et al. (2014) find significant reductions in mortgage repayments, again using residential loans, when loan modification plans become available. Because of the greater default rate and lower repayment amounts, non-recourse loans are subject to strategic default risk. We hypothesize that interest rates on non-recourse mortgages, therefore, should include a premium for this added risk. This leads to our first hypothesis.

Hypothesis 1: *Interest rates on REITs' secured debt are higher than interest rates on unsecured debt.*

Many equity REITs have evolved from their origins as small, family-owned businesses. These REITs may still have large insider stockholdings that can entrench management, enabling the pursuit of private objectives (such as empire building or risk diversification) at the expense of firm value. Thus, although REITs invest in tangible property assets, information asymmetries may engender undetected risk shifting behavior that benefits insiders at the expense of outside stakeholders (see An et al., 2012). Management can adjust a REIT's risk exposure via undetected acquisitions and reallocation of free cash flows across properties in the portfolio. For example, individual property maintenance and managerial effort are largely unobservable to outside investors, but critically important in determining REIT values. Moreover, high leverage creates potential debt overhang problems as equity holders may be reluctant to invest resources in distressed properties

that may be lost to default or bankruptcy (Jensen & Meckling, 1976). Potential agency costs are exacerbated by the issuance of recourse, unsecured debt that may create a debt overhang. Access to public debt exacerbates the potential moral hazard risk shifting. Public debt is typically not subject to the same oversight as secured debt with repayment value dependent upon a single property. Brown and Riddiough (2003) study the characteristics of public (unsecured, i.e., recourse debt) issuers and find that REITs that issue public debt do so to achieve target total leverage ratios, to retain an investment grade credit rating, and fund investment opportunities with equity. Further, Brown and Riddiough (2003) show a negative relation between the likelihood of a public debt issue and the pre-offer secured debt, i.e., firms with higher proportion of secured debt would tend to issue equity or obtain more secured debt to fund their investment opportunities. Riddiough and Steiner (2018) show that unsecured debt covenants that limit firm leverage address moral hazard concerns in the presence of weak managerial governance. Thus, we hypothesize that interest costs are increased when the REIT obtains market access to issuance of unsecured, recourse debt that can exacerbate moral hazard concerns relative to similar firms without market access.

Hypothesis 2: *REIT market access to the ability to issue unsecured, recourse debt increases overall financing costs.*

The presence of substantial amounts of collateralized, non-recourse debt (e.g., mortgages) may mitigate the internal agency costs associated with weak corporate governance (Riddiough & Steiner, 2018). Mortgage lenders have incentives to monitor the value of their property collateral since they have no recourse to other firm assets. The benefits of this monitoring by mortgage lenders may accrue to non-monitored debt and equity holders. That is, monitoring by mortgage lenders provides external benefits to non-mortgage lenders by maximizing property values. These property assets may have residual value that accrues to non-mortgage lenders whenever property values exceed the amount of the mortgage claim. REITs may pay higher mortgage loan rates in order to compensate mortgage lenders for their certification benefits, which reduce REITs overall financing costs on non-monitored debt. Thus, REIT borrowers continue to issue new mortgages even as they age. REITs can use low-value, long-term mortgages, especially when they are liquidity constrained.

Hypothesis 3: *Although REITs are less likely to use mortgages as they grow in size, this occurs at a declining rate. Thus, even established REITs continue to issue mortgage debt that is long-term and low value, especially when they face liquidity constraints.*

Description of the Hand-Collected Database

In order to examine REITs' heterogeneous capital structure, we construct a database consisting of individual debt instruments issued by REIT, by quarter. Colla et al. (2013) examine the heterogeneity of debt using a sample of loans and debt instruments obtained from S&P Capital IQ. We supplement the S&P Capital IQ data with both SNL data as well as a hand-collected sample of mortgage balances so as to examine the costs of various types of debt issued by equity REITs. The sample consists of publicly-traded equity REITs and contains debt instruments outstanding from 2001 to 2012. Table 1 shows the

Table 1. Annual borrowing frequency by debt type.

Debt Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Mortgage bonds	25	27	28	37	55	23	28	35	1	2	1	1	263
Mortgage loans	87	198	168	447	446	635	475	609	304	280	266	225	4140
Mortgage notes	221	455	552	818	741	591	683	520	266	177	139	150	5313
Notes payable	192	218	209	284	349	320	349	245	80	144	102	80	2572
Bonds and notes	18	15	45	39	28	20	25	24	9	7	7	7	244
Revolving credit	42	58	52	60	93	78	105	83	12	43	33	22	681
Term loan	17	29	38	52	45	43	32	38	9	39	39	33	414
Bank loans	18	17	53	81	64	68	60	89	5	29	43	87	614
Total	620	1017	1145	1818	1821	1778	1757	1643	686	721	630	605	14241

Note. This table provides a detailed overview of the annual number of observations by debt type. The sample contains 185 REITs. Data is obtained from S&P Capital IQ. Each borrowing is reported only for the first instance of appearing in the sample, at origination. Subsequent observations of the same loan were omitted.

distribution of debt instruments over the sample period. The persistence of a complex debt structure in equity REITs is indicated by the large number of observations for each of the eight debt instruments over the entire sample period. Table 1 shows that we have 185 REITs in our final sample. We omit duplicate observations in SP Capital IQ as well as non-U.S. dollar denominated debt (approximately half a percent of the sample).

Table 2, Panel A provides a list of the breakdown of debt instruments in our sample. A small number of observations (21) are not classified by debt type; of these 13 are classified based on the text description provided and the remaining 8 observations are omitted. A weakness of the dataset is that SP Capital IQ only tracks the surviving company. Thus, in the case of a merger, the database only tracks the acquiring firm from the moment it attained its own REIT status. REITs focusing on timber or other non-traditional lines of business are omitted. Companies with less than one year of observations are excluded, as well as those that did not break down their debt composition. Companies that were either acquired or otherwise defunct prior to roughly 2005 had no data available and many companies only had annual observations prior to 2004. We classify each debt instrument into eight types using SNL descriptions; i.e., SNL reports a field for Mortgages and Notes. Our sample comes to 35,662 loan observations. We restrict the sample to the first observations for each loan, ending up with a final sample of 185 companies with 14,241 individual and unique loan or debt issuances.

One of our main variables of interest is *Secured* which is an indicator variable that takes on a value of one (zero otherwise) if the debt instrument is classified as having collateral pledged as disclosed by a secured indicator provided in SP Capital IQ. Panel B of Table 2 shows that the dataset includes a total of 11,687 individual quarterly observations of secured loans and 2,554 unsecured debt observations. These are spread over 1,540 REIT quarters. Unsecured debt is comprised of notes payable, bonds, notes, debentures, and those bank loans and term loans that are characterized as unsecured.[9]

The last column of Table 2, Panel A provides the total loan amounts borrowed by REITs under each debt type. At first glance it may appear that the primarily recourse and unsecured debentures and notes payable comprise the largest component of REITs total debt since the average loan amount is over $200 million. However, the total volume of long-term debt is almost evenly allocated between recourse, unsecured debentures and notes payable as compared to non-recourse, secured mortgage instruments, totaling roughly $650 billion each.[10]

Table 2. Interest rate summary statistics.

Panel A: Summary statistics by debt type

Debt Category	No. of Loans	Term	Interest Rate	Interest Rate Spread over 10 yr UST	Loan Amount in Million USD	Cum. Loan Amount in Million USD
Mortgage Borrowing						
Mortgage bonds	263	19.43	4.82	0.62	68.3	17,962.3
Mortgage loans	4,140	6.43	6.34	2.53	61.8	256,037.5
Mortgage notes	5,313	7.27	6.48	2.43	70.1	372,582.7
						646,582.5
Other Borrowing						
Bonds and notes	244	16.68	5.01	0.93	139.4	34,015.1
Notes payable	2,572	7.39	6.28	2.23	246.2	633,214.6
						667,229.7
Short Term Borrowing						
Bank loans	614	4.93	5.45	1.74	38.3	23,525.5
Revolving credit	681	3.00	4.14	0.15	133.2	90,723.5
Term loan	414	4.94	5.12	1.34	195.7	81,003.1
						195,252.2
Total	14,241	7.06	6.15	2.20	106.0	1,509,064.3

Panel B: Interest rates by collateral

		Secured		Unsecured			
	Total	n	Interest Rate	n	Interest Rate	Difference	
Mortgage Borrowing							
Mortgage bonds	263	263	4.82			n/a	
Mortgage loans	4,140	4,140	6.34			n/a	
Mortgage notes	5,313	5,313	6.48			n/a	
Other Borrowing							
Bonds and notes	244	189	5.08	55	4.75	−0.33	
Notes payable	2,572	628	6.31	1,944	6.27	−0.04	
Short Term Borrowing							
Bank loans	614	576	5.59	38	3.30	−2.30	***
Revolving credit	681	257	4.65	424	3.84	−0.81	***
Term loan	414	321	5.29	93	4.52	−0.78	**
Total	14,241	11,687	6.25	2,554	5.73	−0.52	***

Note. Panel A provides summary statistics categorized by reported debt type. Loan information is obtained from S&P Capital IQ. The sample reflects a time period from 2001 to 2012. The loan sample represents 185 REIT borrowers. Panel B bifurcates the sample by whether or not security [property] was pledged as collateral.

S&P Capital IQ reports an interest rate variable [Interest Rate High Value] and it is the variable used in this study.[11] Panel B of Table 2 shows the highest average interest rates of 6.48% and 6.34% for mortgage notes and loans.[12] The lowest average interest rate is for bank loans (3.30%) and revolving credit (3.84%).[13] Table 2 Panel B compares the average interest rate on secured versus unsecured debt instruments. Wherever there are statistically significant differences, secured debt carries a higher average interest rate than unsecured debt (e.g., bank loans, revolving credit, and term loans). This is consistent with literature indicating that secured debt tends to be more costly than unsecured debt (Graham, 2000).

Our next major variable of interest is *Market Access*, which is an indicator variable that takes a value of one if the REIT has the ability to issue unsecured, recourse debt. Following Faulkender and Petersen (2006), we use whether a firm has a debt rating (obtained from SNL Financial, which tracks Moody's, Fitch, and Standard & Poor's ratings) to define the *Market Access* indicator variable. On average, 45.6% of observations have *Market Access* to public debt markets. It is important to note that whereas firms with

market access issue notes payable and debentures, they still substantially rely on mortgages with over 8,000 mortgage borrowings outstanding. Mortgage financing co-exists with notes payable financing in the REIT debt structure.

The third major variable of interest is denoted *Mortgage Percentage*. This variable represents mortgages as share of total debt. The numerator of the variable was obtained from SNL Financial, a field titled Mortgages and Notes. SNL does not provide coverage for companies that were either acquired or otherwise defunct prior to roughly 2005. Hence, the missing observations for years 2001 to 2004 are hand collected from quarterly reports. The denominator, Total Debt, is obtained from SNL financial.

Table 3, Panel A, provides a summary of REIT and control variables obtained from SNL, S&P Capital IQ, Compustat, and CRSP. *Leverage* is calculated as the total debt divided by REIT market value. REIT market value is determined by subtracting the book value of equity from total assets and adding back the market value of equity. The average REIT leverage in our sample is 47%, of which 63% is allocated to mortgages on average. *Size* is calculated as the natural log of REIT market value. *GrowthOpportunities* is calculated as market value of total assets divided by book value of total assets. *Profitability* is calculated as funds from operations (FFO) scaled by total assets as obtained from SNL Financial. *Age* is the age of a REIT measured in quarters, calculated from the latter of going public or obtaining REIT status. *LineofCredit* is defined as total line of credit scaled by total assets.[14] *CreditLineUse*[15] is calculated as the amount of credit line taken down as borrowings, as reported for each quarter, divided by the total amount available. *EquityRepurchase* information was obtained from SNL for years 2008 to 2012. The remaining equity repurchase data for years 2001 to 2007 was hand collected from LexisNexis. *CorporateBondSpread* is the mean Moody's corporate bond spread of BAA rated bonds for each quarter less the 10-year U.S. Treasury rates provided by Bloomberg. We obtain from the Federal Reserve Bank of St. Louis FRED database the interest rate variable *u30Mortg* (the mean 30-year fixed rate mortgage rate for each quarter). *InsiderOwnership*[16] is the percentage of shares held by REIT management scaled by the total number of shares outstanding, obtained from Thomson Reuters (compiling disclosures mandated on Forms 3, 4, 5, and 144). *InstOwnership* is obtained from Thomson Reuters' 13 F filings (variable name: shares) scaled by common shares outstanding, obtained from CRSP. REIT level property types are obtained from SNL Financial. REIT credit ratings are obtained from CRSP.

Panel B of Table 3 shows that roughly 38% of loans are issued by REITs with an investment grade rating. Panel C of Table 3 provides a correlation table. Market access is positively correlated with size,[17] age, market-to-book, and profitability. This suggests that more established, profitable and transparent REITs are likely to have access to issuance of recourse, unsecured debt, and less likely to use mortgages. Moreover, leverage and the secured indicator variable are positively correlated, indicating that leverage is restricted when a REIT issues unsecured debt as recently shown by Riddiough and Steiner (2018).

Empirical Results on REIT Financing Costs

Secured Debt Financing Costs: Tests of Hypothesis 1

Table 4 provides the baseline OLS loan level regression results. The dependent variable, Interest Rate, is the interest rate observed on each individual debt security. In order to test Hypothesis 1, we utilize the *Secured* indicator variable, which is a binary variable

Table 3. REIT summary statistics and credit ratings.

Panel A: REIT summary statistics for each loan observation

	n	Mean	SD	Min	Max
InterestRate	14241	6.15	1.78	0.00	29.39
Secured	14241	0.82	0.38	0.00	1.00
LnLoanAmount	14241	17.17	1.70	6.13	23.35
TermYears	14241	7.06	6.53	0.00	90.15
Size	14241	14.97	1.33	9.73	18.11
MB	14241	1.25	0.29	0.53	2.90
Cash	14241	0.02	0.03	0.00	0.49
Mortgage Percentage	14241	0.63	0.30	0.00	1.00
Leverage	14241	0.47	0.13	0.00	0.91
Profitability	14241	0.01	0.01	−0.12	0.07
Market Access	14241	0.45	0.50	0.00	1.00
Age	14241	37.95	27.93	0.00	169.00
EquityRepurchase	14241	0.12	0.33	0.00	1.00
CreditLineUse	14241	0.33	0.28	0.00	1.00
Instit.Ownership	13260	0.75	0.28	0.00	1.00
InsiderOwnership	11883	0.04	0.26	0.00	1.00

Panel B: Credit ratings of REITs for each loan observation

Rating	No of Loans	Percent
Not Rated	7,764	54.52
A	1	0.01
A-	853	5.99
BBB+	1,955	13.73
BBB	1,080	7.58
BBB-	1,544	10.84
BB+	288	2.02
BB	347	2.44
BB-	252	1.77
B+	87	0.61
B	41	0.29
B-	26	0.18
CCC+	3	0.02
Total	14,241	100

Panel C: Correlation table

	Intere∼e	secur∼01	LnLoan∼t	Term Years	Size	MB	Cash	Mortgage	Leverage	Profitability	Debt Rating	Age	Equity Rep	Credit Line
Interest Rate	1													
secured01	0.1121	1												
LnLoanAmount	−0.1351	−.4024	1											
TermYears	0.0698	0.0372	0.1126	1										
Size	−.0289	−.2026	0.4587	−.0114	1									
MB	0.0219	−.0933	0.1166	0.039	0.388	1								
Cash	−.0255	0.0954	0.0227	−.039	−0.0143	0.0807	1							
Mortgage	−.0596	0.4509	−.2368	−.0206	−.4437	−.2727	0.1678	1						
Leverage	−.0381	0.1388	−.0255	−.0378	−.1821	−.6203	−.1489	0.2893	1					
Profitability	0.0427	−.0524	0.0444	−.0064	0.2657	0.3699	−.0645	−.1696	−.3405	1				
MarketAccess	0.0957	−.3034	0.2847	0.0611	0.5431	0.2894	−.0587	−.7183	−.2782	0.1403	1			
Age	−.0261	−.1048	0.1496	0.0235	0.2427	0.356	−.0207	−.2801	−.1083	0.1216	0.3004	1		
EquityRep	−.1302	0.0133	0.0366	−.0023	0.067	−.1636	−.0441	0.0801	0.26	−.107	−.1052	0.0125	1	
CreditLine	−.0065	0.0297	−.0114	−.0799	−.0525	−.1244	−.2943	−.0337	0.3175	0.0211	−.1592	0.0497	−.0006	1

Notes. The table provides correlation statistics at the REIT level. REITs with less than four quarters available were omitted from the sample. Variable definitions are provided in the Appendix.

REIT performance information was obtained from SNL Financial. REIT aggregate mortgage balance was obtained by hand collection from annual reports. REIT credit ratings were obtained from CRSP.

that takes on a value of one if the debt instrument is collateralized. As shown in Table 4, the coefficient estimate on this variable is statistically significantly and positive (at the 1% level) for all model specifications. This is consistent with Hypothesis 1 indicating that borrowing rates are higher for secured, non-recourse debt as compared to unsecured

Table 4. Determinants of interest rates.

	(1)	(2)	(3)
Secured	0.282***	0.387***	0.722***
	(6.17)	(8.43)	(4.52)
Loan Amount	−0.125***	−0.148***	−0.105*
	(−11.61)	(−12.04)	(−2.31)
TermYears	0.0220***	0.0232***	0.0160
	(7.14)	(7.76)	(1.91)
Size		0.183***	0.00466
		(10.99)	(0.04)
Leverage		0.675***	0.377
		(3.77)	(0.77)
Profitability		−0.521	0.00272
		(−0.31)	(0.00)
Growth Opportunities		0.109	0.298
		(1.40)	(1.62)
Cash Holdings			0.612
			(1.03)
Equity Repurchase			−0.150
			(−1.47)
Property Type	No	Yes	Yes
30yr Mortgage	No	No	Yes
Year	No	Yes	Yes
Firm	No	No	Yes
Corporate Bond Spread	No	No	Yes
Observations	14241	14241	14241
*R*2	0.029	0.140	0.234

Notes. The dependent variable is Interest Rate. The sample reflects a time period from the beginning of the first quarter of 2001 to the end of the fourth quarter of 2012. Variable definitions are provided in the Appendix. Column (1) provides results of loan collateral indicator variable only. Column (2) includes other observable loan characteristics, property type and year controls. Column (3) includes REIT-level characteristics and firm and year fixed effects. All columns reflect *t*-statistics reported in parentheses with White's heteroscedastic consistent standard errors and Column 3 reflects *t*-statistics based on standard errors clustered by firm.

t-statistics in parentheses.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

recourse debt. The coefficient estimate is economically significant, with a coefficient estimate in the third column of Table 4 implying that a secured debt instrument without recourse has an average interest rate that is 72 basis points higher than unsecured but recourse debt. These results control for the loan amount (negative coefficient), the loan term (positive coefficient),[18] interest rate level (on 30-year mortgages) and credit spreads for Baa-rated debt. We include property type, year and firm fixed effects in the regression reported in the third column. Similar to findings of interest rates on unsecured debt borrowings by Brown and Riddiough (2003), interest rates are found to be lower for larger loans, and higher for loans of longer maturity. An additional factor in determining the cost of debt could be the loan to value ratio of secured debt at the property level. Such information is not observed in our data set. We include a control for firm level leverage and find that it is not significant after property type, firm and year fixed effects are included.

Berger and Udell (1995) and Graham (2000) hypothesize that riskier firms are required to post collateral, thereby explaining the positive relationship between secured status and the level of interest rates. Table 5 tests this hypothesis by segmenting our sample by REIT credit rating. The first column reports loans for REITs with a credit rating above BBB or equivalent, the second column reports loans for REITs that have a credit rating

Table 5. Interest rates and debt rating.

	(1) Investment Grade	(2) Non-Investment Grade	(3) "No
Secured	0.686*	−0.278	1.114***
	(2.34)	(−0.72)	(6.04)
Loan Amount	−0.121	−0.0314	−0.114**
	(−1.08)	(−0.22)	(−3.29)
TermYears	−0.000593	0.0517***	0.0256*
	(−0.05)	(6.36)	(2.43)
Size	−0.0289	−0.143	0.0370
	(−0.10)	(−0.25)	(0.24)
Leverage	0.886	2.031	0.108
	(0.83)	(1.00)	(0.15)
Profitability	18.15*	3.519	−4.593*
	(2.09)	(1.06)	(−2.06)
Growth Opportunities	−0.0591	1.100	0.713*
	(−0.22)	(1.62)	(2.02)
Cash Holdings	2.124*	2.086	0.221
	(2.11)	(0.76)	(0.24)
Equity Repurchase	−0.260	−1.560***	−0.0848
	(−1.53)	(−4.23)	(−0.57)
Mortgage Percentage	0.644	1.472	−0.249
	(1.46)	(2.02)	(−0.57)
Property Type	Yes	Yes	Yes
30yr Mortgage	Yes	Yes	Yes
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Corporate Bond Spread	Yes	Yes	Yes
Observations	5433	1044	7764
R^2	0.243	0.280	0.238

Note. Interest Rate is the dependent variable by loan. Variable definitions are provided in the Appendix. All columns reflect *t*-statistics reported in parentheses with White's heteroscedastic consistent standard errors clustered by firm. Column 1 reflects firms with public market debt access and investment grade rating. Column 2 reflects firms with public debt access but without investment grade credit rating and Column 3 reflects firms without public market debt access.

t-statistics in parentheses.

*$p < 0.05$,

**$p < 0.01$,

***$p < 0.001$

below BBB- or equivalent, and the third column reports REITs that do not access the public debt markets. We do not find evidence consistent with a credit risk explanation for the higher rates on secured debt. The 68.6 basis point premium on secured, but non-recourse debt issued by investment grade REITs is economically and statistically significant (at the 1% level). The higher interest rates on secured debt are not driven by firm credit risk. For a potential explanation we consider the highly significant coefficient on Secured in the third column. For REITs without market access (i.e., without credit ratings), the rate premium on secured debt exceeds 100 basis points. To compensate lenders for the risk of strategic default, secured non-recourse debt carries high premium, consistent with Hypothesis 1.

Impact of Ownership Structure and Transparency

Possible alternative explanations for the observed premium pricing of secured debt are examined including REIT ownership characteristics as well as REIT analyst coverage. Results are provided in Table 6. *Institutional Ownership* and *Insider Ownership* are the

Table 6. Institutional and insider ownership robustness.

	(1) Institutional Ownshp	(2) Insider Ownshp	(3) "Inst
InstOwnership	–0.0943		0.0793
	(–0.29)		(0.21)
Secured	0.696***	0.716***	0.700***
	(4.12)	(4.20)	(4.12)
Loan Amount	–0.112*	–0.124*	–0.118*
	(–2.35)	(–2.43)	(–2.22)
TermYears	0.0139	0.0159	0.0161
	(1.56)	(1.72)	(1.73)
Leverage	0.284	0.701	0.614
	(0.54)	(1.28)	(1.01)
Profitability	–0.755	3.848	3.295
	(–0.30)	(1.16)	(1.02)
Growth Opportunities	0.307	0.395	0.385
	(1.66)	(1.94)	(1.82)
Cash Holdings	0.494	0.828	0.728
	(0.82)	(1.11)	(0.95)
Market Access	0.276	0.238	0.241
	(1.83)	(1.46)	(1.44)
EquityRepurchase	–0.176	–0.176	–0.162
	(–1.76)	(–1.59)	(–1.45)
Insider Ownership		0.135***	0.139***
		(5.72)	(5.85)
Property Type	Yes	Yes	Yes
30yr Mortgage	Yes	Yes	Yes
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Corporate Bond Spread	Yes	Yes	Yes
Observations	13260	11883	11642
R^2	0.232	0.240	0.240

Notes. The dependent variable is Interest Rate. Column 1 includes Institutional Ownership, calculated as total shares held by institutions as provided by Thomson Reuters Institutional (13f) Holdings divided by Total Shares Outstanding, obtained from CRSP. Column 2 includes insider ownership. The institutional ownership and insider ownership information was not available for all REITs and/or for all periods, as reflected in the lower number of loan observations. Column 3 includes both institutional and insider ownership. *T*-statistics are reported in parentheses with White's heteroskedastic consistent standard errors clustered by firm.

t-statistics in parentheses.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

variables of interest. The coefficient on the *Secured* indicator variable is still statistically and economically significant in all specifications. The *Institutional Ownership* variable is insignificant, as might be expected given that research by Hardin et al. (2017) shows that the composition of institutional investors is what matters and not just their existence. The *Insider Ownership* variable is statistically significant (at the 1% level) and economically meaningful (a rate premium of three basis points for one point of increase in institutional ownership). The more concentrated the REIT's insider ownership, the greater the likelihood of moral hazard, risk shifting behavior, such as strategic default, and the higher the interest rate.

To address a concern that pricing may be driven by the fact that some REITs may inherently be less transparent than others, we have included property type controls as well as corporate characteristics. In addition to these variables, we consider three proxies for transparency: Earnings Analyst Coverage (I/B/E/S)[19], NAV Analyst Coverage and NAV Analyst Dispersion (both obtained from SNL Financial). The results are provided in Table

Table 7. Analyst coverage robustness.

	(1) Earnings Coverage	(2) NAV Coverage	(3) NAV Dispersion
AnalystCoverage	–0.00484	0.00186	0.00265
	(–0.79)	(0.29)	(0.41)
Secured	0.693*** (4.00)	0.846*** (4.39)	0.840*** (4.34)
Loan Amount	–0.120* (–2.46)	–0.132* (–2.20)	–0.137* (–2.25)
TermYears	0.0139	–0.00109	–0.000685
	(1.49)	(–0.11)	(–0.07)
Leverage	0.717	0.930	1.508*
	(1.37)	(1.37)	(2.07)
Profitability	3.491	2.969	3.126
	(1.36)	(0.85)	(0.80)
Growth Opportunities	0.334	0.0922	0.215
	(1.70)	(0.40)	(0.85)
Cash Holdings	0.836	1.013	1.139
	(1.14)	(1.36)	(1.41)
Market Access	0.303	–0.0332	–0.0321
	(1.89)	(–0.14)	(–0.14)
EquityRepurchase	–0.180	–0.0777	–0.0731
	(–1.78)	(–0.67)	(–0.65)
NAVCov		–0.0423	–0.0437
		(–1.26)	(–1.34)
NAVDisp			–0.493
			(–1.08)
Property Type	Yes	Yes	Yes
30yr Mortgage	Yes	Yes	Yes
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Corporate Bond Spread	Yes	Yes	Yes
Observations	12627	6969	6839
R^2	0.233 31	0.250	0.250

Notes. The dependent variable is Interest Rate. Column 1 includes Earnings Analyst Coverage, which is the number of analysts reporting earnings estimates, obtained from I/B/E/S. Columns 2 and 3 provide NAV Analyst measures, provided from 2005 to 2012 by SNL Financial. NAV coverage is the number of analysts providing NAV estimates. NAV dispersion is the standard deviation of NAV estimates divided by the mean of NAV estimates. *T*-statistics are reported in parentheses with White's heteroskedastic consistent standard errors clustered by firm.

t-statistics in parentheses.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

7. The coefficients on these variables are not statistically significant, although the sign on the NAV dispersion variable is consistent with Letdin et al. (2018).[20] Based on the reported results, we can conclude that the secured debt interest rate premium persists after considering REIT transparency characteristics.

Financing Costs with REIT Market Access: Tests of Hypothesis 2

Hypothesis 2 posits that REIT access to the market for issuance of recourse, unsecured public debt would increase financing costs. Table 8 provides results that are consistent with this hypothesis. The coefficients on the *Market Access* variable are statistically significantly (at the 5% level or better) and positive in all specifications, indicating that access to public debt issuance increases REIT financing costs as the risk of moral hazard managerial activity increases. Using the specification in the third column, the economic significance is a 28 basis point increase in financing costs for REITs that obtain access to

Table 8. Interest rates: Impact of public debt market access.

	(1) Market Access	(2) Size	(3) All Controls
Secured	0.727***	0.722***	0.727***
	(13.30)	(13.21)	(13.29)
Loan Amount	−−0.105*** (−.75)	−.105*** (−.71)	−.105*** (−.74)
TermYears	0.0160*** (5.43)	0.0159*** (5.41)	0.0160*** (5.46)
Market Access	0.250* (2.40)		0.280** (2.58)
Size		0.0404	−0.0440
		(0.61)	(−0.61)
Leverage			0.439
			(1.35)
Profitability			−0.0496
			(−0.03)
Growth Opportunities			0.350* (2.39)
Cash Holdings			0.576
			(1.05)
EquityRepurchase			−0.151* (−2.43)
Property Type	Yes	Yes	Yes
30yr Mortgage	Yes	Yes	Yes
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Corporate Bond Spread	Yes	Yes	Yes
Observations	14241	14241	14241
R^2	0.233	0.233	0.234

Notes. Interest Rate is the dependent variable by loan. Variable definitions are provided in the Appendix. All columns reflect *t*-statistics reported in parentheses with White's heteroskedastic consistent standard errors. All specifications include year, firm and property type fixed effects.

t-statistics in parentheses.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

public debt issuance (as compared to REITs without access). It should be noted that the risk premium on secured debt remains in the results presented in Table 8.

Thus far, we have presented results showing that REIT financing costs are higher for mortgage (non-recourse, secured) debt and when the REIT has access to issuance of notes payable recourse unsecured debt. However, these tests utilized OLS and do not control for potential endogeneity. In particular, the choice to obtain access to public debt issuance (*Market Access*) is an endogenous decision, which may lead to selection bias. Thus, we perform a two-stage analysis to forecast the market access decision in the first stage and then use the fitted predicted variable in the second stage (results presented in Table 9). These are estimated using REIT level data, resulting in 2,008 REIT quarter observations. The first stage model is a probit model with *Market Access* as the dependent variable. The independent variables include all of the REIT company-level variables utilized in the OLS analysis. In addition, the age of the REIT is included as a first stage variable. Letdin (2017) shows that REITs undergo a life cycle in which they start off as private businesses almost entirely financed using mortgage loans. As they grow and develop a reputation, they issue equity and public debt, as well as continuing to issue mortgages. Consistent with Faulkender and Petersen (2006), the results in the first column of Table 9 show that the older the REIT, the more likely it is to obtain access to public debt issuance (i.e., positive, significant coefficient on the *Age* variable). Other variables are added to address potential supply-side credit constraints at the REIT level. These variables are *CreditLineUse* and Year fixed effects. The negative and significant (at the 1% level) coefficient on *CreditLineUse* indicates that REITs seek access to public debt

Table 9. Predicted market access.

	(1) Market Access	(2) InterestExpense
CreditLineUse	−1.265***	
	(−7.55)	
Age	0.00677***	
	(4.90)	
Size	0.763***	−0.00198**
	(13.85)	(−2.83)
Orthog Leverage	0.469	−0.00550
	(1.03)	(−1.30)
Profitability	−6.358	0.0246
	(−1.81)	(1.78)
Growth Opportunities	−0.497**	−0.000621
	(−2.88)	(−0.45)
Cash Holdings	−0.678	−0.00672
	(−0.72)	(−1.53)
Mortgage	−2.902***	0.0102***
	(−17.45)	(4.73)
EquityRepurchase	−0.274*	0.000537
	(−2.20)	(1.97)
Pr(MarketAccess)		0.00664***
		(3.70)
Corporate Bond Spread	Yes	Yes
30yr Mortgage	Yes	Yes
Property Type	Yes	Yes
Year	Yes	Yes
Firm	No	Yes
Observations	2008	2008
Pseudo R^2	0.555	

Notes. The following 2SLS is estimated at the REIT level, with 2,008 REIT quarter observations. The dependent variable in column (1) is Market Access, proxied for by Debt Rating, a binary variable that indicates whether the company had a debt rating (obtained from CRSP). The reported coefficients are estimated with a probit model. The dependent variable in Column (2) is Interest Expense, and the predicted value from column one is included as *Pr(MarketAccess)*. The regression is estimated with OLS. *T*-statistics reported in parentheses with White's heteroskedastic consistent standard errors clustered by firm. Variable definitions are provided in the Appendix.

t-statistics in parentheses.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

markets when bank lending is limited and when their credit lines are at or near capacity utilization. Lastly, indicators are included for 30-year Mortgage rates as well as Corporate Bond Spreads to capture economic conditions that could impact bond issuance.

The second stage results are presented in second column of Table 9. The regressions are at the REIT level. The dependent variable is quarterly *Interest Expense*. The results are consistent with Hypotheses 1 and 2. We find positive and significant coefficients on the *Mortgage Percentage* [secured debt] variable consistent with Hypothesis 1. The positive, significant (at the 1% level) coefficients in all specifications on the predicted *Market Access* variable are consistent with Hypothesis 2.

Mortgage Use in REITs: Tests of Hypothesis 3

To test our market frictions hypothesis, we use an indicator variable for *recession*, which takes a value of one for the period from the first quarter of 2007 to the first quarter of 2009. We also consider management perceived mispricing in the equity markets, proxied

Table 10. Mortgage use in REITs.

	(1) Mortgage
Mortgage Pr(MarketAccess)	−5.513*** (−36.79)
EquityRepurchase	−0.235*** (−6.23)
CreditLineUse	−2.161*** (−28.37)
Size	−2.987*** (−5.06)
Size2	0.127***
	(6.45)
Age	0.0000292
	(1.52)
Age Squared	0.0000292 (1.52)
Orthog Leverage	−0.658* (−2.54)
Profitability	7.698*** (−5.30)
Growth Opportunities	−1.051*** (−11.78)
Cash Holdings	0.976 (1.26)
Recession	0.202 (0.60)
Corporate Bond Spread	Yes
30yr Mortgage	Yes
Property Type	Yes
Year	Yes
Firm	Yes
Observations	2008

Notes. The dependent variable is Mortgage Percentage. The reported coefficients are estimated with a GLM model, and we use the logit link function (that is, the logit transformation of the response variable) and binomial distribution. Variable definitions are provided in the Appendix.
t-statistics in parentheses.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.00$.

by an indicator variable for purchasing shares, *Equity Repurchase*. Our dependent variable is *Mortgage Percentage*. Given that the dependent variable is a proportion, we use a generalized linear model approach as suggested by Papke and Wooldridge (1996). Table 10 furthers our analysis at the REIT level. REITs are less likely to use mortgages as they grow in size, but this occurs at a declining rate. The percentage of mortgage financing in REIT capital structure declines with leverage, indicating the tradeoff between leverage and unsecured, recourse debt. The fewer liquidity constraints of the REIT (indicated by either access to credit lines or equity repurchases), the less valuable the mortgage flexibility option. REITs with high percentages of mortgage financing in their debt structure are both less profitable and have fewer growth opportunities.

We also consider the likelihood that a REIT would issue a secured loan, using loan level data. The results are presented in Table 11. We are able to take advantage of loan level characteristics such as *Term* and *Loan Amount*. REITs are more likely to pledge collateral when they are seeking a relatively lower loan amount and a longer loan term. It is interesting to note that only non-investment grade REITs rely on mortgages during a recessionary period.

Conclusion

We contribute to the literature on REIT capitalization by examining the relationship of loan collateral and cost of debt. We find that REITs are able to benefit from their ability to utilize unsecured corporate level debt that is recourse to the firm and obtain

Table 11. Secured debt issuance in REITs.

	(1) All REITs	(2) Ownrshp	(3) InvestmentGrade	(4) "Non-Investment
TermYears	0.0827***	0.0817***	0.0968***	0.0704**
	(4.70)	(4.57)	(4.20)	(2.69)
Loan Amount	−0.951***	−0.973***	−1.418***	−0.504***
	(−8.34)	(−7.81)	(−7.75)	(−3.86)
Pr(MarketAccess)	−2.456***	−2.352***	−0.272	−2.334***
	(−6.96)	(−5.73)	(−0.29)	(−3.68)
EquityRepurchase	−0.262	−0.218	−0.241	−0.405
	(−1.23)	(−0.96)	(−0.78)	(−1.11)
CreditLineUse	−0.491	−0.537	−0.546	−0.406
	(−1.77)	(−1.80)	(−0.87)	(−1.06)
Size	3.326*	2.843	4.467	−1.826
	(2.09)	(1.71)	(0.79)	(−0.57)
Size2	−0.103	−0.0902	−0.147	0.0673
	(−1.81)	(−1.50)	(−0.80)	(0.61)
Age	0.0000955	−0.000483	0.0218	−0.0107
	(0.01)	(−0.05)	(1.63)	(−0.88)
Age Squared	−0.0000426	−.0000270	−0.000280**	0.0000706
	(−0.59)	(−0.37)	(−2.83)	(0.81)
Leverage	2.254*	1.659	0.794	1.585
	(2.50)	(1.66)	(0.43)	(1.25)
Profitability	−4.375	−1.638	−9.143	6.823
	(−0.61)	(−0.21)	(−0.70)	(0.89)
Growth Opportunities	0.762	0.419	0.920	0.360
	(1.60)	(0.86)	(1.05)	(0.52)
Cash Holdings	8.891*	9.829*	7.566	23.73***
	(2.47)	(2.23)	(1.74)	(3.43)
recession	14.28***	13.73***	−0.318	15.54***
	(10.78)	(9.02)	(−0.06)	(9.51)
InstOwnership		0.768	2.034*	−0.473
		(1.39)	(2.12)	(−0.58)
Insider Ownership		0.120	−0.653	−0.0514
		(0.27)	(−0.37)	(−0.29)
Corporate Bond Spread	Yes	Yes	Yes	Yes
30yr Mortgage	Yes	Yes	Yes	Yes
Property Type	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	14241	11642	4865	6766

Notes. The dependent variable is Secured Debt, at the loan level. The reported coefficients are estimated with a logit model. Variable definitions are provided in the Appendix.
t-statistics in parentheses.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

financing at a lower cost than is available to individual property borrowers. There are two likely explanations for our findings of an interest rate premium on secured debt. One is that property-level, secured debt [mortgages] is non-recourse to the firm and carries a strategic default premium. Another is that secured debt provides higher leverage than unsecured debt. Utilizing a loan level data set we show that REITs are more likely to use mortgages for lower initial balance borrowings, when seeking longer term debt and during recessionary periods. This leads us to conclude that REITs will use mortgages to access higher leverage borrowings, maintain an option to default, and preserve overall operating flexibility.

Notes

1. The REIT literature on capital structure has included studies by Boudry et al. (2010), Hardin and Hill (2011), Harrison et al. (2011), Giambona et al. (2008) and Giambona et al. (2012), among others.
2. One unobserved source of financing is debt taken on by REITs in Joint Ventures. Since these are off balance sheet transactions, we cannot control for those borrowings. It is likely that those borrowings are also mortgage loans, and that our mortgage borrowings are understated.
3. Contrary to residential real estate and small business loans (Giambona et al., 2013), large commercial real estate loans are typically non-recourse. There are a few exceptions to this in the case of development projects and other speculative ventures, perhaps in the case of smaller banks and borrowers. However, in the institutional space and, for example, in the CMBS world, most cash flow dependent loans are non-recourse.
4. While a REIT may choose to continue to service a non-recourse mortgage, the debtholder only has recourse in default to the property including associated cash flows.
5. Another indication that REITs' unsecured, recourse debt issues do not have strategic default risk premiums emanates from conversations with REIT bond buyers at insurance companies, who have revealed that asset market values are not used to conduct covenant tests. A Morningstar REIT Credit Rating Methodology Report reveals a "market value" adjustment to historical acquisition prices as a 125% across the entire asset base. Thus, it would appear that the bond LTV covenant verification, if conducted, is primarily based on historical values, and not current appraisal values, thereby mitigating the risk of strategic default based on property market values.
6. At least 90% of taxable income must be distributed to shareholders annually in the form of dividends. Source: http://www.sec.gov/answers/reits.htm. While recent studies show that the dividend to FFO distribution ratio is closer to 70%-80% (Case et al., 2012), a considerable proportion of operating cash flows is nevertheless distributed.
7. Feng et al. (2007) have shown that REITs are more likely to have high leverage ratios when they have high market valuation and growth opportunities.
8. Sun et al. (2014) have shown that REITs with higher leverage had inferior performance subsequent to the financial crisis.
9. Debentures for firms without market access consist primarily of private placement debt instruments, with the majority issued by one REIT, Monmouth Real Estate Investment Corp (NYSE: MNR).
10. A portion of the mortgages are provided by CMBS lenders. While the loans are securitized, the performance of the property is still monitored by the servicer via lease approvals, springing cash flow sweeps, various lock box structures, DSCR covenants and other monitoring mechanisms.
11. The data shows that at least 83% of the observations are fixed rate, however the index and spread information is not available. By controlling for various index rates (Libor, 10-Year Treasuries, 30-year Mortgage rates) we attempt to address the rate variance due to index fluctuations.
12. The higher interest rates on mortgage debt may reflect an illiquidity premium included in the rate. Thus, the differential rate may include both a premium for monitoring costs and for illiquidity.
13. Revolving debt typically also includes non-usage fees and other fees not available in the data.
14. Hardin and Hill (2011) have shown that REIT lines of credit have a significant relationship with access to public debt markets and provide substantial liquidity.
15. Riddiough and Wu (2009) find that lines of credit are used to preserve debt capacity.
16. This is previously shown to be of importance for REITs by Hardin et al. (2017), Han (2006), Capozza and Seguin (2003), and others.

17. Chui et al. (2003) find that size is a persistent factor in REIT returns and Ambrose et al. (2005) show that larger REITs have lower costs of capital.
18. Alcock et al. (2014) have shown that debt maturity is an important factor in determining REIT leverage.
19. Downs and Guner (2000) show that analyst coverage has a significant relationship with REIT liquidity.
20. Letdin et al. (2018) find that NAV Dispersion is a significant indicator of firm value, where greater analyst dispersion has a negative and significant relationship with firm value. Earnings forecast dispersion is found to not be significant in comparison.

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Appendix

Variables and sources.

Variable	Definition and Source
Age	Age of a REIT measured in quarters, from the latter of going public or obtaining REIT status until the current period.
Analyst Coverage	Coverage of analysts reporting earnings estimates in a given quarter, obtained from I/B/E/S.
Cash Holdings	Cash reported in the 10Q report scaled by Total As-sets.
CreditLineUse	The amount of credit line as reported utilized for the quarter, divided by the total amount available.
Equity Repurchase	Equity repurchases were obtained from SNL for years 2008 to 2012. The remaining equity repurchases data for years 2001 to 2007 was hand collected from Lexis- Nexis.
Growth Opportunities	Market value of total assets divided by book value of total assets.
Insider Ownership	The percentage of shares held by insiders scaled by the total shares outstanding.
Institutional Ownership	Calculated as total shares held by institutions as provided by Thomson Reuters Institutional (13f) Holdings divided by Total Shares Outstanding, obtained from CRSP.
Loan Amount	Natural log of Loan Amount.
Loan Term	Remaining term of the loan in years.
Loan Type	Classified Debt Types detailed in Table 1.
Leverage	Total Debt divided by Market Value.
Market Access	Binary variable that indicates whether the company had a debt (Debt rating obtained from CRSP).
Secured Loan	Binary variable, indicating whether or not collateral was pledged for each individual funding.
Mortgage Percentage	The proportion of Mortgage (SNL data supplemented with hand collected sample) to Total Debt each quarter.
NAV Coverage	NAV Coverage is the quarterly average number of analysts providing NAV estimates, obtained from SNL Financial.
NAV Dispersion	NAV Dispersion is the standard deviation of NAVestimates divided by the mean of NAV estimates, obtained from SNL Financial.
Profitability	Funds from operations (FFO) scaled by Total Assets.
Size	Natural log of market value. The market value of the company is determined by subtracting the book value of equity from total assets and adding back the market value of equity.
30yr Mortgage	Mean 30 -year mortgage rates for the quarter, obtained from the Federal Reserve of St. Louis.
Corporate Bond Spread	The mean Moody's Seasoned Baa Corporate Bond Yield Relative to Yield on 10-Year Treasury Constant Maturity.