Under the Lender's Looking Glass

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Abstract

This paper studies the impact of bank monitoring on the risk of US equity REITs. Using a unique, hand-collected data sample of mortgage balances, I show that bank screening and monitoring of REIT assets via utilizing secured mortgage financing (vs unsecured, recourse debt) lowers the overall company risk of a REIT. At the asset level, screening results in primarily retail and office assets located in primary markets, i.e. more transparent assets, being pledged as collateral. Further, I find evidence consistent with the role of lender monitoring for secured, non-recourse mortgage loans.

Keywords: Collateral, REIT, Secured Debt, Property Type, Lender Monitoring

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1 Introduction

What happens when Real Estate Investment Trusts use mortgages? Some intuition to answer this question is provided by corporate finance literature, that has shown both theoretically and empirically what type of firms rely on secured debt.[1] Prior REIT literature has also enlightened the quandary by examining the equity vs public debt question (Brown and Riddiough, 2003), (Liu et al., 2015). In this paper, I bridge the gap between these two areas of study by examining private, secured mortgage debt for REITs both from a company balance sheet and an individual asset stand point.

According to recent literature, collateralized or secured debt is associated with more opaque and higher risk firms. [2] In order to test the effect of secured debt for REITs on a corporate level, I use a hand collected data set of quarterly mortgage balances. In particular, I examine whether financing choices influence REITs systematic and idiosyncratic risk at the firm level.

In order to asses mortgage use on an asset [property] level, I exploit the visible risk characteristics that are readily available to lenders - property type, and asset location. I use the coordinates of the assets to first control for MSA size (my proxy for liquidity) and distance from corporate headquarters (my proxy for monitoring).

A related work (Liu et al., 2015) explores the average tenant and location quality of REIT's holdings and the corresponding choice of unsecured debt vs equity issuance. They find that firms with higher quality tenants and properties in superior locations are more likely to issue public debt [vs equity]. My findings are complementary, as they show that consistent with theory, lenders whose loans are secured by collateral perform greater monitoring of said collateral than unsecured lenders. Thus the hierarchy of risk is inversely related to monitoring with equity assuming the highest risk position, followed by unsecured debt (as shown by (Liu et al., 2015) and lastly, as this paper shows, secured debt.

Real Estate Investment Trusts (REITs) provide a suitable environment to study the collateral/secured debt question because the composition of long term debt tends to include both secured, non-recourse

[1] See Chan and Kanatas (1985), Chan and Thakor (1987),Besanko and Thakor (1987), Stiglitz and Weiss (1981), Agarwal et al. (2015) among others

[2] Jimnez et al. (2006), Rauh and Sufi (2010), Colla et al. (2013)

mortgages and unsecured, recourse publicly traded bonds (see Giambona et al. (2012)). REITs can also choose to pledge either high or low risk assets as loan collateral. However, bank lenders may observe the quality of the tangible assets by up-front screening and ongoing monitoring of the REITs management. Thus, the presence of informed bank lenders may shift the risk profile of encumbered assets to low risk, high quality properties. To my knowledge, this is the first paper to explicitly examine the role of the bank screening mechanism in identifying the risk of collateral pledged against secured loans.

The heterogeneity of corporate asset base, opacity of assets and industry variation have in the past presented challenges for studying collateralized debt. Real Estate Investments Trusts (REITs) are well suited to mitigate all three of these challenges. First, REITs are legally required to have real estate as their primary asset base in order to qualify for REIT status. Second, a REIT's asset base has highly observable risk characteristics that are largely attributed to either the propertys location or property type. Lastly, REITs present a homogenous sample vs the general population of firms. As an added benefit, REITs are required to distribute the majority of their earnings, which requires them to access capital markets on an ongoing basis. Thus, transparency of management decision making cannot be obscured by the utilization of retained earnings to fund growth.

I extend the current literature by first investigating the following: given that the firm is the *same* and that assets pledged as collateral are monitored by the lender, how does the monitoring affect the risk of the firm? Secondly, how are the assets pledged as collateral different from the ones that are unencumbered? To empirically examine the relationship between mortgage loans and collateral risk, I consider the overall company level risk and the proportion of total debt allocated to secured debt. I utilize a hand-collected data set on the composition of debt (secured (mortgage) as compared to unsecured debt) in order to explicitly test the impact of bank screening on borrowing firm risk exposure. In order to address this question, I calculate the relationship between mortgage use and total company risk as well as firm measures of both systematic and idiosyncratic risk. The findings show total risk is negatively related to the proportion of debt allocated to mortgages. This finding implies that lower risk REIT borrowers are more likely to utilize secured debt in their capital structure. Since collateralized debt in the form of mortgage lending is associated with the presence of bank screening activity, I show that low risk borrowers signal their creditworthiness to banks by pledging

high quality, low risk collateral. I further break down the risk into systematic risk and idiosyncratic risk, and find that it is predominantly idiosyncratic risk that is reduced by bank screening activity.

To determine the drivers of this effect, I test whether there is a difference in the risk profiles of assets pledged as collateral for mortgages as compared to assets that are unencumbered. I assess a property type liquidity category and a location quality liquidity risk to each asset, using a property level database. The property type liquidity risk is based on whether the assets primary purpose is apartment, office, retail, etc. The location liquidity risk is based on the size of the MSA the asset is located in. I calculate the probability of encumbrance, and find that assets with lower opacity are more likely to be used as collateral in commercial mortgages. These findings support a postulation made by Booth (1992) that lenders screen loans so that lower risk, better quality assets are required as collateral. Next I consider the relationship of monitoring and collateral. Evidence of monitoring is based upon the physical distance between the asset pledged as collateral and the REIT that owns and manages it. I find evidence of ongoing monitoring activity during the course of secured bank mortgage lending. This finding supports Allen and Letdin (2015) that document that due to lender monitoring REIT secured loans have higher interest rates than their unsecured counterparts.

2 Prior Literature and Hypotheses

In a mortgage scenario the lender has a chance to value and underwrite the asset prior to funding, monitor its performance throughout the life of the loan, and foreclose on the asset in the event of default. Because of this process, secured debt is subject to fewer information asymmetries between borrowers and lenders than if the assets were financed with unsecured debt. Stulz and Johnson (1985) conclude that secured debt reduces the monitoring costs of debt, and therefore secured debt is safer than unsecured debt ceteris paribus. Moreover, they state that existing bondholders are better off if the firm undertakes a new project and finances it partly with secured debt. Stulz and Johnson (1985) and Chan and Kanatas (1985) focus on the pledge of collateral in addition to the financed project, where the project is credit enhanced by additional collateral. This is contrary to the mortgage instrument and their result may or may not be applicable to REITs financing, where

the liability of the borrower is limited to the real estate pledged as security. Besanko and Thakor (1987) also conclude that there is a negative relationship between risk and collateral by predicting that lower risk borrowers will pledge more collateral in exchange for a lower interest rate.

In contrast, (Berger and Udell, 1995) show that secured loans are higher risk, as assessed by the higher interest rate in their sample. However, their study 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 higher risk and more informationally opaque firms are more likely to pledge collateral. Similar conclusions regarding borrowers of lower quality/higher risk being required by lenders to pledge more collateral are shown by Jimnez et al. (2006) in a study of small businesses in Spain. The existing literature does not distinguish between two related yet separate predictions - one is that assets are lower risk and the other that the borrowers are higher risk.

Several prior studies have looked at debt ratings as an indicator of leverage and debt composition. Faulkender and Petersen (2006) find that access to public debt markets is associated with higher leverage, as regular operating firms dont have many alternatives for financing and are thus constrained without access to the bond market. REITs however are not subject to the same constraints, as access to the mortgage market enables them to obtain project specific financing with higher leverage then available from the public debt market. In related work, recently Colla et al. (2013) and Rauh and Sufi (2010) have demonstrated the heterogeneity of debt. 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 public debt that introduces restrictions at the corporate level.

REITs have a choice in sources of funds: secured debt (collateralized by property), unsecured debt and equity. Issues impacting the firms optimal capital structure, such as tax benefits of debt Graham (2000), and dividend implications of debt Miller and Modigliani (1961), are not applicable to REITs since REITs do not pay taxes and are required to distribute the majority of their earnings as dividends. Thus, the study of REITs provides an opportunity to study capital structure choice abstract from dividend policy and tax considerations. The decision of two types of debt is unique to REITs, as they are required to hold real estate (vs engage in operating activities) and thus could

use exclusively secured debt for all of their assets. Giambona et al. (2012) find that higher use of mortgages indicates that a firm is of inferior quality, as proxied for by Tobin's Q. I postulate that these firms are simply lower risk. A REIT is a collection of real estate investments, a series compiled over time, and its debt structure is culmination of accumulation of a series of asset level financing decisions and/or corporate level decisions. Morellec (2001) finds that pledging part of the firms assets as collateral increases firm value. Secured debt prevents the firm from selling assets and as such reduces the default probability and preserves liquidation value. It also reduces bankruptcy costs due to lower enforcement costs. Pledging assets reduces the probability of default. Monitoring the assets reduces firm risk. These priors lead me to the first hypothesis:

Hypothesis 1: A higher allocation to mortgages as a percentage of total debt should be associated with a borrower of lower risk.

Since a REIT is a company that owns and manages real estate assets as its primary line of business, the risk of the assets and the company are closely aligned. Moreover, secured loans to REITs are in the form of mortgages which have distinct pledges of encumbered assets and which are non-recourse to other, non-pledged firm assets.

Hypothesis 2: Assets pledged as collateral for mortgages (secured, non-recourse loans) are lower risk than unencumbered assets.

In order to test the second hypothesis, I consider those property characteristics that are known by the screening banks prior to the granting of a mortgage loan: location (Chichernea et al., 2008) and property type (Ambrose and Nourse, 1993). I use the Property Type and Location Type characteristics as proxies for risk of the asset as other property characteristics that a bank would consider such as Lease Terms, Tenant Quality, Net Operating Income and Physical Quality are not available in the data sample. Location and property type however are the most permanent characteristics and ones that are difficult to change; as such I believe that they are the most important risk characteristics of the assets. Recent studies (Giambona et al. (2012), Giambona et al. (2013)) establish a strong link between real estate as a pledged asset class and a lender's willingness to extend loans.

One of the defining attributes of secured bank debt is monitoring of the assets. Rajan and Winton (1995) show that pledging collateral incentivizes the lender to monitor. Monitoring ensures that the value of the asset does not fall below the face value of the loan. Agarwal and Hauswald (2010) and Knyazeva and Knyazeva (2012) show that physical distance matters for monitoring and gathering of information. Using location I can calculate the distance of the property to the headquarters of the REIT. I use the distance as a proxy for monitoring of the asset by the borrower.

Hypothesis 3: Assets that are more likely to be monitored [less distant from the management at parent company headquarters] are more likely to be pledged as collateral

By assessing whether the likelihood of a property being pledged as collateral is impacted by its distance from the REIT, I test whether the lender expects the borrower to monitor the asset. The alternative explanation would be that the lender expects to be the sole monitor of the pledged asset and not assign any importance to the borrower managing it, as they expect to own it in a bad state. Unfortunately the identity and location of the lender are not known, to test what monitoring the lender may perform directly. However, as Knyazeva and Knyazeva (2012) have shown, lenders are more likely to provide financing to borrower in close physical proximity. Thus the distance between the asset and the borrower is a proxy for the distance between the lender and the collateral property asset.

3 Data Overview and Methodology

I utilize two data sets: one on the firm (REIT) level and one on the property (asset) level. The REIT-level database includes quarterly observations of REIT operating performance. The property data set provides asset level encumbrance, location and property type information.

3.1 REIT Level Data

The initial sample is obtained from CRSP and SNL for years 2000 to 2012. In order to assess variable accuracy, randomly sampled values were reconciled against the REIT 10K and 10Q reports filed with the SEC. Two possible variables, Mortgage and Notes and Secured Debt field in SNL were examined and the difference was pinpointed to the fact that the latter excludes secured lines of credit. Lines

of credit are of great importance to REITs. However due to their short term nature they are more likely to be used for liquidity management vs long term financing decisions. Lines of credit are inherently different from mortgages not only in their short term, but also the ability of lender to modify the line and to monitor the borrower. Mortgages cannot be modified once funded and do not provide for corporate entity monitoring, the screening and monitoring only takes place at the asset level. The Mortgages and Notes SNL field 138535 was chosen as the most appropriate for the study since the main question is focused on choice of long term collateralized debt allocation. SNL reports a field for Mortgages and Notes for 19,293 company quarters for 2000-2012. After quarters during which a company was either not operational or did not have REIT status were dropped, 7,098 company quarters remained with 2,654 missing observations. A handful of REITs focusing on timber or other non-traditional lines of business were omitted. Companies with less than one year of observations were excluded, as well as those that did not break down their debt composition. SNL data with companies that were either acquired or otherwise defunct prior to roughly 2005 had no observations available and many companies only had annual observations prior to 2004. The missing 1,744 observations were hand collected from quarterly reports for a final sample of 6,188 Mortgages and Notes observations across 216 REITs.

Since many REITs could access the public debt and equity markets to fulfill their funding needs, controls for issuance of both were included. Public debt and equity issuance data were obtained from SNL. Property investment is the expected purpose for REITs to seek external funds. However, a potential alternate use of funds could be equity repurchases. In order to address this concern, information for equity repurchases was obtained from SNL for years 2008 to 2012. The remaining equity repurchases data for years 2000 to 2007 were hand collected from Lexis-Nexis. REIT corporate bond ratings were obtained from Compustat. Moodys corporate bond spreads, Libor, treasuries and 30 years mortgage rates were obtained from the Federal Reserve. The Loan Officer Survey was obtained from St. Louis Federal Reserve. The final sample of 6,188 company quarters of observations consists of 216 REITs. The shortest time span per REIT is four quarters and the longest is 52 quarters, with an average time span of 28 quarters.

The mean percent of Mortgages as a share of Total Debt for each quarter in the sample is shown in Table 2. Despite fluctuations, the mean has been consistently above 50% of Total Debt. Thus

I believe that Mortgages are a very important component of REIT capital issuance decisions and understanding thereof sheds light on predicting riskiness of REITs in the future.

The summary statistics are presented in Table 1. MORTGAGES as a proportion of total debt average 60.5% for the pooled sample. The complete distribution of Mortgages as a share of Total Debt is shown in Figure 1. While there are REITs that do not utilize mortgages at all and those that tend to rely exclusively on mortgages, the majority of the sample is distributed over a spectrum of mortgage use. SIZE is calculated as a 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. LEVERAGE is calculated as Total Debt divided by Market Value. The average leverage for REITs in the sample is 44.7 percent. AGE is shown in quarters, and thus the average age of a company is approximately 9.5 years. Growth Opportunities proxied for by Market to Book is 1.22 (nearly identical to Harrison et al. (2011)). PROFITABILITY is calculated as funds from operations (FFO) scaled by Total Assets, as NOI is not customarily used for REITs due to the substantial depreciation expense associated with real estate assets. EQUITY ISSUE and PURCHASE, UNSECURED DEBT ISSUE and DEBT RATING are all dummy variables where 1 indicates activity, and 0 lack thereof. Comparing to the general public stock market study by Colla et al. (2013) where they find that 60 percent of firm year observations in their sample have debt ratings, the REIT sample has 41 percent of firm quarter observations with a debt rating. Given that this a pooled sample, the average number of companies with a debt rating is not necessarily reflected in the mean statistic. When the sample is bifurcated into rated and unrated companies in the Robustness section, the total number of companies with a debt rating is 87 out of the total sample of 216 REITs. Out of the 87 REITs with a debt rating, 25 obtain it during the sample period.

To examine the mortgage use over time, Table 2 provides a quarterly breakdown of the mean debt allocation to mortgages. Column 2 of Table 2 shows the number of unique firm observations in each quarter, with 107 being the lowest and 135 the highest. There is a marked increase in relative mortgage use from 2004 to 2007, a time of looser credit standards and higher property values. Despite substantial instances of bond issues, as shown in Column 5 of Table 2, the allocation to mortgages nevertheless increased during this time. The lower allocation to mortgages during the financial crisis and beyond is most likely due to tightening of lending standards by the lending insti-

tutions. Notably, these numbers of 59-60% allocation to mortgages are consistent with the pre-boom period of 2000 to 2003. Post financial crisis, bond issuance has resumed but it appears the mortgage lending standards have remained tight relative to the bond market as evidenced by the slightly lower allocation of long term debt to mortgages with a low of 56%. The last time in the sample mortgage use was this low was in 2000. Leverage, as pointed out by Sun et al. (2014) has remained lower after the crisis, possibly since bonds have covenants restricting overall leverage (The majority of bonds restrict total leverage to 60% and secured leverage to 40%, as shown by a Wells Fargo Fixed Income Research Report on Debt Covenants 2014). Also of notice is the Equity Issues that have taken place during high valuation of REIT shares period, which would appears to be consistent with a market timing theory (Baker and Wurgler, 2002). Untabulated Equity Repurchases instances further support market timing as Equity Repurchases peaked during the financial crisis 2007-2009 period when the stocks were undervalued from the managements perspective.

3.2 Property Level Data

Prior to offering a mortgage to a borrower the lender is able to observe the risk profile of the asset during their due diligence period. In order to estimate the probability of a property being pledged as collateral, the observable risk components of a property are considered. Property characteristics such as location (Chichernea et al., 2008) and property type (Ambrose and Nourse, 1993) are some of the major factors that determine the risk and return that a property investment is likely to generate. Next I consider the likelihood of monitoring by the borrower and/or the lender over the life of the loan. A proxy for monitoring by management is the distance of the asset (property) to its owner (REIT), analogous to the relationship between bank monitoring and distance as shown in Knyazeva and Knyazeva (2012). Property data is obtained from SNL for 2000 to 2012. Observations with missing MSA code (18,957) or located in Puerto Rico (1,022) were excluded. Only the assets owned by the REITs included in the study are used. The resulting sample consists of 476,442 company quarters, for 174 companies. Table 7 provides the summary statistics for the property sample. SNL provides all street addresses and some coordinates for the properties owned by REITs. Addresses were used to obtain the missing coordinates for 2,300 properties. The final sample consists of 60,160 unique property coordinates over the sample time period of 1994 to 2012. The coordinates of the REITs headquarters were obtained based on headquarter street addresses. ArcGIS was used to calculate the distance, in miles, from a REITs headquarters to each one of the assets they own each

quarter. The greatest distance from a REIT to an asset they own is 5,128 miles, however 95 percent of the sample is within 2,500 miles. The sample mean distance is 972 and the median is 818 miles. The shortest distance is less than one mile, and 25% of the property sample is within 350 miles from their respective owners. An illustration of the distance calculation is demonstrated in Figure 2 which uses HCP, a healthcare REIT with headquarters in Irvine, CA and their real estate holdings nationwide.

SNL provides encumbrance data for individual assets. A shortcoming of the dataset is that one cannot distinguish among properties with zero debt and those that do not report it. Thus the determining whether or not the asset is pledged as collateral could be omitting some observations of assets that are pledged. However this should only weaken the difference (if any) between encumbered and unencumbered assets.

3.3 Property Risk Characteristics

To assess the important of observable risk characteristics on the probability of asset encumbrance, I assign risk characteristics to the descriptive attributes such as property type and location. Different property types yield different returns and their performance is reflected in their capitalization rates (Net Operating Income divided by Transaction price) as shown by Ambrose and Nourse (1993) among others. Figure 3 reproduces a 2013 report based on NCREIF Cap Rate Survey, showing the premium on different property types has been fairly consistently ranked over time. Multifamily trades at the lowest cap rates, followed by Office, Retail, and Industrial. Other property types such as hospitality are known to trade at even higher premiums Ambrose and Nourse (1993). Motivated by both priors and market evidence, I group the properties into major categories. Table 7 provides the conversion of the detailed property types into categories. For example, Retail is broken up by SNL into Retail: Other, Shopping Center and Regional Mall. I assign all retail properties a category of type Retail, to show that they are different profile investments than multifamily and office properties, consistently with historical Capitalization Rate data. [3]

Superior locations are characterized by ease of liquidity and higher demand (Chichernea et al.,

[3]The Robustness section Table 14 shows the individual results across non-aggregated 12 property types as specified by SNL.

2008). Demand for commercial and multifamily real estate is driven directly by population working and residing in a given area. Liquidity, or the ease of selling an asset, is driven by both population and the economic environment of a marketplace. Thus a favorable location or a location of lower risk would include factors of high user demand and high liquidity at the time of sale. In order to estimate location quality, foreign investment and residing population are used as proxies. MSA population statistics are obtained from SNL. Cities are ranked as lowest risk (Gateway Cities) and subsequently increasing in risk inversely related to MSA population. The MSAs are grouped and coded into 1 to 5 risk categories with 1 being the lowest risk and 5 the highest. A selection of MSA risk categories is shown in Table 7, Panel B. Each property is then categorized by its MSA type risk level and its property type risk level.

Whether or not an asset was acquired as a part of a portfolio (PORTFOLIOBUY) is a binary variable with a value of 1 for yes and 0 for no. Nearly forty seven percent of the sample were portfolio acquisitions (vs individual asset purchases). While the data is only available for about two thirds of the sample, slightly over twenty percent of the properties were sold as a part of a portfolio as well, as noted in PORTFOLIOBUY, also a binary variable. Whether or not an asset is a part of a portfolio is an important consideration of a firms mortgage decision, since it imply that more than one asset was used for collateral for a loan as in Brown and Riddiough (2003) or that a portfolio loan was assumed at the time of the acquisition. In thirteen percent of the observations, the properties were acquired as a part of a merger. Similar to a portfolio acquisition, a merger could also signal a potential lack of active decision on the REITs part as the assets could have mortgage debt already in place. The decision to recapitalize is not observed in this sample.

4 Empirical Findings

4.1 Borrower [REIT] Level Risk

In this section, I consider the impact of lender screening, monitoring and collateral requirements on the overall firm (REIT) risk, as conjectured in Hypothesis 1. In order to test Hypothesis 1, I examine the relationship between mortgage utilization and the total, systematic, idiosyncratic risk of the REIT firm. Total Risk is defined as the standard deviation of REIT returns calculated on a quarterly basis using daily values. The regression specification is as follows:

$$TotalRisk_{j,t} = \alpha_{j,t} + \gamma_{1j,t}Mortgage + \gamma_{2j,t}Leverage + \gamma_{3j,t}Profitability + \gamma_{4j,t}DebtRating + \gamma_{5j,t}Age + \gamma_{6j,t}Size + \varepsilon_{j,t} \quad (1)$$

The results are shown in Table 3. In line with prior literature, leverage and risk are positively related. However, allocating debt towards mortgages is associated with lower risk. Column 2 includes control variables. Size and Profitability have a negative relationship with risk, however only Size is significant. Leverage remains positive and significant. Mortgages remain negative and statistically significant. Column 3 reports estimation with firm fixed effects for a look at variation within a firm. Allocation of debt towards mortgages significantly lowers total firm risk. The finding is the same in Column 4, where variation between firms is considered. Those firms that utilize more mortgages, controlling for overall leverage, are less risky. More profitable firms are found to be less risky as are larger firms.

To study the impact of Mortgages further, I separate systematic and idiosyncratic risk. In order to do so, I first estimate a one factor CAPM using the CRSP value weighted market index. The CRSP value weighted market index serves as a proxy for market return. Daily returns obtained from CRSP are used to estimate quarterly Betas for each REIT. The Beta serves as a proxy for systematic risk. The residual from the equation serves as a proxy for idiosyncratic risk. The regression is as follows:

$$Return_{j,t} = \alpha_{j,t} + \beta_{j,t}MarketReturn + \varepsilon_{j,t} \quad (2)$$

Table 4 presents the results of estimating the Betas as specified in Equation 4. As expected, for the entire sample the coefficient estimate is close to 1. The number of observations 460,546 is reflective of the daily data. The one factor model has an explanatory power of 19.8The estimated Beta is then used as a measure of systematic risk, as a dependent variable in Equation 5 below.

$$\hat{\beta_{j,t}} = \alpha_{j,t} + \gamma_{1j,t}Mortgage + \gamma_{2j,t}Leverage + \gamma_{3j,t}Profitability + \gamma_{4j,t}DebtRating + \gamma_{5j,t}Age + \gamma_{6j,t}Size + \varepsilon_{j,t} \quad (3)$$

Table 5 provides the results. Controls for time, in quarters, are included in all specifications. Column 1 reports OLS results, where Mortgages are negative and significant in relation to systematic risk. Column 2 includes control variables and Column 3 considers within firm variance. Mortgage allocation is no longer significant in explaining systematic risk, once other variables are included. Next, I examine idiosyncratic risk, estimated as the residual estimated in Equation (4). Idiosyncratic risk is the dependent variable in equation 6:

$$\hat{Res}_{j,t} = \alpha_{j,t} + \gamma_{1j,t} Mortgage + \gamma_{2j,t} Leverage + \gamma_{3j,t} Profitability + \gamma_{4j,t} DebtRating + \gamma_{5j,t} Age + \gamma_{6j,t} Size + \varepsilon_{j,t} \quad (4)$$

Table 6 reports the determinants of idiosyncratic risk. This finding is consistent with the first hypothesis, that higher allocation to mortgages should be associated with lower risk. The finding is robust to inclusion of control variables as in Column 2. Column 3 The coefficient on Mortgage however is still negative and highly statistically significant. The robustness section includes predicting public market access as well as bifurcating the sample and only considering those firms that have access to public debt markets.

4.2 Collateral Risk

Hypothesis 2 conjectures that in the presence of bank screening activity, lower risk assets are more likely to be pledged as collateral than higher risk assets. I utilize the property risk variables in order to examine the risk of encumbered properties as compared to unencumbered properties.

The MSA Type risk and Property Type risk parameters are used to test Hypothesis 1, that properties pledged as collateral would be lower risk. To gauge the sample, I run a simple t-test of property risk attributes between encumbered and unencumbered properties. Unreported t-test results show that there is a statistically significant difference between the mortgaged and the unencumbered assets with the lower risk properties more likely to be pledged as collateral. I proceed to estimate the following equation where Risk is either Property Type or Location Risk:

$$Pr(Mortgage_i) = \alpha_i + \delta_{1i} Risk + \varepsilon_i \quad (5)$$

The regression results are shown in Table 8. The binary dependent variable is whether or not a property is encumbered and the regression is estimated using probit, using the property level data on over 476,000 property quarters. Consistent with Hypothesis 2, both risk measures are statistically significant and negatively related to the probability of an asset being encumbered by a mortgage. The omitted property risk type 1 is Multifamily. In order to examine whether the results are capturing other phenomena, I include control variables for time (quarter) and whether or not the property was purchased or sold as a part of a portfolio, or acquired through a merger. The results are demonstrated in Table 9. The sample size is decreased by over a third due to the lack of availability of control variables for all of the observations. The resulting sample size is approximately 300,000 observations. Columns 1 through 2 include the explanatory risk variables individually with controls. Column 3 includes all of the explanatory risk variables together along with controls. An asset that is a part of a portfolio or a merger has a higher likelihood of being pledged as collateral. All risk characteristics remain statistically significant and negative, even when both are included simultaneously as in Column 3.

4.3 Monitoring and Risk

Next I test Hypothesis 3, assets that are more likely to be monitored are more likely to be pledged as collateral. Probability of monitoring is defined as the distance from the asset to the borrowers headquarters. Table 10 provides the results of testing Hypothesis 3. Column 1 reports univariate results, where a statistically significant negative relationship is established between distance and likelihood of the asset collateralization. Its converse is then true, strong likelihood of active monitoring by the owner (close proximity to company headquarters) means the asset is more likely to be used as collateral for a mortgage Column 2 includes control variables, and the relationship remains highly statistically significant. Column 3 includes MSA Type Risk, 4 categories of Property Type Risk and Monitoring in the same regression along with controls. All remain highly statistically significant and negatively correlated to the likelihood of property encumbrance.

4.4 Robustness Tests

The robustness tests are divided into two alternative explanations. First, several studies have shown that the ability to access bond markets could be driving by the heterogeneity of debt (Faulkender Petersen (2006), Rauh Sufi (2010), Colla et all (2013)). I therefore perform a robustness check by bifurcating the sample into firms with and without public market debt access, using bond rating as a proxy for market access. I estimate Equation 4 for the subsample with access to public debt market. The Results are reported in Table 11. Column 1 shows only those REITs that had access to the bond markets. REITs with market access are still found to be less risky in terms of idiosyncratic risk when a higher proportion of their debt is allocated towards mortgages.

Brown and Riddiough (2003) study the characteristics of public (unsecured i.e. recourse debt) issuers. They 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. Brown and Riddiough (2003) show a negative relation between the likelihood of a public debt issue and the pre-offer secured debt, ie firms with higher proportion of secured debt would tend to issue equity or obtain more secured debt to fund their investment opportunities. Given that the access to public debt markets is potentially endogenous for REITs, I use a two stage approach to first estimate the probability that a REIT will have access to the bond market and subsequently include the estimated parameter into the risk equation. The first stage results are shown in Table 12. As in Faulkender Petersen (2006), I use Age and Size to predict public market access. Table 13 reports the second stage results, estimated with OLS. The idiosyncratic risk is found to be positively and statistically significantly related to public market debt access, in comprisk lete symmetry to the negative and statistically significant relationship of the secured debt ratio.

Another robustness check disaggregates the property risk index into its component parts in order to examine the likelihood of property encumbrance in more detail. Thus, I consider each detailed property risk characteristic (HealthCare, Hotel, Industrial, Manufactured Home, Multifamily, Multiuse, Office, Regional Mall, Retail Other, Self-Storage, Shopping Center and Specialty) individually without aggregation to general property types. The results are reported in Table 14. Multifamily, Office and Regional Malls stand out as the most likely to be pledged as collateral, consistent with their lower risk profiles.

5 Conclusion

In this paper I test the impact of screening and monitoring on borrower risk, by focusing on REITs, a group of highly transparent borrowers with tangible assets. Using a unique sample of outstanding mortgage balances obtained from company quarterly reports to supplement database gaps, I find that screening and monitoring at the asset level translates to mortgage use having a negative relationship with total company risk. Further I show that the screening and monitoring that comes with use of secured long term debt lowers primarily idiosyncratic risk. Subsequently I examine the relationship between observable property liquidity risk during the lender screening process. Prior studies predicted mortgages to be extended on better quality assets (see Stulz and Johnson (1985), Boot et al. (1991)). I find that lenders extend non-recourse secured debt (mortgages) on lower risk assets. I also find significant evidence of a positive relationship between monitoring and collateral, by using the physical location of the assets.

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Table 1: Summary Statistics

The table presents summary statistics for the sample of firm quarterly observations from 2000 Q1 to 2012 Q4. Size is calculated as a natural log of Market Value. Market Value is Calculated as Total Assets less Book Equity plus Market Equity. Leverage is calculated as Total Debt divided by Market Value. Mortgage is a percentage of Total Debt that is Mortgages. Mortgage Balances were collected from SNL and the missing observations (30%) were hand collected from quarterly reports. Profitability is FFO scaled by Total Assets. Equity Issue, Equity Purchase, Unsecured Bond Issue and Debt Rating are a 0/1 variables. Debt Rating service as a proxy for whether or not the REIT has public debt market access. Debt Ratings were obtained from CRSP and provided by Standard and Poors.

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Mortgage	0.605	0.331	0	1	6188
Size	14.306	1.443	8.948	18.11	6188
Leverage	0.447	0.166	0	0.935	6188
Age	38.379	29.545	0	170	6188
MB	1.22	0.327	0.393	3.653	6188
Profitability	0.013	0.021	-0.476	0.742	6162
EquityIssue	0.172	0.378	0	1	6188
EquityRepurchase	0.089	0.285	0	1	6188
BondIssue	0.069	0.254	0	1	6188
DebtRating	0.412	0.492	0	1	6188

Table 2: REIT Mortgage Use and Leverage

The table shows the quarterly summary statistics. The total number of unique REITs in the sample is 216. The number of REITs for each quarter is shown in column 4. Mortgage is the mean proportion of Mortgage Indebtness to Total Debt across all REITs for the quarter, shown in Column 3. Leverage across all REITs is shown in Column 4. Leverage is calculated as Total Debt divided by Market Value. Market Value is Calculated as Total Assets less Book Equity plus Market Equity. Instances of Bond and Equity Issues are shown in Column 5 and 6 respectively, obtained from SNL and compensated with hand collected data from Lexus Nexis.

	n	Mean Mortgage	Mean Leverage	BondIssue	EquityIssue
2000Q1	117	55%	50%	0	4
2000Q2	118	56%	49%	0	2
2000Q3	121	58%	48%	2	3
2000Q4	120	57%	49%	4	4
2001Q1	123	57%	48%	11	2
2001Q2	124	58%	46%	6	18
2001Q3	122	57%	46%	4	12
2001Q4	120	57%	47%	3	15
2002Q1	121	58%	47%	3	19
2002Q2	121	60%	45%	4	20
2002Q3	120	59%	46%	8	5
2002Q4	110	59%	48%	9	5
2003Q1	118	60%	49%	12	4
2003Q2	117	63%	47%	10	15
2003Q3	117	63%	45%	4	20
2003Q4	116	61%	43%	8	20
2004Q1	120	64%	42%	14	24
2004Q2	120	65%	42%	8	10
2004Q3	124	65%	42%	13	17
2004Q4	129	66%	40%	5	19
2005Q1	133	66%	41%	9	10
2005Q2	135	65%	42%	12	11
2005Q3	135	66%	40%	8	22
2005Q4	134	64%	41%	12	15
2006Q1	131	64%	40%	10	16
2006Q2	133	64%	40%	8	20
2006Q3	127	63%	40%	22	17
2006Q4	119	63%	39%	13	18
2007Q1	117	61%	39%	16	13
2007Q2	113	60%	39%	12	9
2007Q3	108	59%	42%	6	4
2007Q4	109	59%	43%	4	11
2008Q1	110	59%	46%	2	11
2008Q2	108	58%	45%	2	15
2008Q3	109	58%	46%	2	20
2008Q4	107	58%	55%	1	12
2009Q1	107	59%	60%	1	8
2009Q2	107	60%	56%	5	49
2009Q3	107	61%	52%	11	33
2009Q4	108	60%	50%	6	31
2010Q1	111	59%	47%	14	34
2010Q2	113	60%	43%	12	46
2010Q3	115	61%	44%	14	39
2010Q4	118	60%	43%	14	39
2011Q1	120	62%	41%	10	49
2011Q2	121	61%	41%	11	47
2011Q3	121	61%	43%	3	37
2011Q4	123	60%	45%	8	27
2012Q1	124	60%	43%	10	43
2012Q2	123	59%	42%	10	40
2012Q3	123	58%	41%	19	47
2012Q4	121	56%	41%	15	34
All	216	60%	45%	430	1065

Table 3: Total Risk and Mortgage Use

The table presents OLS results where the dependent variable is Total Risk. *TotalRisk* is defined as the standard deviation of REIT returns calculated quarterly from daily values.*Mortgage* is the ratio of Mortgage debt to Total Debt (as collected from quarterly reports and SNL), *Leverage* is the ratio of total debt reported to the market value of the company. 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. *Debt Rating* is a binary variable that indicates whether the company had a debt rating (obtained from Compustat). *Age* of the company is the latter of a company going public or obtaining REIT status. Size is the natural log of Total Assets. [4] Quarter controls are included in regressions 1, 2 and 4. White's heteroscedastic consistent standard errors are reported in parenthesis.

	(1) OLS	(2) OLS Controls	(3) Time Series	(4) Cross Sectional
Mortgage	-0.00469***	-0.00785***	-0.00587***	-0.00850***
	(-6.32)	(-9.04)	(-4.45)	(-3.88)
Leverage	0.0401***	0.0398***	0.0720***	0.0102*
	(17.52)	(17.36)	(35.49)	(2.22)
DebtRating		-0.00128	-0.00295*	-0.00258
		(-1.96)	(-2.42)	(-1.64)
FFOovTA		-0.0272	-0.0175	-0.401***
		(-1.42)	(-1.80)	(-5.43)
Age		0.00000620	0.000433***	0.0000223
		(0.74)	(20.62)	(1.09)
Size		-0.00145***	-0.00650***	-0.000936*
		(-5.97)	(-10.83)	(-2.15)
qtr	Yes	Yes	No	Yes
N	6188	6162	6162	6162
R^2	0.173	0.190	0.249	0.284

Table 4: REIT Beta

This table provides OLS results where Beta is estimated using Equation 1 for each REIT/quarter using daily stock prices from CRSP and CRSP value weigthed market index. The dependent variable is the REIT stock market return. The CRSP value weighted market index serves as a proxy for market return. The number of observations reflects daily stock prices used to estimate quarterly Beta for each REIT.

	(1)
	ret
Market Index	0.927***
	(337.04)
_cons	0.000588***
	(16.15)
N	460546
R^2	0.198

Table 5: Systematic Risk and Mortgage Use

This table provides OLS results for Equation 2. The dependent variable is Beta, used as a measure of systematic risk, estimated in Equation (1) for each REIT/quarter. T-statistics (in parentheses) are based on White's heteroscedastic consistent standard errors. Size is calculated as a natural log of Market Value. Market Value is Calculated as Total Assets less Book Equity plus Market Equity. Leverage is calculated as Total Debt divided by Market Value. Mortgage is a percentage of Total Debt that is Mortgages. Profitability is FFO scaled by Total Assets. The estimators include quarter controls in equations 1 and 2. Column 3 includes firm fixed effects.

	(1) OLS	(2) OLS Controls	(3) Time Series
Mortgage	-0.224***	-0.0385	0.00771
	(-9.76)	(-1.63)	(0.19)
Leverage	0.512***	0.502***	1.240***
	(7.90)	(8.08)	(19.44)
Profitability		-0.525	-0.934**
		(-1.78)	(-3.06)
Age		0.000839***	0.0218***
		(3.35)	(33.02)
Size		0.126***	0.0438*
		(23.33)	(2.32)
qtr	Yes	Yes	No
Observations	6188	6162	6162
R^2	0.297	0.366	0.312

Table 6: Idiosyncratic Risk and Mortgage Use

The dependent variable is the residual estimated in Equation (4) for each REIT/quarter. Size is calculated as a natural log of Market Value. Market Value is Calculated as Total Assets less Book Equity plus Market Equity. Leverage is calculated as Total Debt divided by Market Value. Mortgage is a percentage of Total Debt that is Mortgages. Mortgage Balances were collected from SNL and the missing observations (30%) were hand collected from quarterly reports. Profitability is FFO scaled by Total Assets. T-statistics (in parentheses) are based on White's heteroscedastic consistent standard errors. The estimators include quarter controls in all equations. Column 3 includes REIT level clusters.

	(1) OLS	(2) OLS Controls	(3) Time Series	(4) Cross Sectional
Mortgage	-0.0155***	-0.0269***	-0.0225*	-0.0331**
	(-3.36)	(-5.96)	(-2.57)	(-3.08)
Leverage	0.168***	0.163***	0.271***	0.0150
	(9.11)	(8.85)	(19.59)	(0.57)
Profitability		-0.236	-0.111	-3.085***
		(-1.81)	(-1.68)	(-7.31)
Age		0.0000483	0.00125***	0.0000818
		(0.69)	(8.73)	(0.70)
Size		-0.00813***	-0.0275***	-0.00567**
		(-3.75)	(-6.79)	(-2.61)
qtr	Yes	Yes	No	Yes
Observations	6188	6162	6162	6162
R^2	0.064	0.077	0.083	0.311

Table 7: Risk Characteristics

The table presents an overview of property type classifications as provided by SNL. Theses were assigned Risk Type Characteristics based on the major property type as shown. The Property Quarter observations reflected are for assets acquired from 2000 to 2012 by the REITs defined in the sample. Each property is observed for the time period it is owned by the REIT. The sample represents 60,160 individual properties.

Panel A Property Type Risk Characteristics

SNL Property Type	Risk Type	Number of Observations
Multi-family	Multifamily	44,916
Office	Office	71,094
Regional Mall	Retail	8,002
Retail: Other	Retail	70,739
Shopping Center	Retail	60,600
Industrial	Industrial	41,936
Health Care	Other	61,084
Hotel	Other	16,533
Manufactured home	Other	7,755
Multi-use	Other	5,346
Self-Storage	Other	40,537
Specialty	Other	47,899
Total		476,441

Panel B: MSA Type Risk Characteristics

Property location was obtained from SNL. Standard Metropolitan Statistical Area population numbers were obtained from the 2000 Census. Cities were sorted into five groups by sMSA population, with cut offs provided in the table below.

Risk	**MSA Description**	**MSA Examples**
1	Population Gateway MSAs $>$ 5 million residents	New York, Los Angeles etc
2	Population MSAs $>$ 5 million residents	Chicago, Dallas etc
3	1 million residents $<$ Population MSA $<$ 5 million	Includes Houston, Atlanta, Phoenix
4	500,000 residents $<$ Population MSA $<$ 1 million	El Paso, TX; Syracuse, NY etc
5	500,000 $<$ Population MSA	Reno, NV; Flint, MI etc

Table 8: Probability of Property Encumbrance

This table provides probit results where the the dependent variable is a binary variable indicating whether or not a given asset is encumbered by a mortgage. Encumbrance data is provided by SNL. Controls for all property types are included and the omitted property type is Multifamily. MSA Type Risk Definition is provided by Table 7. Quarter controls are included.

	(1) Mortgage	(2) Mortgage
Office Property Type	0.386***	
	(37.29)	
Retail Property Type	0.332***	
	(34.64)	
Industrial Property Type	-0.252***	
	(-18.63)	
Other Property Type	-0.448***	
	(-43.01)	
MSA Type Risk		-0.0695***
		(-33.63)
qtr	Yes	Yes
Observations	476441	476328

Table 9: Probability of Property Encumbrance with Controls

This table provides results where the the dependent variable is a binary variable indicating whether or not a given asset is encumbered by a mortgage. The regression is estimated using Probit. Encumbrance data is provided by SNL. MSA Type Risk Definition is provided by Table 7. Controls for all property types are included and the omitted property type is Multifamily. Portfolio Disposition, Portfolio Acquisition and Merger Y/N are binary variables. Quarter controls are included in all specifications.

	(1)	(2)	(3)
	est1	est2	est3
MortgDummy			
Property Type Office	0.401***		0.403***
	(34.22)		(34.28)
Property Type Retail	0.453***		0.488***
	(41.68)		(44.28)
Property Type Industrial	-0.215***		-0.211***
	(-13.64)		(-13.42)
Property Type Other	-0.266***		-0.238***
	(-22.00)		(-19.50)
Portfolio Disposition	0.129***	0.0955***	0.142***
	(16.39)	(13.13)	(18.02)
Portfolio Acquisition	0.0184**	0.104***	0.0263***
	(2.64)	(15.58)	(3.78)
Acquired through Merger? Yes/No	0.0285**	0.111***	0.0300**
	(2.74)	(11.10)	(2.88)
MSA Type Risk		-0.0519***	-0.0606***
		(-20.80)	(-23.19)
qtr	Yes	Yes	Yes
Observations	299458	299356	299356
R^2			

z statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: Monitoring and Probability of Property Encumbrance
This table provides probit results where the the dependent variable is a binary variable indicating whether or not a given asset is encumbered by a mortgage. Encumbrance data is provided by SNL. MSA Type Risk Definition is provided by Table 7. Controls for all property types are included and the omitted property type is Multifamily. Quarter controls are included in all specifications.

	(1)	(2)	(3)
Monitoring	-0.000329***	-0.000292***	-0.000268***
	(-85.49)	(-64.79)	(-58.55)
Portfolio Disposition		0.0753***	0.132***
		(10.24)	(16.57)
Portfolio Acquisition		0.113***	0.0405***
		(16.75)	(5.75)
Acquired through Merger? Yes/No		0.0888***	0.00864
		(8.83)	(0.82)
MSA Type Risk			-0.0477***
			(-18.04)
Office Type			0.354***
			(29.77)
Retail Type			0.495***
			(44.37)
Industrial Type			-0.247***
			(-15.52)
Other Property Type			-0.221***
			(-17.92)
qtr	Yes	Yes	Yes
Observations	474880	297909	297807

Table 11: Robustness: Idiosyncratic Risk and Access to the Public Debt Markets
To verify that access to the public debt markets is not driving the result, REITs without public debt are excluded. The regression shows only REITs with access to the public debt markets (proxied for by whether or not the REIT has a debt rating). Idiosyncratic risk, the residual estimated in Equation (4) is the dependent variable. Size is calculated as a natural log of Market Value. Market Value is Calculated as Total Assets less Book Equity plus Market Equity. Leverage is calculated as Total Debt divided by Market Value. Mortgage is a percentage of Total Debt that is Mortgages. Mortgage Balances were collected from SNL and the missing observations (30%) were hand collected from quarterly reports. Profitability is FFO scaled by Total Assets.

	(1)
	Idiosyncratic Risk
Mortgage	-0.0265***
	(-3.31)
Leverage	0.115***
	(3.44)
Profitability	-1.297*
	(-2.14)
Age	-0.0000340
	(-0.86)
Size	-0.00361**
	(-3.08)
qtr	Yes
Observations	2552
R^2	0.137

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12: Robustness: Stage 1. Likelihood of public market access

The first stage regression is estimated using Probit. Debt Rating is a binary dependent variable. Percentinsider is the bumber of shares owned by management scaled by the total number of shares outstanding. Age of a REIT is calculated in quarters. Growth opportunities is calculated as the market value divided by book value. Market Value is Calculated as Total Assets less Book Equity plus Market Equity. Prcntcash is Cash scaled by Total Assets. Mortgage is a percentage of Total Debt that is Mortgages. Profitability is FFO scaled by Total Assets. Lender Survey is provided by Federal Reserve Board of St. Louis. Line of Credit Utilization is the proportion of Line of Credit Outstanding to Line of Credit available. Quarter controls are included to account for time varying market conditions.

percentinsider	-1.488***
	(-4.45)
Age	0.0364***
	(16.35)
Age Squared	-0.000226***
	(-14.13)
Growth Opportunities	-0.244**
	(-3.08)
Prcntcash	-5.930***
	(-7.69)
Mortgage	-3.070***
	(-38.36)
Lender Survey	-0.00358*
	(-2.55)
Line of Credit Utilization	-1.408***
	(-16.04)
qtr	Yes
Observations	4843
Pseudo R^2	0.404

Table 13: Robustness: Idiosyncratic Risk and Access to the Public Debt Markets
The fitted values are used in the second stage regression. Idiosyncratic risk, the residual estimated in Equation (4) is the dependent variable. Size is calculated as a natural log of Market Value. Market Value is Calculated as Total Assets less Book Equity plus Market Equity. Leverage is calculated as Total Debt divided by Market Value. Mortgage is a percentage of Total Debt that is Mortgages. Profitability is FFO scaled by Total Assets. T-statistics (in parentheses) are based on White's heteroscedastic consistent standard errors.

	(1) Idiosyncratic Risk
Pr(DebtRating)	-0.0173**
	(-3.20)
Mortgage	-0.0347***
	(-6.31)
Leverage	0.114***
	(20.28)
Size	-0.00590***
	(-8.48)
Profitability	-0.226***
	(-3.91)
qtr	Yes
Observations	4843
R^2	0.124

Table 14: Robustness: Property Types: Detail

The table reflects individual property type probabilities of encumbrance. The dependent variable is binary, indicating whether or not a given asset is encumbered by a mortgage. Specialty property type is ommitted. Equation is estimated using Probit and includes quarter time controls.

	(1) MortgDummy
MortgDummy	
HealthCare	-0.152***
	(-9.43)
Hotel	0.840***
	(50.98)
Industrial	0.208***
	(13.44)
Manufacturedhome	-0.791***
	(-12.69)
Multifamily	0.466***
	(32.65)
Multiuse	0.0812*
	(2.39)
Office	0.857***
	(67.27)
RegionalMall	2.086***
	(114.94)
RetailOther	0.0950***
	(6.62)
SelfStorage	-0.910***
	(-27.59)
ShoppingCenter	1.039***
	(81.36)
N	476441
pseudo R^2	0.151

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1: The histogram below showcases the frequency of mortgage use, or the popularity of it as a debt instrument among REITs.

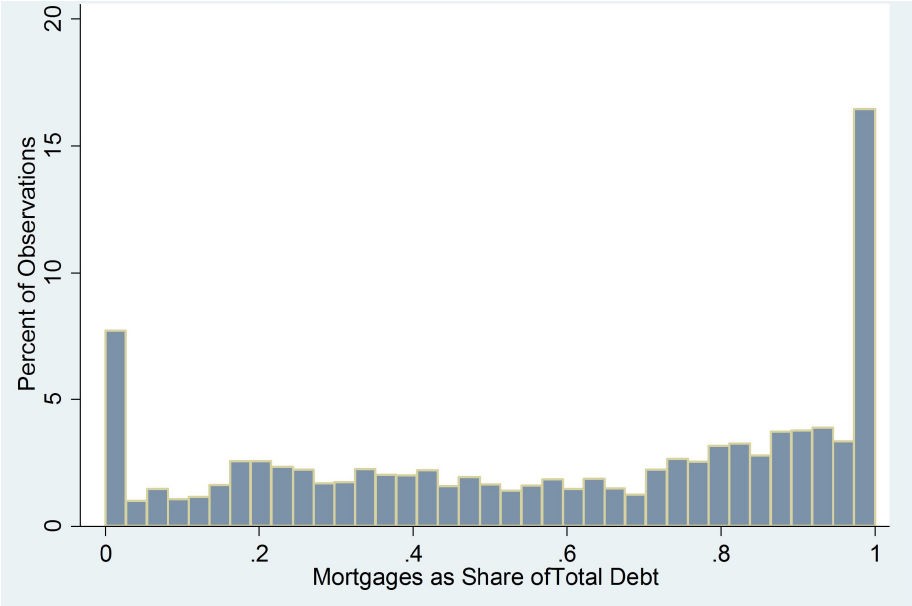

Figure 2: The figure below outlines the property portfolio of HCP, a healthcare REIT located in Irvine, CA

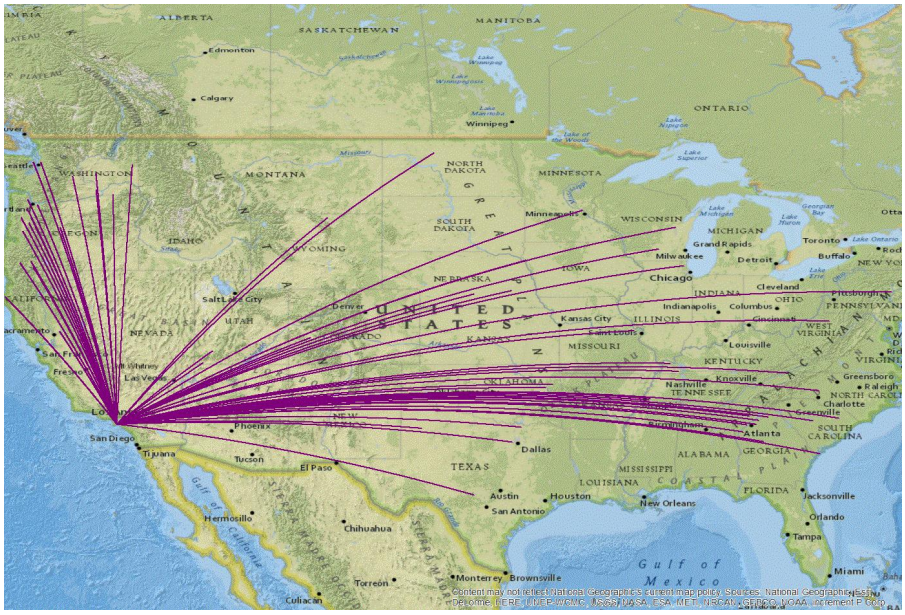

Figure 3: The figure below outlines historical cap rates by property type