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Real Assets, Liquidation Value and Choice of Financing

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Abstract
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Keywords
asset quality, liquidation, real estate investment trusts (REITs), commercial real estate

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The financial crisis of 2007 to 2009 was arguably triggered by the collapse of the U.S. housing bubble. In the years leading up to the outbreak of the crisis, asset quality of subprime mortgages were assessed improperly. This led to excessive cheap credit to financial institutions and house owners with low credit worthiness, which subsequently exacerbated the impact of the housing slump. Tremendous efforts have since been devoted to enhancing the stability of financial markets. However, research on how to fairly assess asset quality is scarce. This article seeks to fill this gap by proposing three novel firm-level measures of asset quality. Using these measures, we directly examine how asset quality, through its link to liquidation values, affects financing decisions of real estate investment trusts (REITs).

Market participants have long recognized the importance of asset quality in the price formation process in financial markets. Asset quality as defined in our study includes tenant quality and the diversity of industries in a given location. The latter factor is commonly known as the economic base and it measures the firesale effect proposed by Shleifer and Vishny (1992). The actions of Bill Ackman, the CEO of hedge fund Pershing Square Capital Management LP, represent one example of market participants' recognition

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of the quality–price relationship. In an October 6, 2009, presentation of Realty Income (ticker symbol O) entitled "'O' No!," Ackman announced that he was shorting the REIT because he believed that Realty Income Corp had issues with tenant quality. As evidence of poor tenant quality/credit ratings, his presentation noted that not only was there a high concentration of discretionary, regional retail tenants (such as casual dining restaurants, movie theaters, and day care centers.) that had been hit hard in the recession, but there were also some of the largest tenants having junk or unrated credit ratings with high leverage (bankruptcy potential). In addition to this, the report goes on to say that "unlike many other REITs, Realty Income does not disclose its tenants.[1] There is limited transparency as to: names of tenants, credit of tenants, average credit rating of total tenant pool, and individual tenant contribution to revenue. Analysts and investors have asked for more tenant disclosure, but the Company has refused. Question: Why? Answer: We believe that O's tenant quality is poor and the company is concerned about the impact of transparency on its stock price." This suggests to Mr. Ackman that the dividend will probably get cut and investors will be hurt.[2]

Asset quality is not only important in predicting future REIT performance but it is also a critical factor in the asset liquidation process. The key objective of the FDIC resolution process is to identify and implement the disposition of the failed financial institution's assets that is least costly to the deposit insurance fund. According to Schiffman (2009), the FDIC recognizes asset quality as a determinant in setting the reserve price because this is one factor used to group assets into pools. The reserve price (minimum bid) is then assigned based on the value of the underlying collateral of each pool to achieve the maximum recovery in liquidation. Besides this, in an April 12, 2007, report entitled "INDUS (ECLIPSE 2007-1) plc," the bond rating agency DBRS[3] was of the opinion that

"*property quality grades of above average or excellent ... are more capable of retaining and attracting tenants and thus more liquid in a stressed market... The highest-quality properties within a market have lower probabilities of default because they are more likely to be viable and attractive to new tenants,*

[1]For comparison purposes, Ackman notes that "Simon Property Group, for example, discloses tenants representing as little as 0.2% of its minimum rental income."

[2]Once word of his presentation got out, shares were down over 7% at one point on Wednesday.

[3]DBRS is a rating agency that rates companies and single-purpose vehicles that issue commercial paper, term debt and preferred shares in the global capital markets. For further information, please visit http://www.dbrs.com/about.

increasing cash flow stability. To evaluate property quality, DBRS considers the location, the functional utility of the asset ..."

The recent bankruptcy of mall operator General Growth Properties (GGP) provides further evidence of the impact that asset quality has on the value of real estate. Faced with dwindling options for managing its $25+ billion in short-term mortgage debt coming due within a year, GGP filed for bankruptcy on April 16, 2009. It was the largest real estate bankruptcy since 1980. In commenting on GGP's bankruptcy, the *New York Times* noted that "Few analysts dispute the quality of General Growth's malls, which include the Ala Moana Center in Honolulu, Water Tower Place in Chicago and the Grand Canal Shoppes at the Venetian in Las Vegas. But its undoing was the mounting pile of short-term mortgages the operator used to expand." GGP's high-quality assets resulting from high-quality tenants and prime locations resulted in a bidding war between Simon Property Group and Brookfield Asset Management with the former suitor raising its price three times in their unsuccessful bid. Given its asset quality, GGP was able to negotiate one large equity commitment instead of trying to sell off assets piecemeal during its reorganization. According to Chris Macke, senior real estate strategist with the CoStar Group, "Trying to sell the malls one by one would likely have taken much longer than a year and might have forced the company to accept deep discounts on its assets." The impact that asset quality had on GGP's reorganization is consistent with Shleifer and Vishny's (1992) liquidation value theory: with good assets, not only do its competitors want their assets, but also debt capacity is higher, which is why GGP was in trouble. Due to good asset quality, GGP left bankruptcy on November 8, 2010, splitting itself into two independent and publicly traded companies.[4]

Using prior research[5] as our starting point, we examine the relation between a firm's financing choice and determinants of its liquidation value with an

[4]Its namesake, an REIT (the New GGP) comprised of 170 core regional malls and 65 additional properties (strip centers and offices that will be sold) and Howard Hughes Corp., (NYSE:HHC), an operating company focusing on the development of master planned communities and shopping centers.

[5]Our work builds on earlier research that empirically tests the effect of liquidation value on a firm's capital structure choices. For example, Benmelech and Bergman (2008), who study the U.S. airline industry and Benmelech (2009), who examines the 19th century American railroad industry, find that firms with more saleable real assets and redeployable collateral tend to have lower costs of external financing and longer maturities associated with debt financing. Almeida and Campello (2007) gauges the expected liquidation value of firm's main categories of operating assets using various measures of asset tangibility. In a dynamic model of collateralized firm financing framework, Rampini and Viswanathan (2010) predicts that firms with low net worth exhaust their debt capacity and hedge less.

emphasis on asset quality. We propose three firm-level measures of asset quality. First, motivated by the aforementioned anecdotal evidence, we focus on tenant quality rather than the potential buyers of a firm's assets. This measure proxies for the sustainability of the cash flows associated with the assets over the business cycle. Second, we look at the firesale discount of a firm's assets by constructing a measure of asset liquidity using information on the local economy. More liquid assets should experience less firesale discount in liquidation (Shleifer and Vishny 1992) and hence be of higher quality. Finally, we utilize historical loss severity rates from similar liquidation events.

The rationale for these measures goes to the issue of value in best use. The value of assets is reflected by their ability to generate cash flow. In our case, real estate properties generate cash flows through a bundle of existing and future lease contracts. Consequently, tenant quality and the economic base of the local real estate markets affect whether asset sales are at prices below the value in best use. Because real estate properties are fixed in location, the health of the local economy influences the cash flow of the tenant and hence its decision to remain in its contract. Therefore, potential buyers face a decision on assessing the value in best use, given the quality of the asset in question relative to the desirability of the local region. This emphasis is the distinguishing feature of our study. We theoretically prove and empirically test the notion that asset quality, which we measure by tenant quality, together with the industry concentration structure of the local real estate market, determines the liquidation value of an REIT and its financing choices. Our fundamental measures of asset liquidation value include the industry concentration of local markets, which more accurately captures the long-term zoning flexibility notion of Benmelech, Garmaise and Moskowitz (2005) and a measure of tenant quality, which reflects the short-run or intermediate-term asset quality.

In addition to their close relation to the financial crisis of 2007 to 2009, we choose to focus on real estate firms rather than general corporations to analyze the role of asset liquidation values in a firm's financing decisions for the following reasons. First, real estate firms, with their unique features, provide an identification framework for general finance theories in the prior literature. As Benmelech, Garmaise and Moskowitz (2005) note, the real estate market is a natural candidate for testing financial contracting, given its high levels of debt coupled with potential measures of an asset's liquidation value, which is usually difficult to ascertain *ex ante*. They use commercial real estate to test Shleifer and Vishny's (1992) hypothesis on the firesale effect. In addition, REITs are more homogeneous and offer greater transparency (Capozza and Seguin 1998, Chui, Titman and Wei 2003, Kallberg, Liu and Pasquariello

2008) with respect to their operations and assets. The comparative advantage of using REITs is that the productivity, asset quality and other asset characteristics, all critical characteristics in determining an asset's liquidation value and optimal financing choice of a project, are observable on the asset (property) level (Liu 2010). Moreover, real estate constitutes a nontrivial portion of the assets held on the balance sheets of corporations. According to Chaney, Sraer and Thesmar (2010), 58% of U.S. public firms in 1993 reported at least some real estate ownership, with real estate accounting for 19% of these firms' total market value. Thus, our analysis may provide new insights on the liquidity of assets and liquidation values for other industries with tangible fixed assets (property, plant and equipment, PP&E).

Another distinguishing feature of our study is that we examine firms' new security issuances in the primary markets rather than the commonly used leverage ratios. By focusing on a firm's incremental financing decisions, our approach addresses the persistence problem of leverage ratios (Lemmon, Roberts and Zender 2008), which may yield misleading results (Strebulaev 2007).

The article is organized as follows. In the section "A Stylized Model of Liquidation Value," we provide a stylized model that links a firm's liquidation value to our three measures of asset quality. The model helps us to disentangle the intrinsic asset characteristics from the market proxy for liquidation value, which guides our empirical tests. In the section "Measures of Asset Quality," we discuss in more details our measures of asset quality: tenant quality, firesale discount and the loss severity rate. In section "Data," we describe our sample, and in section "Empirical Analysis" we investigate the relation between financing choices and asset liquidation values. Section "Conclusions" concludes.

A Stylized Model of Liquidation Value

A real estate firm (REIT) operates a portfolio of commercial real estate assets, which generates a constant cash flow[6] of I per unit of time until default. A default event occurs according to a Poisson process with an exogenous hazard intensity of λ.

Federal regulations require that REITs must hold at least 75% of its assets in real estate. Therefore, we assume that the firm's value equals the total value

[6]In reality, net operating income (NOI), which is rental income net of operating expenses, may not be a constant. In an alternative NOI specification we developed, the major result remains the same.

of the assets it holds. We further assume that due to private information, geographical expertise, and reputation developed in operating the portfolio of real assets, the current firm is the first-best owner, in the sense that the real assets under current REIT management generate the highest cash flows until the event of default.

In fact, the informal arguments that link the firm's liquidation value to the best use of assets are often maintained as the following quotation from Shleifer and Vishny (1992) indicate:

"*Because of credit constraints and government regulation of industry buyers, assets would have to be sold to industry outsiders who don't know how to manage them well, face agency costs of hiring specialists to run these assets properly. When industry buyers cannot buy the assets and industry outsiders face significant costs of acquiring and managing the assets, assets in liquidation fetch prices below value in best use, which is the value when managed by specialists*."

Formally, if it defaults, the REIT liquidates its portfolio of real assets as a whole to homogeneous second-best owners in the competitive secondary market. Over time, the new owners gradually obtain private information, develop expertise and rebuild the reputation by managing the assets. Hence, over time, the cash flow reverts to the predefault level. We assume that the cash flow generated under the management of the second-best owner is $(1 - \beta e^{-\kappa t})I$, where $\beta \in (0, 1)$ captures the instant discount of the cash flow at liquidation; κ measures the speed of cash flow recovery to its pre-default level, and t is the length of time after default.

All market participants are risk-neutral and discount future cash flows by the constant risk-free rate, r. The market value of the firm is the sum of the present value of its cash flow until default and the present value of the liquidation value upon default:

$$V_0 = E_0\left[\int_0^{\tau_\lambda} e^{-rs} I \, ds + e^{-r\tau_\lambda} V_1\right], \tag{1}$$

where we assume the current time is zero and denote τ_λ as the time of default. $E_0(\cdot)$ is the expectation taken at time 0. V_1 is the market value of the liquidating real assets at τ_λ. V_1 is the sum of the present value of the cash flows under a new REIT until the next default and the present value of the liquidation value upon the next default:

$$V_1 = E_0\left[\int_0^{\tau'_\lambda} e^{-rt}\left(1 - \beta e^{-\kappa t}\right) I \, dt + e^{-r\tau'_\lambda} V_1\right], \tag{2}$$

where τ'_λ denotes the time between the first and the second defaults. The terminal value is also V_1 because upon the second default, the homogeneous and competitive second-best owners are facing exactly the same situation as the REIT faces at the first default. Solving Equation (2), we get the firm's liquidation value as:

$$V_1 = \frac{I}{r}\left(1 - \beta\frac{r+\lambda}{r+\lambda+\kappa}\right). \tag{3}$$

To make the firm's liquidation value scalable, we normalize the terminal liquidation value V_1 by its current market value V_0. From Equation (1), we can write the current market value as

$$V_0 = \frac{1}{r+\lambda}(I + \lambda V_1). \tag{4}$$

Therefore, the normalized liquidation value is

$$L \equiv \frac{V_1}{V_0} = \frac{(r+\lambda)V_1}{(I+\lambda V_1)}. \tag{5}$$

When we examine the determinants that affect this normalized liquidation value, we find that the larger the normalized liquidation value, L, the more likely the real estate firm is to finance with debt than equity *ex ante*, according to Shleifer and Vishny (1992).

Measures of Asset Quality

The objective of our study is straightforward: we examine the impact of asset liquidation value on a firm's financing decision, which is summarized in the following overarching hypothesis.

The Overarching Hypothesis: An increase in asset liquidation value increases a firm's debt capacity.

To empirically investigate such a linkage, it is essential to measure a firm's liquidation value correctly. Our model presented in the previous section implies that measures of asset quality, namely tenant quality and the firesale discount, are directly related to a firm's liquidation value. Furthermore, prior liquidations of similar assets also provide signals on the liquidation value of a firm. The historical liquidation events are more important if the asset quality and firesale discount are not measurable or are not transparent. In the following subsections, we develop three testable hypotheses linking these measures of asset quality to the likelihood of a debt issuance.

Tenant Quality

Real assets with higher tenant quality generate more stable long-term cash flows. In our model, the new, second-best owner initially incurs additional costs to obtain private information about and to develop a relationship with the tenants. This suboptimal level of cash flows reverts back to the predefault first-best level over time. With high-quality tenants, the process can be considerably shorter because of the stable cash flows. Therefore, tenant quality determines the speed of cash flow recovery κ. It follows from Equations (3) and (5) that

$$\frac{\partial L}{\partial \kappa} = \frac{\beta I^2 (r+\lambda)^2}{r(I+\lambda V_1)^2 (r+\lambda+\kappa)^2} > 0. \tag{6}$$

Equation (6) predicts that tenant quality has a positive effect on the normalized liquidation value.

There are several ways to measure tenant quality with respect to cash flow stability. Tax regulation requires that at least 95% of REIT gross income must come from rental income or other passive investment such as Treasuries. Property value is defined as capitalized future rents, which are contracted in the properties' leases. Therefore, one way to measure cash flow stability is by its lease maturities. For example, a firm's real assets with long-term leases should have higher quality, because future cash flows are more stable for the asset owner over a long time period. However, in reality, the lease term tells only a part of the story. Because the lease maturity and rental payment are results of negotiation between lessor and lessee, they thus reflect a balance between the cash flow stability and option value. Therefore, the lease expiration structure suffers from an endogeneity problem as a proxy for liquidation value.

Liu and Liu (2013) explicitly exam the channels through which the tenant quality impact the performance of its landlord REIT company. Similarly, we argue that tenant credit worthiness is the main driver of asset liquidation value. Our reasoning is that there are also costs associated with long-term leases. When the long-term rent is higher than the market rent, the owner may experience lease defaults. When the long-term rent is lower than the market rent, the owner does not have the option to adjust the rent accordingly. Therefore, short-term leases give the property owner more control over property improvement, restructuring and refinancing flexibility. Furthermore, the lease term and base lease are often bundled with lease escalation, percentage rent and lease options (lease renewal, cancelation option, expansion option, etc.). Without other contract terms such as escalation and the options mentioned

above, the lease maturity itself cannot capture the whole value of the lease contract.

We propose tenants' credit quality as a new measure of tenant quality. Most asset managers believe that the property is only as strong as the tenant (Smith 2009). Under the nondisturbance clause, the tenant will continue to occupy the property and pay rents under the current terms even if the property is sold or is taken over from the current landlord by the creditors. Therefore, when the current owner liquidates its assets, the speed of cash flow recovery κ depends on the creditworthiness of existing tenants. In other words, the liquidation value of a landlord firm depends on the creditworthiness of its tenants. Tenant quality was especially highlighted during the 2007 to 2009 financial crisis. In the case of lease contracts, often referred to as the engines of property values, lease counterparty risk arises when a tenant with low creditworthiness is unable to make rental payments. Therefore, the quality of lease contracts depends on the credit quality of the tenants. A tenant with better quality implies less rental payment risk, which in turn means higher asset quality. We measure asset quality with the revenue-weighted Altman Z score, which we construct using the historical performance of assets, liabilities, and earnings to predict a firm's probability of default.

To construct such a measure, we focus on the major tenants that provide the top 60% of the landlord firm's revenue in aggregate and match all publicly traded tenants to Compustat. We calculate an average tenant Altman Z score weighted by the percentage contribution of revenue of each tenant for every firm in our sample.

Thus, our first testable implication is as follows:

Testable Implication I: An REIT with higher average tenant Z scores has higher asset quality and higher liquidation value. Therefore, an REIT with higher average tenant Z scores tends to finance with debt.

Firesale Discount

One key problem with illiquid assets like real estate is that a hasty liquidation may cause significant private costs to the owner. When a financially constrained real estate firm wants to sell a property in a highly concentrated real estate market, it is likely that potential buyers are in similar financial distress. Consistent with this argument, real estate appraisers typically assume that a rapid sale of real estate leads to a liquidation discount (or firesale discount), because redeployment of the firm's assets is difficult. Shleifer and Vishny (1992) find that the liquidation discount is about 15% to 25% relative to an

orderly sale. Kaplan (1989) cites Merrill Lynch estimates that the distressed sale of the Campeau retail empire would bring about 68% of what an orderly sale would bring.

In our model, we capture such a liquidation discount by β, which represents an immediate drop in the generated cash flows at the time of liquidation. Based on Equations (3) and (5), we get

$$\frac{\partial L}{\partial \beta} = -\frac{I^2(r+\lambda)^2}{r(I+\lambda V_1)^2(r+\lambda+\kappa)} < 0. \tag{7}$$

Therefore, our model predicts a negative effect of the liquidation discount on the normalized liquidation value.

Real estate assets are immobile and location quality is therefore an important component of the asset quality. In our analysis, we measure the firesale discount using an average ratio of the industry concentration of a REIT's top markets. Each local market is defined as a Metropolitan Statistical Area (MSA). The United States Office of Management and Budget (OMB) defines an MSA as one or more adjacent counties or county equivalents that have at least one urban core area of at least 50,000 population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. The OMB has defined 366 MSAs in the United States. For example, the New York metropolitan area (the New York–Northern New Jersey–Long Island MSA), which is the largest MSA in the United States, includes 10 counties in New York State, 12 counties in Northern and Central New Jersey and 1 county in northeastern Pennsylvania. The idea is that REITs that invest in areas with a high industry concentration (less diversified mix of industries in a given locale) may have to offer a deeper discount to sell their assets, because the potential buyers may be suffering the same financial difficulty. For example, the redeployability of real estate assets in Detroit is much lower than in other areas, as most businesses in Detroit are associated with the auto industry.

Using commercial property zoning flexibility as a proxy for liquidation values, Benmelech, Garmaise and Moskowitz (2005) find that higher liquidation values are associated with longer term loans, a smaller number of creditors, higher loan-to-value ratios and lower interest rates. Although the flexibility in zoning designation that governs permitted uses of a property, is associated with the potential level of property redeployability, such effects tend to influence the liquidation value primarily in the long run. In fact, the flexibility option alluded to in Benmelech, Garmaise and Moskowitz (2005) is typically out of the money except when the age of the building is such that the building

is in need of rehabilitation or can be torn down. Due to the long-term durability of the real estate asset, when facing financing choices firms may be more interested in the determinants of liquidation value at short or intermediate horizons. In the short or intermediate term, there is a greater emphasis around asset quality such as the quality of tenants in a space. In a long-run market equilibrium, the zoning restriction and the local economic base should be integrated in a region that provides a unique industry structure. Therefore, the industry concentration structure captures the long-run attractiveness of a market.

To construct a proxy of location quality, we first obtain the top 10 markets for each REIT. Following Liu and Liu (2013), for each MSA we calculate a Herfindahl–Hirschman Index (*HHI*), $HHI = \frac{\sum_{i=1}^{N} E_i^2}{(\sum E_i)^2}$, where E_i is the number of employees in each industry category of a particular MSA. A higher *HHI* means a higher industry concentration (Hirschman 1964). Doing so makes it possible for us to measure the extent of local real estate market diversification and industry concentration. If the labor force is wholly concentrated in a single industry, then the index is one. With the revenue-weighted average of the local market HHI as a proxy for the firesale discount, we have our second testable implication.

Testable Implication II: A higher industry concentration for an REIT's property market is associated with a higher firesale discount upon liquidation. Therefore, firms with lower average industry concentration ratios are more likely to finance with debt.

If the market is more or less efficient, some of the information about asset quality and attractiveness of real estate markets should be priced in realized liquidations. We also test our hypotheses by using the realized loss severity rate on securitized commercial mortgages.

Loss Severity Rate

Does past liquidation events predict future liquidation value for similar assets? If the asset quality and the firesale discount are able to capture the future liquidation value, the information from past foreclosures should be already captured. However for firms whose properties are occupied by short-term transient tenants or nonpublic corporate tenants, the role of historical liquidation value will be more pronounced. Assuming that the historical liquidations are indicative of future loss severity, we compute a firm-level index using realized loss severity rate of publicly traded commercial mortgage backed security (CMBS) as a proxy of REITs' asset liquidation value. The loss

severity rate of a defaulted CMBS is defined as the present value of its lifetime losses (both interest and principal losses) as a percentage of principal balance, measured at either the origination date or the default date.

We note that there may be some difference in liquidation values between properties collateralized in portfolio loans compared to those securitized in CMBS deals. However, the loss severity rates extracted in CMBS deals still provide a useful market measure for liquidation value across property types and over time. Thus, as a measure of loss severity, we exploit the average loss severity by property type from foreclosed real assets in securitized CMBS deals, provided by the U.S. structured products research of LehmanLive.[7] We build a loss severity indicator for each REIT according to its real asset exposure to test our third implication. This indicator serves as a consistency check on our prior tests.

Testable Implication III: A lower realized CMBS loss severity rate of a REIT indicates higher asset liquidation value. Therefore, firms with lower realized CMBS loss severity are more likely to finance with debt *ex ante*.

Data

The variable of interest is the choice of incremental financing, *i.e.*, debt or equity. The data on REITs' incremental financing decisions are from SNL Real Estate, which covers all equity REITs' public security offerings from January 2000 through December 2009. SNL Real Estate provides detailed information on REIT investments, firm financial characteristics, as well as information on geographical distribution of properties and tenant exposures; most of this information is not available on Compustat.

There are 2,150 new issues, including 921 bond issues and 1,229 equity issues from 183 REITs during the 2000 to 2009 period. We derive accounting information, such as total book assets, total debt and returns on average assets, from Compustat, complemented when necessary by SNL Real Estate. Among the three components of our liquidation value measures, two reflect fundamental measures of asset quality: the tenant quality and location quality. However, because some properties (*e.g.*, hotels and apartments) do not have corporate tenants whose stock is publicly traded, the final sample contains

[7]LehmanLive becomes Barclays Capital Live after the Lehman Brothers was liquidated and acquired by Barclay Capital in 2009. We also use a similar index from Standard and Poor's CMBS Quarterly Insights. The results are essentially the same. We thank John Harding for providing Standard and Poor's CMBS quarterly data of loan defaults and losses.

1,043 new offerings, which consist of 484 bond issues and 559 equity issues from 102 REITs. On average, there is one issue per firm per year. For properties that are run by an operating company,[8] or are mixed use, we use the operator's quality to represent the tenant quality. We believe that for hotels, apartments and other property types with transient tenants, a property managed by a more efficient operator should have higher asset quality.[9] In the robustness checks, the historical loss severity rate is used, which has 1,300 observations.

Table 1 reports the descriptive statistics of security issuances by equity REITs between January 2000 and December 2009. Panel A reports the number of issuances and the number of firms that issue securities by REIT property type. SNL Real Estate defines eight property types: retail (including shopping centers, regional malls and other retail outlets), office, industrial, apartment, lodging, health care, diversified, and other special property types. Because most REITs invest in only one type of real estate, the industry often classifies REITs by the property type on which they focus. Panel B reports the number of issuances and the number of firms that issue securities by issuing year. Total issuance of public offerings is clustered in offices and shopping centers. There is also an apparent time variation in the average number of security issues per firm. The average peaks in 2004 with 179 total issues.

Table 2 presents the distribution of new security issues by REIT property focus (panel A) and by issuing year (panel B). REITs that choose to issue bonds are larger in size than REITs that issue equity. This phenomenon is consistent with the general notion that large firms are more likely to have access to the bond markets than small firms. The apartment sector, which has special access to the debt market through government-sponsored enterprises (GSEs), and the office and retail sectors, have the most debt offerings per firm. The health care[10] and apartment sectors, which normally do not have long-term tenants, have the most equity offerings per firm. The sample for the 2004 to 2005 period had the highest issuing intensity in debt with three bond offerings per firm. Over the 2006 to 2008 period, there were more equity issues per firm (almost two issues per firm) then debt issues.

[8]For example, some hotel properties of Hospitality Properties Trust (HPT) are run by Hyatt Hotel Corp., or Intercontinental Hotels Group.

[9]For example, branded management companies (operators) such as Marriott define quality standards under which the hotel must operate. Quality standards include a property improvement plan (PIP), known in finance as capital expenditures necessary to maintain not only the value of the hotel, but also the brand reputation of the hotel operator.

[10]Health care sector include senior housing and assisted-living facilities.

Table 1 ■ Firm and issue characteristics.

Panel A: Firm and Issue Characteristics by Property Type							Panel B: Firm and Issue Characteristics by Issuing Year						
	Total		Debt Offerings		Equity Offerings			Total		Debt Offerings		Equity Offerings	
Property Type	# of Issues	# of Issuers	# of Issues	# of Issuers	# of Issues	# of Issuers	Year	# of Issues	# of Issuers	# of Issues	# of Issuers	# of Issues	# of Issuers
Retail													
Shopping Center	206	19	97	12	109	18	2000	46	20	37	14	9	8
Regional Mall	89	9	43	4	46	9	2001	87	48	40	21	47	34
Other Retail	14	3	3	1	11	3	2002	118	53	56	31	62	39
Office	251	21	155	14	96	19	2003	150	59	56	23	94	53
Industrial	81	9	40	7	41	9	2004	179	59	99	30	80	45
Apartment	61	3	38	3	23	3	2005	123	46	79	28	44	27
Hotel/Motel	119	15	46	5	73	14	2006	122	50	59	33	63	34
Health Care	116	8	35	6	81	8	2007	66	35	28	20	38	22
Diversified	72	10	18	4	54	10	2008	54	28	9	6	45	25
Others	34	5	9	4	25	4	2009	98	50	21	15	77	48
Total	1,043	102	484	60	559	97	Total	1,043	448	484	221	559	335

This table reports descriptive statistics of security issuances by equity REITs during the period January 2000 to December 2009. Panel A reports number of issuances and number of firms issuing securities by REIT investment types. Panel B reports number of issuances and number of firms issuing securities by issuing years.

Table 2 ■ Summary statistics on new issues of REITs.

Panel A: Summary Statistics of REIT New Issues by Property Type

	Debt Offerings				Equity Offerings			
	# of Issues	Size ($million)			# of Issues	Size ($million)		
Property Type	per Firm	Mean	Median	*SD*	per Firm	Mean	Median	*SD*
Retail								
Shopping Center	8.08	116.63	100.00	110.09	6.06	95.53	60.00	114.94
Regional Mall	10.75	458.13	400.00	256.33	5.11	188.21	100.36	231.45
Other Retail	3.00	160.00	130.00	79.37	3.67	62.61	50.00	38.61
Office	11.07	168.77	113.00	215.34	5.05	138.65	88.86	132.14
Industrial	5.71	128.27	87.50	149.21	4.56	76.19	46.25	161.31
Apartment	12.67	131.05	100.00	101.36	7.67	74.34	71.75	51.40
Hotel/Motel	9.20	323.15	300.00	199.70	5.21	117.70	80.64	115.67
Health Care	5.83	217.77	200.00	139.53	10.13	128.35	90.00	134.49
Diversified	4.50	332.35	250.00	349.84	5.40	95.63	52.75	171.47
Others	2.25	147.28	100.00	169.06	6.25	100.55	80.00	66.56

Table 2 ■ Continued.

Panel B: Summary Statistics of REIT New Issues by Issuing Year

	Debt Offerings				Equity Offerings			
	# of Issues	Size ($million)			# of Issues	Size ($million)		
Year	per Firm	Mean	Median	*SD*	per Firm	Mean	Median	*SD*
2000	2.64	110.57	30.00	151.40	1.13	99.30	41.13	184.72
2001	1.90	224.18	200.00	207.33	1.38	93.75	60.80	95.00
2002	1.81	152.77	137.50	145.77	1.59	64.92	38.02	75.73
2003	2.43	167.72	137.50	168.50	1.77	80.16	60.00	75.22
2004	3.30	126.24	100.00	141.36	1.78	111.78	75.00	123.26
2005	2.82	161.18	120.00	181.80	1.63	98.81	73.84	123.03
2006	1.79	324.15	275.00	247.16	1.85	171.36	110.30	206.05
2007	1.40	409.93	300.00	350.12	1.73	143.95	143.71	111.35
2008	1.50	412.00	500.00	305.73	1.80	135.17	90.95	141.90
2009	1.40	333.81	260.00	196.07	1.60	156.77	89.25	202.43

This table reports descriptive statistics of security issuances by equity REITs during the period January 2000 to December 2009. Panel A reports average number of issuances per firm and summary statistics for issuance size by REIT investment types. Panel B reports average number of issuances per firm and summary statistics for issuance size by issuing years.

The two panels in Table 3 report the summary statistics of measures of asset liquidation value by property type (panel A) and by issuing year (panel B). Diversified REITs have the highest concentration ratios (on average, 9.67%) indicating that firms operating in markets in which industries are more concentrated such as Detroit tend to diversify their property types. The health care sector has the lowest tenant *Z* score (1.3) while the retail sector has the highest tenant *Z* score (5–6). The lodging sector has the highest loss severity rate, which is consistent with the industry consensus that hotels are the riskiest asset class due to the lack of long-term tenants (*e.g.*, many rent rooms for just one night). The firesale discount (measured by the average industry concentration ratio of a REIT's top markets) are stable over time, because those industry structures in equilibrium tend to take effect over the long run. The tenant quality declines over the period from 2000 to 2008, and then increases slightly in 2009.

Empirical Analysis

Based on the model of REIT liquidation value presented in Section and empirical specifications of liquidation measures presented in Section, we test our three implications by using multivariate logit regressions. To demonstrate that our measures of asset liquidation value are significant determinants of firm's choice of financing, we need to control for alternative explanations developed in the literature and to control for firm characteristics. Following is a discussion of these alternative explanations and how we control for each of them.

Controlling for Firm Default Probability and Firm Characteristics

Under the nondisturbance clause, it seems that the existing tenants determine the cash flow recovery ability, and thus the asset value upon liquidation. However, the *ex ante* measure of tenant quality also impacts the probability of firm defaults. Higher tenant quality not only implies higher liquidation value, but also reduces the probability of firm default. Following Sibilkov (2009), we include the firm rating information (Rating Dummy) to control for firm's default probability. In addition, fixed costs associated with a new debt issue are lower for large firms, which makes debt financing more appealing to them. Therefore, we control for variables such as firm size, measured as the logarithm of a firm's book assets. Furthermore, we also control for firm clustering effect.

Controlling for Competing Explanations

To conduct our formal regression analysis, we control for determinants of financing choice that are commonly used in the capital structure literature:

Table 3 ■ Measures of asset liquidation value.

Panel A: Summary Statistics of REIT Measures of Asset Liquidation Value by Property Type

		Firesale Discount				Tenant Quality							
		Industry Concentration (%)				Tenant *Z* score				Loss Severity (%)			
Property Type	# of Issues	Mean	*SD*	Min	Max	Mean	*SD*	Min	Max	Mean	*SD*	Min	Max
Retail													
Shopping Center	206	9.47	0.78	8.07	11.81	5.8	1.4	2.0	12.9	31.7	5.6	9.3	38.9
Regional Mall	89	8.47	0.44	8.10	9.56	4.5	1.7	2.8	16.8	31.6	4.6	20.2	38.8
Retail: Other	14	9.50	0.43	9.14	10.49	6.0	1.2	3.8	7.4	31.5	4.6	20.3	39.0
Office	251	8.49	0.34	8.08	9.14	3.2	1.4	−3.9	10.7	31.2	6.3	10.3	42.0
Industrial	81	8.66	0.32	8.26	9.17	3.9	3.2	−3.2	14.2	27.0	10.9	0.0	46.3
Apartment	61	8.42	0.31	8.13	8.81	5.0	1.3	3.9	9.9	23.1	5.2	12.0	33.0
Hotel/Motel	119	8.52	0.28	8.20	9.23	3.0	1.0	1.1	5.9	43.5	9.6	0.0	64.5
Health Care	116	9.17	0.64	8.41	9.92	1.3	1.3	−2.3	4.5	25.2	12.5	10.8	53.6
Diversified	72	9.67	0.55	8.13	10.64	4.4	1.7	2.1	14.0	28.7	6.4	3.6	41.6
Others	34	8.45	0.40	7.96	9.07	3.0	2.2	0.3	6.3	27.7	10.6	12.0	53.6

Table 3 ■ Continued.

Panel B: Summary Statistics of REIT Measures of Asset Liquidation Value by Year

		Firesale Discount				Tenant Quality							
		Industry Concentration (%)				Tenant *Z* score				Loss Severity (%)			
Year	# of Issues	Mean	*SD*	Min	Max	Mean	*SD*	Min	Max	Mean	*SD*	Min	Max
2000	46	8.69	0.61	8.07	10.23	6.2	3.4	2.3	14.2	11.5	8.4	0.0	33.4
2001	87	8.82	0.62	8.08	10.25	4.6	2.8	−1.3	14.0	29.8	12.2	10.3	53.6
2002	118	9.00	0.60	8.08	10.25	4.4	2.8	−2.3	16.8	36.0	11.9	12.0	64.5
2003	150	8.87	0.60	8.08	10.49	3.9	1.5	0.5	6.2	33.6	8.5	12.0	49.9
2004	179	8.72	0.60	8.08	10.25	3.9	1.3	−3.9	6.2	32.5	6.7	10.8	49.3
2005	123	8.78	0.84	8.08	11.81	3.7	1.5	−0.6	7.4	31.2	5.4	19.2	44.9
2006	122	8.88	0.70	7.96	11.81	3.6	1.6	−0.8	7.4	31.2	7.9	20.0	46.2
2007	66	8.93	0.65	7.96	10.25	2.9	2.0	−3.2	8.1	29.3	6.9	21.0	42.4
2008	54	9.06	0.74	7.96	10.64	2.6	2.1	−1.5	7.6	26.8	5.9	19.5	41.3
2009	98	9.00	0.84	7.96	11.81	3.2	1.5	−1.2	7.4	31.4	5.7	20.4	42.1

This table reports the summary statistics of REIT measures of asset liquidation value by property type (Panel A) and by issuing year (Panel B).

the effects of the trade-off theory (leverage ratio), the pecking order theory (profitability, growth opportunity), the market timing theory (market-to-book ratio) and signaling (dilution). We also consider alternative measures of these control variables for our robustness checks.

Trade-off theory

The trade-off theory, first proposed by Kraus and Litzenberger (1973), hypothesizes that firms weigh the benefits (*e.g.*, tax savings) against the costs (*e.g.*, deadweight bankruptcy costs) of debt, *i.e.*, firms design each incremental financing activity to adjust their overall leverage ratios toward optimal target levels. Hence, they can gradually eliminate the deviations from the target. A firm in need of external finance should issue equity if its leverage ratio is above the target and issue debt if it is below. Thus, we control for the targeting behavior of corporate financing choice by using the leverage ratio of the firm (*e.g.*, Flannery and Rangan 2006, Lewellen 2006).

Pecking order theory

Myers and Majluf's (1984) pecking order theory states that when facing financing needs, firms prioritize their sources of financing. Internal funds are used first, and when those funds are depleted, the firm issues debt. When the debt capacity is reached, the firm issues equity.

Because profitable firms have a financial surplus, the pecking order theory predicts an inverse relation between profitability and leverage (Titman and Wessels 1988, Fama and French 2002). Profitable firms mainly use internal financing when necessary; hence their use of external sources of financing is low. The negative association between profitability and leverage that supports the pecking order theory has been empirically documented by Myers (1984), Baskin (1989), Rajan and Zingales (1995) and Stenbacka and Tombak (2002).

To control for the inverse relation between profitability and leverage ratio, we include a measure of profitability, the return on average assets (ROAA). We also control for a firm's growth, which we measure as the growth rate of funds from operations (FFO). The FFO, a proxy for free cash flow, is a measure of REITs' operating performance that is calculated by adding depreciation and amortization expenses to earnings. FFO gives us a clearer idea of an REIT's cash performance, which is a better measure of the REIT's performance than is earnings.

Market timing theory

Baker and Wurgler (2002) explore the managers' practice of timing the equity market, and find evidence for this policy. They demonstrate that market timing

implies that not only does the market-to-book ratio affect capital structure through equity issues, but also that the negative effect is persistent and helps to explain the cross-sectional variation in leverage. These effects cannot be explained by capital structure theories. Using alternative measures, Elliot, Koeter-Kant and Warr (2008) show that market timing has significant impact on the debt–equity choice. We include the market-to-book ratio to control for the market timing effect.

Signaling

In the pecking order model, good-quality firms use internal funds to avoid the adverse selection problem and the loss of value. However, these firms are not able to signal their quality by using capital structure. Another strand of capital structure theory proposed by Ross (1977) posits that capital structure serves as a signal of private information. Ross's argument is that equity issuance signals that the stock is overpriced. To avoid such a signaling effect, companies with major financing needs tend to prefer debt.

To control for the signaling effect, we include dilution as a control variable. We compute dilution as the total amount of new issues divided by total market cap one quarter prior to the security offering (Asquith and Mullins, 1986).

Table 4 summarizes the predicted effects on the firm's financing decisions.

Empirical Results

We initially use univariate analysis to investigate the effect of liquidation value on financing choice. Table 5 summarizes the descriptive statistics of our measures of firms' liquidation values and the explanatory variables used in the multivariate analysis.

The Pearson correlation matrix reported in Table 6 shows that the correlations between these explanatory variables is moderate at best; most of the correlations are low for our primary variables of interests, especially tenant quality. For example, the correlations between tenant quality and the controls for alternative capital structure theories (leverage, profitability, market-to-book, dilution, FFO growth, and size) are within ± 0.08.The evidence supports our claim that tenant quality is a better proxy for liquidation value. The correlation between MSA industry concentration and tenant quality is -0.08, which supports our empirical method of jointly testing short- and long-run measures of asset liquidation value. The correlation between tenant quality and the loss severity rate is -0.13, respectively. This result is not surprising, because

Table 4 ■ Empirical implication of capital structure theories.

Proxy	Asset Liquidation Value Theory	Trade Off Theory	Pecking Order Theory	Market Timing Theory	Signaling Theory
Tenant Quality	Increase likelihood of issuing debt				
Firesale Discount	Decrease likelihood of issuing debt				
Lease Maturity	-				
Loss Severity	Decrease likelihood of issuing debt				
Leverage		Decrease likelihood of issuing debt			
Profitability			Decrease likelihood of issuing debt		
Market-to-Book				Decrease likelihood of issuing debt	
Dilution					Increase likelihood of issuing debt
FFO Growth			Decrease likelihood of issuing debt		
Rating	Increase likelihood of issuing debt	Increase likelihood of issuing debt	Increase likelihood of issuing debt	Increase likelihood of issuing debt	Increase likelihood of issuing debt

This table summarizes the major empirical implications of the five theories of capital structure and presents the predicted effects of various factors on the probability of new debt issues.

Table 5 ■ Descriptive statistics.

Variable	Observation	Mean	*SD*	Min	Max
Tenant Quality (*Z* score)	1,043	3.87	2.12	−3.87	16.81
Firesale Discount (%)	1,043	8.86	0.69	7.96	11.81
Lease Maturity (years)	1,043	3.88	1.69	0.00	5.56
Loss Severity (%)	1,043	30.99	9.48	0.00	64.53
Leverage Ratio	1,043	0.48	0.13	0.09	0.97
Profitability (%)	1,043	3.50	4.36	−8.11	76.57
Market-to-book	1,043	1.14	0.24	0.56	1.78
Dilution	1,043	0.10	0.16	0.00	3.09
FFO Growth (%)	1,043	9.87	32.98	−96.57	185.92
Earning Volatility (%)	1,043	0.30	0.18	0.01	10.09
Size	1,043	14.91	1.14	9.55	17.20

This table reports the summary statistics of the independent variables of REIT security issuance decisions for the sample of 1,043 observations.

the capital market captures some of information conveyed from fundamental measures of asset quality.

In Table 7, we compare the distributions of asset liquidation value measures and other explanatory variables and test for significant differences between debt offerings and equity offerings. The results suggest that on average, relative to REITs that issue equity, REITs that raise funds by issuing bonds have a larger market capitalization, lower current market leverage ratios, lower FFO growth, smaller offering amounts relative to the value of book assets and higher market-to-book ratios.

Multivariate logit analysis

We use multivariate logit regression analysis as our primary tool to study the choice of new security issuance. We set the dependent variable equal to one for bond issues and zero for equity issues. We measure the liquidation value with three different variables: the average tenant *Z* scores, the industry concentration of top markets in which the REIT operates, and the firm's loss severity from historical CMBS liquidation. According to our theoretical model, we expect a positive loading on the tenant quality and negative loadings on the firesale discount and loss-severity rates.

Our control variables include the current market leverage ratio (Leverage), the return on average assets (Profitability), the market-to-book ratio, the offering amount divided by the market cap (Dilution), the growth rate of FFOs (FFO growth), standard deviation of Earning volatility, Rating Dummy and

Table 6 ■ Correlation matrix.

	Tenant Quality	Firesale Discount	Lease Maturity	Loss Severity	Leverage	Profit-ability	Market-to-book	Dilution	FFO Growth	Earning Volatility	Size
Tenant Quality	1										
Firesale Discount	−0.08	1									
Lease Maturity	0.14	−0.28	1								
Loss Severity	−0.13	0.01	−0.30	1							
Leverage	0.01	0.01	−0.10	0.10	1						
Profitability	0.04	−0.11	0.09	−0.06	−0.34	1					
Market-to-Book	0.05	−0.11	0.14	−0.13	−0.64	0.29	1				
Dilution	−0.06	−0.05	−0.11	0.13	0.33	−0.07	−0.29	1			
FFO Growth	0.08	−0.18	0.07	−0.09	−0.20	0.19	0.24	−0.02	1		
Earning Volatility	−0.15	0.23	−0.46	0.27	0.23	−0.13	−0.15	0.18	−0.20	1	
Size	−0.04	0.38	0.05	−0.01	0.04	−0.09	0.01	−0.28	−0.17	0.07	1

This table reports Pearson correlations between variables used in the regressions for the sample of 1,043 observations over the period 2000 to 2009.

Table 7 ■ Difference in means.

	Debt Offerings		Equity Offerings		
	Mean	*SE*	Mean	*SE*	*t* Stat
Measures of Liquidation Value					
Tenant Quality	4.01	2.01	3.75	2.20	1.92*
Firesale Discount	8.68	0.60	9.02	0.72	−8.31***
Loss Severity	30.46	9.56	31.45	9.40	−1.70*
Control Variables					
Lease Maturity	3.90	1.61	3.86	1.76	0.47
Leverage	0.47	0.11	0.50	0.15	−4.09***
Profitability	3.30	2.90	3.67	5.31	−1.39
Market-to-Book	1.16	0.24	1.13	0.23	1.83*
Dilution	0.08	0.10	0.12	0.20	−3.78***
FFO Growth	5.11	31.21	13.99	33.92	−4.37***
Earning Volatility	0.31	0.18	0.29	0.17	1.23
Size	15.43	0.99	14.46	1.08	15.10***

This table presents the sample means and sample standard errors of the dependent and independent variables in our regression analysis of REITs' new debt and equity offerings. Our sample comprises 1,043 observations over the period January 2000 to December 2009. We report *t* statistics and their significance levels on difference in means. *, ** and *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

logarithm of firm's book asset (Firm size). Our empirical evidence, which is consistent across all three measures of liquidation value, supports the Shleifer and Vishny (1992) hypothesis. Firms that issue bonds not only have higher quality tenants (*Z* scores) but also hold assets in real estate markets that tend to have a more diverse mix of industries in a location relative to the industry concentration associated with equity-offering firms. The relation is reversed for the historical loss severity. These results suggest that higher expected liquidation values are associated with a higher likelihood of bond issues relative to equity issues. The effect is significant from both statistical and economic perspectives. A one-standard-deviation increase in the tenant quality is associated with a 4% to 5% higher probability of issuing debt. The probability increases by 4% for a one-standard-deviation decreases in the loss severity rate.

Table 8 presents the multivariate logit regression results with fundamental measures of asset liquidation value. Model 1 tests the effects of asset liquidation value using the weighted average tenant *Z* score and the firesale discount (measured as the MSA industry concentration ratio). Model 1 controls for firm size and the firm ratings, but does not control for other capital structure

Table 8 ■ Logit regression with asset quality as firm's liquidation value.

	Model 1		Model 2		Model 3	
	Coefficient	Change in Prob.	Coefficient	Change in Prob.	Coefficient	Change in Prob.
Tenant Quality	0.074***	3.9%	0.071**	3.7%	0.092***	4.9%
	2.226		2.086		2.636	
Firesale Discount	−0.560***	−9.1%	−0.606***	−9.8%	−0.512***	−7.9%
	−4.491		−4.497		−3.599	
Lease Maturity			0.043		0.030	
			0.926		0.567	
Leverage					−3.514***	− 10.6%
					−4.050	
Profitability					−0.036	
					−1.403	
Market-to-Book					−0.167	
					−0.398	
Dilution					1.129**	4.6%
					2.240	
FFO Growth					−0.005*	−3.6%
					−1.687	
Earning Volatility					4.152	
					0.083	
Rating	1.771***		1.783***		1.537***	
	8.103		8.125		6.642	
Size	0.479***	13.6%	0.463***	13.2%	0.622***	18.0%
	5.004		4.751		5.701	
Intercept	−4.001**		−3.512*		−4.667**	
	−1.956		−1.661		−2.085	
Year FE	Yes		Yes		Yes	
Pseudo R^2	0.214		0.215		0.231	
Observations	1,043		1,043		1,043	

This table presents the multivariate logit regression results we obtain for REITs' incremental financing decisions using a sample of 1,043 observations. The dependent variable is set to one for a new bond issue, and zero for an equity issue. We measure liquidation value by the revenue-weighted average Altman *Z* score of major tenants and the industry concentration ratio of REIT top markets. Leverage is the ratio of total debt to total market assets, where we define market assets as the total book assets plus the difference between the market value of equity and the book value of equity. The growth rate of funds from operations (FFO Growth) is the annual percentage change in such funds. Dilution is the total amount of offering divided by the market cap prior to the new issue. We measure profitability by the return on average assets (ROAA). Market-to-book is the total book assets divided by the total market value of assets. Earning Volatility is the standard deviation of FFO over the past three years. Rating is a dummy variable that takes a value of 1 if the firm has either a bond rating or a commercial paper rating and zero otherwise. *Z* statistics are shown in the line below the coefficient. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. For any independent variable that is statistically significant at 10% and above, we provide economic significance with Change in Probability showing the change in probability of issuing debt when the independent variable changes one standard deviation.

theories. The higher the asset liquidation value (lower industry concentration and higher tenant quality), the greater the likelihood of debt issuance. The results are statistically significant at the 1% level.

The column "Change in Prob" in Model 1, which computes the change in probability of issuing debt for a one-standard-deviation increase in a corresponding variable, also shows the economic significance. A one-standard-deviation increase (decrease) in the tenant average *Z* score (industry concentration ratio of REIT's top markets) is associated with a 4% (9%) higher probability that a firm will issue debt. In addition, the firm's characteristics also play an important role in its financing decisions. Larger firms are more likely to issue debt.

In Model 2 we include the average lease maturity as an additional control. Given tenant quality, the lease maturity has no effect on a firm's financing choice, which verifies our hypothesis that the lease maturity is endogenously determined.

Model 3 further controls for alternative capital structure theories. Our results are consistent with the trade-off, pecking order and signaling theories of capital structure. The market leverage prior to a new security issue has a significant negative impact on the use of bonds. This finding is consistent with the trade-off theory. Our estimates suggest that given a one-standard-deviation increase in market leverage, on average a firm is 10.6% less likely to issue bonds. Consistent with the pecking order theory, there is a negative relation between debt financing and the FFO growth or profitability ratio. Our estimates are also consistent with the signaling hypothesis, under which the firm's likelihood of issuing debt increases by 4.6% if the dilution measure increases by one standard deviation. Conditional on other theories developed in the past studies, our proxies for asset liquidation value remain significant on both a statistical and economical basis.

Robustness checks

Table 8 establishes the major results of this study: a higher tenant quality (tenant *Z* score) is associated with a higher likelihood that a firm will issue debt (testable implication I); lower industrial concentration of an REIT's property markets indicates a lower firesale discount and a higher debt capacity (testable implication II). We perform several robustness checks. Most importantly, we test if the historical loss severity rate from CMBS foreclosures predicts a firm's debt issuance decision. Using the loss severity rate as an explanatory variable, Table 9, Model 4 (1300 observations) shows the impact of loss severity on financing choice with respect to liquidation value. Given

Table 9 ■ Robustness Check—regression results with historical loss severity rates as firm's liquidation value.

	Model 4		Model 5		Model 6	
	Coefficient	Change in Prob.	Coefficient	Change in Prob.	Coefficient	Change in Prob.
Loss Severity	−0.017***	−3.9%	−0.069***	−12.0%	−0.005	
	−2.713		−4.910		−0.657	
Tenant Quality					0.087***	4.4%
					2.493	
Firesale Discount					−0.531***	−8.1%
					−3.665	
Leverage	−2.389***	−7.2%	−1.848	−4.9%	−3.577***	−10.1%
	−3.471		−1.587		−4.199	
Profitability	−0.051**	−5.3%	−0.053		−0.039	
	−2.032		−1.118		−1.629	
Market-to-Book	−0.023		0.590		−0.158	
	−0.069		0.947		−0.377	
Dilution	1.142**	4.5%	1.935***	7.0%	1.076**	4.2%
	2.430		2.770		2.094	
FFO Growth	−0.005**	−3.9%	0.005		−0.004	
	−1.964		1.216		−1.520	
Earning Volatility	20.99		232.00***	9.4%	24.86	
	1.469		4.037		1.325	
Rating	1.678***		2.797***		1.551***	
	8.148		4.967		6.629	
Size	0.665***	18.8%	0.713***	19.3%	0.611***	17.2%
	7.848		3.291		5.569	
Intercept	−9.695***		−11.80***		−4.254*	
	−7.504		−3.833		−1.890	
Year FE	Yes		Yes		Yes	
Pseudo R^2	0.219		0.343		0.233	
Observations	1,300		257		1,043	

This table presents the multivariate logit regression results of REITs' incremental financing decisions. Model 4 uses 1,300 observations with the firm-level loss severity rate we construct using historical loss severity rates across different property types. Model 5 tests the role of firm-level loss severity index in REITs' financing choice for a sample of firms that do not have tenant information (363 observations). Model 6 jointly tests the role of loss severity in addition to tenant quality and firesale discount in explaining REITs' financing choice (1,043 observations). It shows that when asset quality and firesale discount are in place, the explanatory power of historical loss severity is significantly reduced. The dependent variable is set to one for a new bond issue, and zero for an equity issue. Leverage is the ratio of total debt to total market assets, where we define market assets as the total book assets plus the difference between the market value of equity and the book value of equity. Funds from operations (FFO) growth is the annual percentage change in such funds. Dilution is the total amount of offering divided by the market cap prior to the new issue. We measure profitability by the return on average assets (ROAA). Market-to-book is the total book assets divided by the total market value of assets. Earning Volatility is the standard deviation of FFO over the past three years. Rating is a dummy variable that takes a value of 1 if the firm has either a bond rating or a commercial paper rating and zero otherwise. *Z* statistics are shown in the line below the coefficient. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. For any independent variable that is statistically significant at 10 showing the change in probability of issuing debt when the independent variable changes one standard deviation.

proxies for trade-off, pecking order, market timing and signaling theory, the firm's historical loss severity is significantly associated with the firm's decision to issue debt. A one-standard-deviation increase in the loss severity rate is associated with a 4% decrease in the probability of issuing debt.

Model 5 in Table 9 tests the same prediction using a subsample of 257 observations, which do not contain either local market information or tenant information. For the most part, the sample used in Model 4 contains properties such as hotels, apartments, health care facilities and other type of firms whose tenant information is not disclosed. Model 4 shows that the impact of the loss severity rate to a firm's likelihood of issuing debt is three times that in the overall sample with 1,300 observations. A one-standard-deviation increase in loss severity is associated with a 12% decrease in the likelihood of debt issuance.

To see if the historical loss severity provides any additional information beyond the tenant quality and the firesale discount, we include all three determinants (tenant *Z* score, MSA industrial concentration ratio and loss severity index) in Model 6. The tenant quality and the firesale discount remain significant drivers of a firm's financing choice in this model. Other control variables have similar results. However, the historical loss severity measure no longer has a significant association with firm debt issuance, which is consistent with our model.

Conclusions

We propose three novel measures of asset quality and utilize them to investigate the influence of asset liquidation value on firms' financing decisions. The real estate industry provides an ideal setting to test the cross-sectional patterns of firms' financing choices, because the values of real assets are relatively easier to identify and measure. Our measures of asset quality encompass not only the credit quality of the tenants who occupy the building, but also the location quality of an area. To determine location quality, we use the economic base (mixture of various industries) of an area as a proxy, because real estate is fixed in location and the health of the local economy influences the cash flow of the tenants. The location quality measures the firesale effect. Our tenant quality measure reflects the asset quality from a shorter-term perspective. Because our metric of industry concentration (economic base) within local markets captures the long-term redeployability notion of Benmelech, Garmaise and Moskowitz (2005), we essentially control for such long-term equilibrium vis-à-vis the industry concentration.

We construct a stylized valuation model to link asset quality to liquidation value. We then test whether our model predicts the observed choices that firms

make in terms of their choice to issue debt or equity. We show that REITs with higher asset values (as proxied by tenant quality, etc.) also tend to be REITs that borrow more debt, but this is a statistical association potentially driven by omitted factors, not a causal relationship. Asset quality, through its link to liquidation value, significantly affects the choice of financing.[11] Firms that issue debt not only have higher quality tenants, but also hold assets in geographical markets that have a more diverse mix of industries relative to firms that issue equity. For firms such as hotels, apartments and self-storage, whose assets are not occupied by long-term tenants we cannot easily observe the fundamental measures of asset quality. The firm's financing choices rely more heavily on the overall real asset market conditions in these situations.

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[11]Despite all the control variable we include, there are potential omitted variables that may drive firm's financing decision. Due to the lack of exogenous variation, the results should be interpreted as a statistical inference between the cross-sectional variation of issuance decisions and liquidation value measures.

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