Financial Flexibility and Manager-Shareholder Conflict: Evidence from REITs

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Abstract

We show empirically that the use of unsecured debt, which contains standardized covenants that place limits on total leverage and the use of secured debt, is associated with lower and more stable leverage outcomes. We then show that firm value is sensitive to leverage levels and leverage stability, decreasing in the former and increasing in the latter. Our results suggest that unsecured debt covenants function as a managerial commitment device that preserves the firm's debt capacity to enhance financial flexibility.

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Collateral assets support corporate investment (Chaney, Sraer, and Thesmar, 2012; Chen, Liu, Xiong, and Zhou, 2017; Gan, 2007) because firms can borrow against their pledgeable assets (Almeida and Campello, 2007). Consistent with this notion, corporate leverage and bank debt increase in the value of collateral (Cvijanović, 2014; Lin, 2016).

A potential drawback of collateral is that the available debt capacity introduces an agency conflict associated with the ease with which collateral is converted into cash. In particular, absent a commitment device, unrestrained borrowing by self-interested managers may exhaust the firm's debt capacity unnecessarily. This in turn may put valuable financial flexibility, which has a strong temporal component that is better served by a policy of maintaining low and stable leverage in most states of the world, at risk.[1]

To illustrate the salient issues we study Equity Real Estate Investment Trusts (REITs).[2] REITs primarily own capital-intensive, income-producing commercial properties that offer economically significant debt capacity, which managers may easily exploit by raising debt secured against those assets. The REIT industry is further governed by strict regulations that severely limit cash retention and asset sales as a regular source of inside liquidity. Limited inside liquidity makes REITs vulnerable to income and investment shocks, intensifying the need to retain spare debt capacity as an alternative liquidity source. Further, REITs are

[1] Retaining financial flexibility is valuable for the firm when financing and investment shocks can occur and there are costs associated with raising external finance (Almeida, Campello, and Weisbach, 2011; DeAngelo, DeAngelo, and Whited, 2011; Gamba and Triantis, 2008). Rampini and Viswanathan (2010) describe the link between capital structure choices today and the firm's ability to address cash flow and investment shocks in the future. Empirical work has further linked capital structure choices to considerations around unused debt capacity and demand for financial flexibility (Byoun, 2011; Denis and McKeon, 2012; Singh and Hodder, 2000). Li, Whited, and Wu (2016) note that financial flexibility is different from holding cash, as in Faulkender and Wang (2006) for instance.

[2] The National Association of Real Estate Investment Trusts (NAREIT) reports that there are currently over 200 listed equity REITs, approximately 40 of which have a total market value of at least $5 billion and 28 of which are included in the S&P 500. REITs currently own c. $1.8 trillion of commercial real estate assets in the US, with a total equity market capitalization of c. $1.0 trillion. REITs have also been recognized as a distinct sector in the Global Industry Classification Standards (GICS) in 2016. See `www.reit.com`, accessed January 16, 2017.

subject to diversified ownership rules that undermine the market for corporate control as a commitment device to restrain self-interested managers.

We examine a solution to the manager-shareholder conflict over spare debt capacity that ironically resides in the deployment of a certain type of debt: long-term, corporate-level unsecured debt. Giambona, Mello, and Riddiough (2016) show that REITs employ two (and only two) types of long-term financing: corporate-level unsecured debt and asset-level secured mortgage debt. However, commercial mortgage debt in the U.S. is non-recourse, in the sense that the borrower's liability in default is limited to the pledged asset and nothing more.[3] Therefore, in contrast with the usual characterization that secured (recourse) debt facilitates borrower monitoring (Stulz and Johnson, 1985; Triantis, 1992), non-recourse mortgage debt secured by income-producing real estate actually works in the opposite direction. Further, with mortgage debt there are typically no covenants limiting the issuance of additional mortgage debt that is secured by other assets of the firm. Consequently, secured real estate debt is unable to ensure managerial commitment relating to time-consistent financial management, as it does little to keep managers from depleting debt capacity should they decide to try.

Unsecured debt contracts used to finance REITS, on the other hand, incorporate a standard set of covenants that directly address the conflict between managers and shareholders over the preservation of spare debt capacity. Giambona, Mello, and Riddiough (2016) show that the covenants that are included in a vast majority of REIT unsecured debt contracts are: (i)

[3] State foreclosure laws govern recourse versus non-recourse provisions for residential mortgages, but do not apply to the commercial real estate held by REITs. Recourse with commercial real estate mortgages is instead governed by the details of the mortgage contract and the Uniform Commercial Code (UCC). The state foreclosure law distinction is primarily determined by "power of sale" versus "judicial" foreclosure as they affect certain control issues and the timing of foreclosure recoveries.

Total leverage no greater than 60%; (ii) Secured debt to total assets no greater than 40%; (iii) EBITDA to interest expense no less than 1.5 times; and (iv) Unencumbered assets to total unsecured debt outstanding no less than 1.5 times (Franckel, 2014).[4]

In contrast to the debt contracts analyzed in Murfin (2012), Hollander and Verriest (2016) or Prilmeier (2016), REIT unsecured debt covenants vary only within tight ranges. They are insensitive to firm risk as well. Unlike the contracts analyzed in Roberts (2015), REIT unsecured debt covenants are stable through time, with little scope for relaxation conditional upon strong financial outcomes. Therefore, the question about the use of covenants in REIT debt contracts effectively collapses to the choice between secured non-recourse mortgage debt, which offers no covenants that address issues of time-consistency in financial management at the firm level, and unsecured debt, which is subject to an industry-standard set of covenants that impose constraints on financial managerial discretion. Because unsecured debt covenants limit financial discretion so as to preserve spare debt capacity, we would also expect leverage stability to improve as financial management becomes increasingly time-consistent.

This discussion leads us to form three hypotheses that we test in our empirical analysis: (1) Leverage levels decrease in unsecured debt usage, reflecting the commitment value of unsecured debt whose covenants impose limits on corporate indebtedness; (2) Leverage stability increases in unsecured debt usage, reflecting temporal effects resulting from the imposed unsecured debt covenants; (3a) Over a wide range of leverage levels, there is an

[4]For example, based on issuance-level data from Giambona, Mello, and Riddiough (2016), supplied to us by the authors, 80% of REITs that issue unsecured debt and for which there are covenant data available report a 60% total leverage covenant. Over 90% of REITs report either a 60% or 65% leverage covenant. Similarly, 80% of REITs report a 1.5x interest coverage covenant. In addition, in comparison to industrial firms, there tend to be few other covenants such as those restricting dividend payments or asset sales.

inverse relationship between leverage and firm value, reflecting the cost of lost financial flexibility from exhausting the debt capacity of the firm; and (3b) Firm value increases in leverage stability, generating the corollary that lower leverage levels and greater stability are complementary with respect to enhancing financial flexibility.

In the empirical analysis we confront several challenges associated with causal identification: (1) There may be unobservable factors at play, (2) Leverage and unsecured debt may be simultaneously determined, and (3) There may be feedback effects going from firm value to capital structure. To address these issues we include firm and time fixed effects, estimate contemporaneous specifications and specifications where the predictors are lagged, and identify an instrumental variable for unsecured debt in the determination of leverage and leverage stability that is rooted in the specific institutional environment of REITs. We also control for path-dependency by estimating dynamic IV panel models, and we test our hypotheses for book leverage as well as market leverage.

Using this empirical design, we find an inverse relationship between the share of unsecured debt and leverage levels, and a positive relationship between the share of unsecured debt and the stability of leverage through time. We further find that firm value decreases in leverage across a wide range, and increases as leverage becomes more stable. We estimate the costs of lost financial flexibility from excessive leverage to be significant. After conditioning on investment and other relevant factors, we find that a one standard deviation increase in leverage levels leads to a reduction in firm value of almost 9% relative to the sample mean. Our findings stand in contrast to the conclusion in Graham and Leary (2011) that firm value is largely insensitive to capital structure choices as described in traditional theories.

We conduct several robustness tests. First, we examine the plausibility of a corner solution where the best choice for the firm is to hold zero leverage. We find that the costs of lost financial flexibility do not start from zero leverage, but become operative from 25% leverage onward, confirming the likely existence of an internal optimum. In further support of the disciplining effects of unsecured debt usage, we also find that firms with more unsecured debt stray less from their characteristic-informed levels of target leverage. Lastly, based on the recent work of Li, Whited, and Wu (2016), we confirm that our results on the value effects of low and stable leverage are not influenced by sub-period regimes in which the relative effectiveness non-recourse secured debt varied as a means to protect equity cash flows in bankruptcy. These sub-periods also coincide with the business and funding cycle, and more specifically, the mortgage securitization boom and bust experienced in the US, which may have been related to lender screening and monitoring incentives (Diamond, Hu, and Rajan, 2017; Wang and Xia, 2014).

With our results, we contribute to the literature on the collateral channel by studying the use of debt covenants as they affect capital structure and value outcomes for firms with significant collateral and resulting available debt capacity. The effects of debt covenants documented to date include restricted access to credit facilities (Sufi, 2009), material restructuring and refinancing costs incurred upon covenant violation (Beneish and Press, 1993), improved accounting transparency (Bharath, Sunder, and Sunder, 2008), reductions in investment (Chava and Roberts, 2008; Nini, Smith, and Sufi, 2009), and frequent renegotiation (Roberts and Sufi, 2009b). We illustrate the use of debt covenants to manage manager-shareholder conflicts – in contrast to the usual focus on shareholder-debtholder conflicts – as well as on leverage and firm valuation effects.

Roberts and Sufi (2009a) document an inverse relationship between covenant violations and subsequent debt issuance. We present evidence for an inverse relationship between covenants and leverage levels even in the absence of covenant violations, confirming the *ex ante* disciplining effect of covenants on financing choices (see also Demiroglu and James (2010)). We further extend earlier findings by presenting evidence for the effect of debt covenants on the stability of leverage through time. DeAngelo and Roll (2015) summarize leverage stability as being "the exception, rather than the rule", contrasting with the result that leverage is largely driven by long-run stable factors as described in Lemmon, Roberts, and Zender (2008), Flannery and Rangan (2006), or Kayhan and Titman (2007). In the context of this debate, our results speak to the question of possible determinants of cross-sectional differences in leverage stability, as we identify unsecured debt as a mechanism that facilitates leverage stability via restrictive debt covenants.

We also present evidence on the consequences for firm value of committing managers to preserving financial flexibility. Marchica and Mura (2010) find that financially flexible firms generate better risk-adjusted returns for shareholders. They conclude, however, that agency issues are not operative, but do not explore why or how the effects are muted. Lastly, our work also expands on the findings that covenants allow debt holders to reign in risk taking by equity holders (Helwege, Huang, and Wang, 2016), address underinvestment (Billett, King, and Mauer, 2007), and mitigate risk shifting by equity holders (Gilje, 2016), by focusing on a conflict between shareholders and managers over spare debt capacity.

Real Estate Investment Trusts (REITs) and secured debt

Maintaining financial flexibility is a central issue for firms that hold little cash and that have to rely on external funding sources to fund investment (Ang and Smedema, 2011; Faulkender and Wang, 2006). REIT regulation in the US allows qualifying firms to avoid taxation at the firm level by distributing at least 90% of taxable income as dividends. Discretion in dividend policy is consequently reduced significantly, with REITs being unable to retain much cash flow from operations (Ott, Riddiough, and Yi, 2005). REITs have further been documented as not stockpiling cash from external offerings of existing assets (Hardin, Highfield, Hill, and Kelly, 2008). Their regulation also precludes them from using asset sales as a consistent and significant means with which to fund new investment.[5]

Regulation of REITs further stipulates that at least 75% of REIT assets must be real estate. Most REITs hold considerably more than the minimum, and the vast majority of assets are income-producing (leased) land and buildings. This type of asset is tangible, durable, traded in an active secondary market, not highly specific to the owner and thus generally redeployable, offering significant debt capacity (Almeida and Campello, 2007; Caballero, 2006; Campello and Giambona, 2013; Cvijanović, 2014). The debt capacity of REIT-held assets thus offers a means by which these firms can relax financial constraints (Cvijanović, 2014; Giambona, Golec, and Schwienbacher, 2014). At the same time, however, the recent financial crisis has vividly illustrated the real limits to debt capacity – even as they apply to commercial real estate assets (Liu, Liu, and Zhang, 2016; Pavlov, Steiner, and Wachter,

[5]REITs are subject to constraints on asset sales, and may be liable to pay a 100% tax on net income from sales of property in the ordinary course of business (prohibited transactions or dealer sales). See NAREIT briefing on "Detailed Description of the Provisions in the Update and Streamline REIT Act Introduced in the House of Representatives", accessed via `www.reit.com`.

2015; Sun, Titman, and Twite, 2015). When combined with limitations on cash holdings as a source of inside liquidity with which to fund operations and new investment, the existence of significant debt capacity associated with the assets-in-place highlights the importance of the prudent use of this valuable but limited resource.

Because of dividend payout requirements, REITs rely almost exclusively on external equity and long-term debt capital to fund investment (Ott, Riddiough, and Yi, 2005). Giambona, Mello, and Riddiough (2016) show that the long-term debt financing decision for REITs boils down to a choice between two types of debt: *pari passu* corporate-level unsecured debt and secured non-recourse mortgage debt. Brown and Riddiough (2003) and Giambona, Mello, and Riddiough (2016) show that REIT unsecured debt contains covenants which explicitly limit total leverage at the firm level over the term of the debt, thus committing management to the retention of at least some of its available debt capacity. Secured non-recourse mortgage debt contains no such provisions at the firm level. This is because the non-recourse feature leads secured lenders to focus exclusively on the pledged asset, and not on the firm as a whole. Furthermore, secured non-recourse debt often equals or exceeds 70% leverage at the asset level, offering managers a significant source of debt capacity, and even higher leverage levels may be achieved using mezzanine debt (Mello and Quintin, 2017). This compares to typical leverage limits of 60% at the firm level for unsecured debt, with additional limits on the use of high levels of secured debt across the entire firm (Giambona, Mello, and Riddiough, 2016).

REITs display a critical vulnerability in corporate governance: the inability to discipline managers through the market for corporate control. A dispersed ownership rule requires REITs to have at least 100 distinct shareholders, five or fewer of whom cannot own more than 50% of the REIT's stock. Additionally, almost all REITs limit individual shareholders to a 9.9% equity stake in the firm, generally through dilution and related "poison pill" mechanisms contained in their articles of incorporation that automatically kick in when the maximum holding percentage is exceeded. As a result, the 9.9% limit prevails regardless of the look-through provision that would otherwise apply to many institutional investors. *De facto* dispersed share ownership weakens the ability of outsiders to take control of the firm or otherwise influence managerial decision making, leaving shareholders vulnerable to managerial conflicts of interest (Armstrong, Guay, and Weber, 2010; Shleifer and Vishny, 1997). In addition, most listed equity REITs are incorporated in Maryland, which has extremely management-friendly legislative standards.[6]

The discussion above suggests that REITs provide an attractive laboratory to examine the issue of financial flexibility in financial management. REITs are exogenously cash constrained and thus require continued access to external capital sources. Their assets offer significant debt capacity that can relax financial constraints, but that debt capacity is finite. Further, the market for corporate control is weak in the REIT industry. This weakness raises shareholder concerns regarding the optimality of the firm's financial decision making over time, especially given empire-building or other time-inconsistent value-depleting managerial tendencies.

[6]A recent takeover attempt of Macerich by Simon Property Group illustrates the issues, where Macerich deployed the Maryland Unsolicited Takeover Act to successfully rebuke Simon's advances. Amongst other things, this act allowed Macerich to change from a de-staggered to a staggered board in response to the takeover attempt.

Empirical approach

This analysis leads us to formulate the following empirical predictions. Due to the managerial commitment gained by complying with covenants contained in unsecured debt financing, we predict that firm leverage is inversely related to the use of unsecured debt. In contrast, we expect unsecured debt usage to be positively related to leverage stability. The latter relation follows because reliance on unsecured debt implies more commitment to following a time-consistent debt policy, and therefore less fluctuation in firm leverage over time. Then, conditional on these effects, we would expect a second-stage response in which firm value reacts to changes in leverage and leverage stability. More specifically, in a world with cost frictions in sourcing external finance, depending on the firm's available debt capacity and financial flexibility, we expect that, within a relevant range, firm value is decreasing in leverage and increasing leverage stability.

We note that the anticipated relations do not necessarily imply a corner solution whereby the prediction is that firms should optimally employ no leverage nor any secured debt in their capital structures. As discussed in DeAngelo and DeAngelo (2007), depending on the debt capacity of the firm's assets-in-place and certain other potential offsetting factors, lesser amounts of leverage can be tolerated by firms without incurring meaningful costs to lost financial flexibility. A similar argument would apply to the use of secured debt relative to unsecured debt. Leverage stability would, as well, not necessarily be adversely affected at low levels of total leverage and secured debt usage.

Estimating the effect of unsecured debt on the level and stability of leverage

We face three main empirical challenges in identifying the effect of unsecured debt on the level of leverage. First, capital structure outcomes may be driven by unobservable firm-specific, time-invariant characteristics (Flannery and Rangan, 2006; Lemmon, Roberts, and Zender, 2008) or by time-varying factors common to all firms, such as sentiment or business cycles. Second, leverage and the share of unsecured debt in the capital structure may be simultaneously determined, similar to the links between leverage and maturity choices (Barclay, Marx, and Smith, 2003; Johnson, 2003). Third, there may be reverse causality from leverage to unsecured debt, as suggested in Stulz and Johnson (1985).[7] To explore the preliminary hypothesized relationships, we specify a baseline model with the market leverage ratio (Lev) as a function of unsecured debt ($Unsec$), specified as follows:

$$Lev_{it} = \gamma_1 Unsec_{it} + \beta \mathbf{x}_{it} + f_i + d_t + u_{it} \tag{1}$$

where $\mathbf{x_{it}}$ contains observable covariates and u_{it} is the residual. We include the following control variables: price-to-FFO ratio,[8] profitability, the fixed assets ratio, cash to total assets, firm size, earnings volatility, and firm age. We control for real estate investment growth as a proxy for the external financing deficit, since, given REIT dividend payout requirements, investment growth is the major source of external financing needs (Ott, Riddiough, and Yi, 2005). We also include an indicator variable when firms have issued unsecured debt, but never

[7] We consider an alternative identification strategy using IV specific to the REIT institutional environment in Section .

[8] The measure proxies for growth opportunities. FFO stands for funds from operations. In the REIT sector it is a standard measure of earnings, basically defined as net income plus depreciation. The rationale for focusing on FFO rather than net income as a measure of earnings is that real estate typically retains or even appreciates in nominal value even though the physical structures do (slowly) depreciate.

had a debt rating. This is meant to control for those firms that use short-term unsecured bank lines of credit (Riddiough and Wu, 2009). Notice that this indicator does not affect a situation where a firm loses its credit rating and may thus be precluded from using long-term unsecured debt. We also control for time-invariant unobservable firm characteristics using firm fixed effects, f_i, and for time-varying unobservables using quarter fixed effects, d_t.

We then lag the explanatory variables, consistent with Billett, King, and Mauer (2007); Datta, Iskandar-Datta, and Raman (2005); Johnson (2003).[9] While leverage may influence unsecured debt contemporaneously, leverage today is unlikely to affect previous unsecured debt choices. Conversely, previous unsecured debt choices may have effects on leverage that remain observable in the current period. The lagged model is specified as follows:

$$Lev_{it} = \gamma_1 L.Unsec_{it} + \beta L.\mathbf{x}_{it} + f_i + d_t + u_{it} \tag{2}$$

where coefficients and variables are defined as in Equation 1 and $L.$ denotes the lag operator. Fixed effects are included as before. In order to control for the possibility of firm-specific, time-varying unobservable effects, we follow DeAngelo and Roll (2015) and run a robustness check controilling for firm-decade fixed effects.

Next, we explore the effects of unsecured debt on the stability of leverage. Following DeAngelo and Roll (2015), we define a stable regime as the number of consecutive periods (quarters) for which leverage stays within a range of +/-5%. We then replace the dependent variables

[9] Bellemare, Masaki, and Pepinsky (2015) note that lagged explanatory variables address endogeneity when there is (i) serial correlation in the potentially endogenous explanatory variable, and (ii) no serial correlation among the unobserved sources of endogeneity.

in (1) and (2) with this measure. Again, we run robustness checks controlling for firm-decade fixed effects (DeAngelo and Roll, 2015).

Estimating the effects of leverage levels and stability on firm value

After considering the effects of unsecured debt usage on leverage level and stability, we examine how these choices affect firm value. Doing so requires an empirical measure of relative firm value. For this purpose we appeal to Tobin's (1969) q theory in the presence of financial frictions, as described for instance in Almeida, Campello, and Weisbach (2011); Bolton, Chen, and Wang (2011); Fazzari, Hubbard, and Petersen (1988) or Hennessy, Levy, and Whited (2007).

Empirically, we can observe average Q, which compares average asset productivity with the firm's weighted average cost of capital. In the presence of financial frictions, the weighted average cost of capital, and thus firm value, will be a function of the firm's capital structure choices. Following McConnell and Servaes (1995) and others, we use the market-to-book (MB) ratio as a proxy for Q.[10]

We face the following empirical complications in identifying capital structure effects on firm value. The MB ratio and capital structure choices may be driven by unobservables. As before,

[10]Empirically extracting cost of capital from Q requires isolating capital structure effects from other factors affecting Q. These other factors include the characteristics of assets-in-place, real-side operational efficiencies and investment activity. Because we analyze a particular industry that almost exclusively holds income-producing commercial real estate assets, there is little variability in asset characteristics across firms (we use firm fixed effects in all of our specifications in any case). Thus, given appropriate model specification, a higher MB ratio implies a lower cost of capital and therefore a higher firm value. Further, empirical measures of Q may be subject to measurement error when replacement costs are proxied by the depreciated book value of assets (Erickson and Whited, 2000). However, Hartzell, Sun, and Titman (2006) and Ott, Riddiough, and Yi (2005) show that the depreciated book value of real estate assets is closely correlated with their replacement cost, mitigating a potential measurement error, Also see Riddiough and Wu (2009). As an alternative to MB, other estimates of the value of assets-in-place exist, often referred to as net asset value (NAV) estimates. The primary issue with using these values is that they are typically calculated based on proprietary valuation methods, and therefore are subjective. As a result, they are not easily replicable by independent analysts. MB ratios are, in contrast, consistently measured, independently verified and easily obtained.

we address the resulting omitted variable bias by controlling for firm and time fixed effects. Further, the MB ratio also captures growth opportunities, where firms with more growth opportunities may have lower leverage in order to mitigate underinvestment (Myers, 1977; Stulz and Johnson, 1985). Firms with more growth opportunities at a given point in time may further exhibit greater variation in investment over time. They may also be young and have more volatile earnings (Dessí and Robertson, 2003). Therefore, we control for growth opportunities using the price-to-FFO ratio (McConnell and Servaes, 1995), as well as for realized real estate investment growth and firm age. Finally, there may be contemporaneous feedback effects, resulting in reverse causality, when the firm's MB ratio influences its leverage choices for reasons unrelated to growth opportunities, as described in Berger and Bonaccorsi di Patti (2006).

In order to address these issues, we estimate a baseline (contemporaneous OLS) panel model of the MB ratio as a function of market leverage (Lev) and leverage stability ($Stab$) as follows:

$$MB_{it} = \gamma_1 Lev_{it} + \gamma_2 Stab_{it} + \beta \mathbf{x}_{it} + f_i + d_t + u_{it} \tag{3}$$

where $\mathbf{x_{it}}$ contains the observable covariates and u_{it} is the residual. We include the same control variables as before. We control for time-invariant unobservable firm characteristics using firm fixed effects, f_i, and for time-varying unobservables using time (quarter) fixed effects, d_t. As before, we then lag the explanatory variables to mitigate potential endogeneity:

$$MB_{it} = \gamma_1 L.Lev_{it} + \gamma_2 L.Stab_{it} + \beta L.\mathbf{x}_{it} + f_i + d_t + u_{it} \tag{4}$$

where coefficients and variables are defined as in Equation 3 and $L.$ denotes the lag operator. Control variables and fixed effects are included as before. Similarly, to control for the possibility of firm-specific, time-varying unobservable effects, we follow DeAngelo and Roll (2015) and also run robustness checks controlling for firm-decade fixed effects.

The sample

We employ data on listed US equity REITs obtained from the *SNL Financial* database. *SNL Financial* is a large commercial data provider of REIT financial and market pricing data. We begin the sample period in 1993, which corresponds to the inception of the "modern REIT era" marked by the introduction of the UPREIT legislation. Later on we provide detail regarding the effects of the UPREIT legislation and firm status when we take an instrumental variable approach to identification. The study period goes through 2014. All firm-level data are obtained from *SNL*. Our final sample contains 7,985 complete firm-quarter observations, an average of about 100 firms per quarter.

We adopt an unbalanced panel approach to mitigate survivorship bias (Baum, 2006). Firms enter the sample when they first appear on *SNL* and meet the data requirements, and exit when they become inactive (acquired/privatized/defunct). Entry and exit may be related to capital structure. Fama and French (1999) study *Compustat* firms and find that the capital structure of firms exiting the sample is no different from other firms. They also find that younger firms have more equity capital, perhaps because they entered the sample in a "hot" equity market. We address this issue through time fixed effects and the firm age control.

We measure each firm's Q using the MB ratio as calculated on a quarterly basis. Observations with a MB ratio outside of [0.5,2] are excluded in order to mitigate any undue influence of outliers. For the same purpose, all other firm characteristics and capital structure variables are winsorized at the 1^{st} and 99^{th} percentiles.

Table 1 presents the characteristics of the sample firms during the study period. The MB ratio is on average 1.26. The average market leverage ratio is 0.47. This is higher than for industrial firms with an average of 0.18 (Barclay, Heitzman, and Smith, 2013). The mean duration of stable market leverage regimes within +/-5% of leverage is just over 5 quarters, but ranges from 0 to 40 quarters.

Consistent with Brown and Riddiough (2003), the firms in our sample generally use a mix of secured and unsecured debt, where the mean unsecured debt ratio is 0.37.[11] Given the typical REIT debt structure as described for instance in Giambona, Mello, and Riddiough (2016), all long-term debt is either secured (mortgage) debt or unsecured corporate level debt. As a result, the share of unsecured debt to total debt of 0.37 implies a share of secured (mortgage debt) to total debt of 1-0.37=0.63, as shown in the table. As expected based on the institutional and regulatory features of REITs, the mean fixed assets ratio is high at 0.84, while the mean cash to assets ratio is low at 0.02. This low cash retention rate confirms Ott, Riddiough, and Yi (2005) in that REITs generally do not have an immediate store of inside liquidity available to fund investment, mitigating concerns that cash serves as a substitute for excess debt capacity (we control for cash to total assets in any case).

[11] Also, the sample REITs held positive amounts of unsecured debt in 77.5% of firm-quarters. Conversely, in 22.5% of firm-quarters, the sample REITs held only secured debt. The share of firm quarters where the sample REITs exclusively use unsecured debt is 2.7% of the total.

[Table 1 about here.]

Table 2 presents pairwise correlation coefficients between the variables in our study. We find significant inverse correlations between the MB ratio and market leverage. On the other hand, we find that the MB ratio is positively correlated with the duration of stable regimes in market leverage, consistent with the notion that shareholders value leverage stability. We further find that market leverage is inversely correlated with unsecured debt, consistent with our argument that unsecured debt commits management to lower leverage levels. Unsecured debt is also positively correlated with longer stable regimes in market leverage, in line with our argument that the strict financial covenants embedded in unsecured debt induce time consistency and hence greater stability in REIT leverage choices.

A low unconditional correlation of 0.02 between leverage levels and stability is found, suggesting that low and stable leverage do not automatically occur together. Rather, as we will argue, both may be facilitated through the commitment value of unsecured debt. Beyond that, Table 2 generally indicates no excessive correlations, alleviating concerns surrounding multicollinearity in our regressions.

[Table 2 about here.]

Results

Empirical regularities

Figure 1 shows a scatter plot of the market leverage ratio versus the proportion of unsecured debt to total debt, along with a regression line fitted to the data. The fitted line shows a downward trend in the market leverage ratio as a function of unsecured debt, consistent with the hypothesized effect that unsecured debt covenants limit leverage to preserve debt capacity. Conversely, the scatter plot in Figure 2 shows an upward trend in the stability of market leverage, measured as the duration of stable regimes of market leverage (the number of consecutive quarters staying within +/-5% of the previous quarter's market leverage, following DeAngelo and Roll (2015)), as a function of unsecured debt, consistent with the posited commitment effects of unsecured debt.

[Figures 1 and 2 about here.]

Figure 3 shows the time series evolution of mean market leverage across firms that use only secured debt in their capital structure versus those firms that use at least some unsecured debt. The graph shows that firms with at least some unsecured debt in their capital structure tend to have lower ratios of market leverage through time. Furthermore, the mean market leverage of firms with at least some unsecured debt also displays less variation over time. These relations are again consistent with the hypothesis that unsecured debt covenants impose not only limits to leverage but also time-consistency in financial management.

[Figure 3 about here.]

Figure 4 shows a scatter plot of the MB ratio as a function of leverage. A cubic spline fitted to the plot indicates that the MB ratio is flat to slightly increasing at low leverage levels, up to about 25%. Then the MB ratio peaks and begins to decrease when leverage exceeds 30%, which we hypothesize reflects the costs of lost financial flexibility. The neutral to weakly positive relationship between the MB ratio and leverage at very low leverage levels suggests that the incremental costs to lost financial flexibility are low for low debt levels, implying that an internal optimum may exist as opposed to a corner solution.

[Figure 4 about here.]

Figure 5 shows a scatter plot of the MB ratio as a function of the stability of leverage, measured as the duration of stable regimes (within +/-5% quarter-over-quarter). A linear regression is fitted to the plot and shows a positive relationship between leverage stability and firm value. In combination with Figure 4, these relations imply that keeping leverage not only low but also stable are both value-relevant components.

[Figure 5 about here.]

In Table 3 we show an unconditional, multivariate analysis that highlights combinations of capital structure and firm characteristics that are empirically associated with a higher MB ratio. We sort all firm-quarter observations into quintiles ranked by the MB ratio, with quintile 1 containing the lowest MB ratio firms and quintile 5 containing the highest MB ratio firms. We tabulate the corresponding mean capital structure and firm characteristics in each quintile, and test the hypothesis that these means differ significantly across the top and bottom quintiles.

The Table shows a number of significant differences across the quintiles. We again find a negative relationship between the MB ratio and leverage. The highest MB ratio firms have a mean leverage ratio of 0.39 whereas the lowest MB ratio firms have a mean leverage ratio of

0.55. Graham and Leary (2011) report that the firm value function is essentially flat across a wide range of leverage outcomes for many firms. In contrast, we find that the value function is highly sensitive to capital structure. Unconditionally, a roughly 15% variation in total leverage is associated with an approximately 50% change in the MB ratio.

Further, we find that the firms in the highest MB ratio quintile simultaneously have significantly more stable leverage, as the mean duration of stable regimes (within +/-5% quarter-over-quarter) increases from less than 4 quarters to almost 7 quarters. In addition, we find that firms with higher MB ratios also have higher shares of unsecured debt (0.47 versus 0.24). Lastly, the table shows that firms with higher MB ratios hold less cash (1.8% of assets versus 2.3% of assets). This observation suggests that, even if REITs are able overcome the limitations to cash retention imposed by direct or indirect regulation, REIT shareholders do not appear to value the retention of cash reserves, consistent with findings highlighted in Pinkowitz and Williamson (2007).

[Table 3 about here.]

The effects of unsecured debt on leverage levels and stability

Next, we present OLS regression results. Following equations (1) and (2), Table 4 reports the estimation results from regressing market leverage on unsecured debt usage and the control variables. The columns report parameter estimates corresponding to the contemporaneous and lagged specifications.

[Table 4 about here.]

Our results indicate a significant inverse relationship between leverage and the share of unsecured debt. This finding relates to the literature that considers capital structure as a multi-dimensional choice problem as in, for instance, Barclay, Marx, and Smith (2003); Johnson (2003), or Giambona, Harding, and Sirmans (2008). Our results imply that unsecured debt, through the strict application of standardized debt covenants, is associated with lower leverage by committing management to maintain a collateral liquidity buffer. We note that our focus on manager-shareholder conflicts is different from the debtholder-shareholder conflict channel typically emphasized in the literature.

Our next hypothesis reflects the observation that unsecured debt covenants not only reduce leverage levels but also improve time-consistency as manifested in the stability of leverage. Table 5 shows the corresponding results.[12] The dependent variable is now the stability of leverage ratios through time, measured as the duration of (+/-5%) stable regimes defined following DeAngelo and Roll (2015). The primary result of interest is the effect of unsecured debt usage on leverage stability. The columns report the parameter estimates corresponding to specifications that serve to address the identification issues we discussed.[13]

[Table 5 about here.]

We find that the stability of leverage increases in the share of unsecured debt. In combination with our findings in Table 4, our results suggest that unsecured debt produces more stable as well as lower leverage ratios. These findings relate to the question of how stable leverage

[12] Our results are robust to controlling for the possibility of firm-specific, time-varying unobservable effects, as measured by firm-decade fixed effects (DeAngelo and Roll, 2015).

[13] We note that our findings on unsecured debt and leverage stability are robust to controlling for leverage levels and for the volatility of the firm's stock price.

is through time. Several influential studies suggest that a large proportion of variation in leverage is driven by a "permanent component" (Lemmon, Roberts, and Zender, 2008) or "missing stable factor" (Flannery and Rangan, 2006). In contrast, DeAngelo and Roll (2015) present evidence showing significant time variation in observed leverage ratios, contradicting the notion that leverage is stable "back to the beginning". Our results contribute to this debate by identifying unsecured debt usage, with its strict leverage covenants, as a specific mechanism that induces stability in leverage ratios through time.

The effects of leverage levels and stability on firm value

The next step in our analysis is to consider the effects of leverage levels and stability on firm value, with a focus on the costs of lost financial flexibility from exhausting corporate debt capacity. Table 6 presents the results of the regression analysis estimating the marginal impact of changes in leverage levels and leverage stability on the MB ratio. The columns report the parameter estimates corresponding to the specifications discussed.

[Table 6 about here.]

As hypothesized, we find a significant inverse relationship between leverage and the MB ratio, implying that the firm's WACC increases as a function of total leverage over a wide range.[14] Together with the high average absolute leverage levels for collateral-rich REITs as compared to industrial firms[15], we believe this finding provides support for the importance of retaining spare debt capacity as a source of financial flexibility.

[14] Our results are robust to controlling for the possibility of firm-specific, time-varying unobservable effects, as measured by firm-decade fixed effects (DeAngelo and Roll, 2015).

[15] Recall Table 1 and Figure 4, the latter of which indicates that REITs with less than 25% leverage do not incur substantial costs of lost financial flexibility.

The economic impact of our findings is significant. Considering a firm with an average MB ratio of 1.26 and an average market leverage ratio of 0.47, we find that an increase in market leverage by one standard deviation (0.15) leads to a decrease in the MB ratio of approximately 10 basis points or almost 9% relative to the sample mean. These findings contrast with Graham and Leary's (2011) previous finding that firm value is often surprisingly insensitive to capital structure choices.

Finally, we also find that more stable leverage is significantly related to a higher MB ratio. The evidence is consistent with the notion that long-term non-recourse mortgage debt lacks commitment, leading to agency problems that are exacerbated by limitations on share block holdings and the inability to discipline management through the market for corporate control. Our findings suggest that unsecured debt provides a mechanism to address both issues, with standard covenants that cause leverage to remain lower and more stable, thus enhancing financial flexibility to positively affect firm value.

Some argue that corporate governance provisions protecting shareholder rights are less relevant for firm value in REITs due to the restrictions on managerial discretion imposed by the REIT regulation (Bauer, Eichholtz, and Kok, 2010; Campbell, Ghosh, Petrova, and Sirmans, 2011; Hartzell, Kallberg, and Liu, 2008). That would imply that the market for corporate control is not actually required for imposing managerial discipline in REITs. Our findings suggest direct linkages between a weak underlying structure, debt choice, and then firm value. This may as a result partly explain the weak relationship between measures of corporate governance versus REIT value and performance sometimes found in empirical studies that do not consider the governance mechanisms implied in the composition of the firm's capital structure – in particular, the commitment value of unsecured debt.

Estimation via IV

Instrument choice

As an alternative estimation strategy, we specify instrumental variable (IV) models for leverage levels and stability as a function of unsecured debt. We propose using the firm's UPREIT status as an instrument for unsecured debt. In the following paragraphs, we lay out the rationale for our choice and provide empirical evidence to support it.

UPREIT stands for umbrella partnership REIT. It is a provision of the US tax code that allows individuals or other entities to contribute real estate assets to a REIT in exchange for equity partnership units in that firm. As long as the contributing party remains in possession of the partnership units, and the firm remains in possession of the contributed assets, this exchange defers payment of capital gains taxes that would otherwise become due as a result of a regular sale of the asset.[16] Importantly, the capital gains tax liability is determined on the level of the asset concerned before it becomes part of the REIT's portfolio, and thus does not depend on the REIT's firm or financial characteristics.

The decision whether or not to adopt the UPREIT structure is mostly taken around the beginning of the firm's life. In this case, individuals typically begin contributing assets to the

[16] For more details, see Ling and Ryngaert (1997). Technically, the UPREIT structure is not formally embedded in the tax code. But the structure has been used successfully as a mechanism to defer capital gains tax payments in the REIT sector since 1993, remaining unchallenged by the IRS for close to 25 years now. There is consensus in the industry that the IRS has, through a policy of inaction, fully accepted the UPREIT structure with little or no risk of reversal on the issue. REITs may also use what is termed as a DownREIT structure to accomplish the same basic purpose as an UPREIT structure (i.e., deferral of capital gains taxes). The primary difference between the two structures is that contributed assets exchanged for UPREIT share units are pooled together with other assets of the firm so that value changes in common shares and UPREIT shares move in lockstep with one another (typically on a one-for-one basis). In contrast, contributed assets in a DownREIT structure are, for valuation purposes, segregated from other firm assets. We understand from SNL that the vast majority of units issued are UPREIT shares.

firm in exchange for partnership units shortly after the firm is incorporated. These individuals then usually become part of the top management of the firm. As noted, the contributed assets must stay within the firm in order to ensure the continued deferral of capital gains taxes. Remaining in control over the contributed assets as it relates to their retention is therefore of first-order importance to UPREIT managers.

The strong asset retention motive leads us to hypothesize that UPREIT managers will be inclined to ring-fence those contributed assets by issuing secured non-recourse mortgage debt. They do this because mingling contributed assets with other firm assets through unsecured debt issuances runs the risk of losing control over the retention of those assets, which could then trigger a tax liability to the UPREIT unitholder.[17] Coincidentally, unsecured debt generally places no limits on asset sales, whereas secured mortgage debt does.[18] Given that UPREIT managers prefer not to sell or otherwise lose control of contributed assets, we posit that they favor secured mortgage debt over unsecured debt, all else being equal.

Empirically, we define an UPREIT status variable as follows. On a quarterly basis our data source, SNL, reports two relevant numbers: the firm's market capitalization, defined as the aggregate value of all common stock, and the implied market capitalization. The latter includes, in addition to the aggregate value of common shares, the "as converted" value of UPREIT or DownREIT units. In those quarters where the implied market valuation exceeds the market capitalization of common shares, we can conclude that UPREIT/DownREIT unit

[17] We note that the incentive to finance contributed assets with secured non-recourse mortgage debt is even stronger with a DownREIT structure, since the contributed assets remain segregated from the other assets of the firm.

[18] Secured debt providers generally do not allow for the substitution of collateral due to asset substitution concerns. Without an ability to substitute collateral, secured mortgage lenders limit asset sales through loan prepayment restrictions that either fully restrict prepayment for a set period of time or allow prepayment only at a significant cost.

shares are outstanding. The UPREIT variable is thus a zero-one indicator that can vary through time for a given firm. Figure 6 shows the evolution of the aggregated mean value of the UPREIT indicator through time.

[Figure 6 about here.]

We present the following evidence to provide support for using the firm's UPREIT status as IV for unsecured debt in the leverage and leverage stability models. First, we expect that the firm's existing capital structure to have no influence on the decision to adopt UPREIT status. This follows because the dominating motive behind that choice is the deferral of property-level capital gains taxes, which are independent of the firm's debt structure. Based on a sample of firms that existed prior to issuing UPREIT units, Table 7 shows that the choice of the firm to issue UPREIT units is independent of pre-existing capital structure characteristics in terms of leverage, leverage stability and unsecured debt.

[Table 7 about here.]

Next, we do not expect UPREIT to influence the amount of leverage chosen in every period, and thus the stability of leverage, directly. If the CEO/UPREIT unitholder seeks to protect the contributed asset from effects of firm-wide financial distress and bankruptcy, non-recourse secured mortgage debt allows for that in a targeted manner, even when the firm is significantly leveraged. A policy of zero to low leverage would also work in this regard, but that policy has firm-wide implications and potentially lacks commitment. In other words, a choice of no to low leverage has implications for a variety of the firm's financial, operating and strategic objectives.

A much more targeted solution to preserving control over contributed assets is to treat those assets narrowly with respect to the secured versus unsecured debt financing decision rather than implement wholesale firm-wide changes to financial management policies. Table 8 shows that UPREIT status has no direct influence on the level or stability of leverage.[19]

[Table 8 about here.]

Lastly, we posit that UPREIT status does influence the share of unsecured debt in the firm's capital structure. Specifically, we expect UPREIT status to be associated with higher shares of secured mortgage debt, as UPREIT managers have strong incentives to ensure contributed assets remain within direct control of the firm. Unsecured debt, in contrast, offers no specific protection against asset control changes given unrelated covenant violations as well as no restrictions on asset sales.

As additional evidence in support of UPREIT status as an appropriate IV, we layer scatter plots of the share of secured debt on a firm-quarter basis as a function of firm age for UPREITs versus non-UPREITs. We then fit a linear regression line to each layer, omitting the underlying scatter plots for readability. Figure 7 shows that there are only minor differences in the mean share of secured debt when firms are young, consistent with our finding that the UPREIT adoption decision is independent of the firm's capital structure. As firms age, however, non-UPREITs steadily decrease their reliance on secured debt relative to UPREITs.[20]

[19] This result also holds when we lag the right-hand side variables, and when we control for unsecured debt and the market-to-book ratio.

[20] This relationship stands in contrast with the total leverage relationship (not shown), where there are only small differences between UPREITs and non-UPREITs with respect to total leverage when firms are young (UPREITs are actually slightly more levered than non-UPREITs at IPO), with those small differences persisting as firms age, moving in parallel.

[Figure 7 about here.]

In direct support of the effect of UPREIT status on the secured versus unsecured debt choice, we report results corresponding to the first-stage regression from the IV-2SLS model. Table 9 shows that the coefficient on the UPREIT status variable is significant and has the expected negative sign in the regression for unsecured debt. The reliance of UPREITs on secured debt is consistent with the rationale that UPREIT managers have incentives to retain control of contributed assets in the firm to defer payment of capital gains taxes.

[Table 9 about here.]

IV estimation results

Using the UPREIT IV in 2SLS models of market and book leverage, the results in Table 10 confirm our previous findings that unsecured debt reduces leverage. Note that the under-identification LM statistic for the relevance of the UPREIT indicator as an instrument for unsecured debt is 80.13 with a p-value < 0.01.

[Table 10 about here.]

We further estimate a model for the stability of leverage based on this IV specification, and alternatively employ the stability of book and market leverage. We also control for path dependence in the stability of leverage, and therefore estimate dynamic panel models following Arrellano and Bond (1991). The results reported in Table 11 show that our previous conclusions are robust to these specifications.

[Table 11 about here.]

Next, we replicate the regressions for firm value as a function of leverage levels and stability based on a similar Arrellano and Bond (1991) dynamic panel-IV model. Here we employ instrumental variables to estimate simultaneous equations for leverage and firm value, similar to Agrawal and Knoeber (1996); Dessí and Robertson (2003); Harvey, Lins, and Roper (2004). Following Dessí and Robertson (2003), we use earnings growth volatility (Bradley, Jarrell, and Kim, 1984) and firm size (Altinkiliç and Hansen, 2000; Leary and Roberts, 2005) as instruments for leverage.[21] The findings presented in Table 12 indicate that our conclusions are robust to these alternative specifications.

[Table 12 about here.]

Lastly, we note that our rationale for choosing the UPREIT status as IV for unsecured debt should also relate to the actual amount of UPREIT shares issued, not just the indicator for whether or not the firm has adopted the UPREIT status. To confirm, we replicate the results from Tables 10 and 11 using the actual amount of UPREIT shares outstanding, expressed as a share of the total implied market capitalization, as the IV. Table 13 shows that our IV estimation results are robust to using the numerical values of actual UPREIT shares outstanding.

[Table 13 about here.]

[21] In unreported results, we also account for the possibility that leverage stability may be endogenous. Seeing that firm size is recognized as an instrument for the levels of leverage in the literature, we use the stability of firm size (measured in the same way as the stable regime variable of leverage) as an additional instrument for leverage stability. Our conclusions remain unchanged if we instrument for leverage stability.

Robustness tests

While we generally expect an inverse relationship between leverage and firm value over a wide range of leverage levels, our hypothesis does not necessarily imply that firms should optimally hold zero leverage. Figure 4 suggests in fact that an internal optimum exists. To examine this issue further, we estimate a stepwise model with various thresholds of market leverage to illustrate that low levels of leverage may not necessarily have the same detrimental effect on firm value as higher levels of leverage. Table 14 shows, for a simple OLS specification, that market leverage levels up to c. 25% produce an insignificant effect on the MB ratio, suggesting that managers are indifferent to the use of debt relative to equity in that low leverage range. From a market leverage level of approximately 30% onwards, however, the market-to-book declines in leverage, suggesting that the costs of depleting debt capacity outweigh any potential benefits to debt that were operative at lower levels of leverage.

[Table 14 about here.]

If unsecured debt helps mitigate managerial incentives to exhaust the debt capacity of the firm unnecessarily, then we should also see an effect of unsecured debt on the extent to which a firm strays from its optimal characteristic-informed level of target leverage. We estimate target leverage as a function of relevant firm characteristics and collect the residuals as a measure for the difference between actual and target leverage. We then regress the deviations from target leverage on unsecured debt and the control variables. Table 15 shows that higher levels of unsecured debt are associated with lower deviations from target leverage, implying that unsecured debt helps keep the firm closer to its optimal level of target leverage.

[Table 15 about here.]

Li, Whited, and Wu (2016) consider legal changes implemented in the 1990s and 2000s that address the treatment of secured financing via Special Purpose Vehicles in the case of firm bankruptcy. These changes, the first of which happened in 1997, attempted to strengthen the position of secured creditors by ensuring "bankruptcy remoteness" and consequent immunity from automatic stay provisions should bankruptcy occur at the firm level. As discussed by Li, Whited, and Wu (2016), in a 2003 bankruptcy of a Texas firm these changes were repudiated by a bankruptcy judge, who effectively re-characterized debt that was supposed immune to such re-characterization. At roughly the same time, particularly during the 2001 to 2007 time window, mortgage securitization was booming, offering a cheap and plentiful funding alternative to other sources of credit for real estate firms. These secured commercial mortgages (which were placed into CMBS) were structured to be bankruptcy remote. Shortly after the Lehman bankruptcy in September 2008, a large retail REIT, GGP, defaulted on its unsecured line of bank credit and declared bankruptcy. In early 2009 the bankruptcy judge similarly repudiated the bankruptcy remote structure of the firm's CMBS debt.

All of this leads us to question whether, in spite of our inclusion of quarter fixed effects, our results are robust to sub-period regimes across which the "strength" of the bankruptcy remote secured debt structure appears to have varied significantly. To consider this issue, we define three sub-periods: 1993-2002, 2003-2008, and 2009-2014.

Figure 8 shows that, broadly consistent with our story as to the advantages of committing to low and stable leverage through unsecured debt covenants, throughout our sample period there is a strong long-term trend away from secured mortgage debt and towards unsecured debt. Interestingly, the two periods of time when the movement away from secured mortgage debt was strongest were during 1997 through early 1998 and 2006 through early 2008. These time periods coincide with generally robust markets for secured mortgage debt, during which confidence in the bankruptcy remote structure of CMBS loans was strong. In unreported results we split our sample into the noted sub-periods and re-estimate our models. We find no systematic differences in the value effects of leverage and unsecured debt across those sub-periods, with our conclusions remaining unchanged.

[Figure 8 about here.]

Conclusion

Our findings highlight the implications of liquidity management and limits to debt capacity for firm value. They further illustrate that Jensen's (1986) free cash flow problem is not limited to firms with excess cash on hand, but also extends to firms that can generate fresh cash by tapping into their available debt capacity. In this latter case, increasing leverage is not the solution to the manager-shareholder conflict, but rather a symptom of the problem.

Evidence comes from equity REITs, which are non-taxed cash-constrained going concerns, whose assets offer significant debt capacity, especially by supporting secured non-recourse mortgage debt, but whose shareholders have limited scope for disciplining managers. Given that significant value may be associated with retaining debt capacity, we develop predictions about the role of unsecured debt, with its strict imposition of standard leverage covenants, in committing management to preserving financial flexibility in a time-consistent manner.

Consistent with our predictions, we find that leverage levels decrease in unsecured debt, and that leverage is more stable in firms with more unsecured debt. Furthermore, we find that firm value is decreasing in leverage over a wide range, and increasing in leverage stability, consistent with our agency-based financial flexibility arguments. Our evidence for unsecured debt as a mechanism to enhance financial flexibility through low and stable leverage is, to our knowledge, novel.

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Figures and Tables

Firm characteristics, 1993–2014

VARIABLES	Mean	SD	P25	Median	P75	Min	Max
Market-to-book ratio	1.26	0.24	1.10	1.23	1.40	0.56	2.00
Market leverage	0.47	0.15	0.38	0.47	0.57	0.03	0.91
Stability of market leverage	5.08	5.88	1.00	3.00	7.00	0.00	40.00
Unsecured debt to total debt	0.37	0.34	0.00	0.29	0.68	0.00	1.00
Secured debt to total debt	0.63	0.34	0.00	0.32	0.71	0.99	1.00
Unsecured but no rating	0.38	0.49	0.00	0.00	1.00	0.00	1.00
Log of firm size	17.60	1.35	16.82	17.67	18.56	12.43	20.56
Earnings volatility	0.01	0.01	0.00	0.00	0.01	0.00	0.12
Profitability	0.09	0.03	0.08	0.10	0.11	0.00	0.19
Price to FFO multiple	12.38	5.43	9.04	11.43	14.58	2.30	39.33
Fixed-assets ratio	0.84	0.12	0.79	0.86	0.92	0.00	0.98
Cash to total assets	0.02	0.03	0.00	0.01	0.02	0.00	0.31
RE investment growth	0.17	0.42	-0.02	0.04	0.19	-0.48	3.10
Firm age	10.88	6.10	5.75	10.00	16.50	0.25	21.75

Table 1: *The table presents the descriptive statistics for the firm characteristics of the US equity REITs in the sample on a quarterly basis over the period 1993–2014. All firm-level information is obtained from SNL. The total number of observations is 7,985. The market-to-book (MB) ratio is the market value of assets over the book value of assets. The market value of assets is the book value of assets (defined as all assets owned by the company as of the date indicated, as carried on the balance sheet and defined under the indicated accounting principles) minus book value of common equity plus market value of equity (number of common shares outstanding multiplied by the end of quarter share price). Market leverage is the ratio of total liabilities plus mezzanine items to the market value of assets. Stability of market leverage is the number of consecutive quarters during which market leverage remains within a regime of +/-5%. Unsecured debt is the ratio of unsecured debt to total debt. Secured debt is the ratio of secured to total debt. Unsecured but no rating is an indicator that equals 1 if a firm has unsecured debt but no debt rating, and zero otherwise. Firm size is measured as the log of total revenue. Earnings volatility is measured as the standard deviation in EBITDA growth over four quarters, scaled by the average book value of assets over that period. Profitability is the ratio of the rental net operating income (NOI) to the average value of the REIT's properties in a quarter. The price to FFO ratio is the ratio of the share price to funds from operations (FFO) per share. The fixed assets ratio is the ratio of net property investment to total book value of assets. The cash to total assets ratio measures cash and cash equivalents as a proportion of total assets. Real estate (RE) investment growth is the quarterly rate of growth in net real estate investment. Firm age is measured in years since IPO/initial listing.*

Cross-correlation table

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Market-to-book ratio	1												
(2) Market leverage	-0.4629*	1											
(3) Stability of market leverage	0.1970*	0.0222*	1										
(4) Unsecured debt to total debt	0.2247*	-0.3768*	0.1055*	1									
(5) Unsecured but no rating	-0.0759*	0.0694*	-0.1519*	-0.1109*	1								
(6) Log of firm size	0.2977*	-0.0575*	0.1806*	0.3689*	-0.2104*	1							
(7) Earnings volatility	-0.1043*	0.0976*	-0.1138*	-0.1224*	0.0169	-0.0732*	1						
(8) Profitability	0.1745*	-0.0621*	-0.0264*	0.0670*	0.0545*	-0.2541*	-0.1030*	1					
(9) Price to FFO multiple	0.4327*	-0.3281*	0.0399*	0.0843*	-0.0508*	0.2364*	-0.0377*	-0.2536*	1				
(10) Fixed-assets ratio	-0.0805*	0.0910*	0.1030*	-0.0506*	0.0047	-0.0740*	-0.1464*	-0.0169	-0.1392*	1			
(11) Cash to total assets	-0.0048	-0.0698*	-0.1328*	-0.1649*	-0.0596*	-0.1177*	0.1492*	-0.0664*	0.1255*	-0.3025*	1		
(12) RE investment growth	0.0149	-0.0796*	-0.1547*	-0.0241*	0.0735*	-0.0576*	-0.0345*	0.0871*	0.0729*	0.0253*	-0.0185	1	
(13) Firm age	0.2516*	-0.1269*	0.1022*	0.1369*	-0.1027*	0.4774*	-0.0052	-0.4520*	0.4311*	-0.1419*	0.0689*	-0.1170*	1

Table 2: *The table presents the pairwise Pearson correlation coefficients for the capital structure and firm characteristics of the US equity REITs in the sample over the period 1993–2014. All variables are defined as in Table 1.The asterisk denotes significance of the difference of correlation coefficients from zero at the 5% level.*

Scatter plots of market leverage versus unsecured debt to total debt

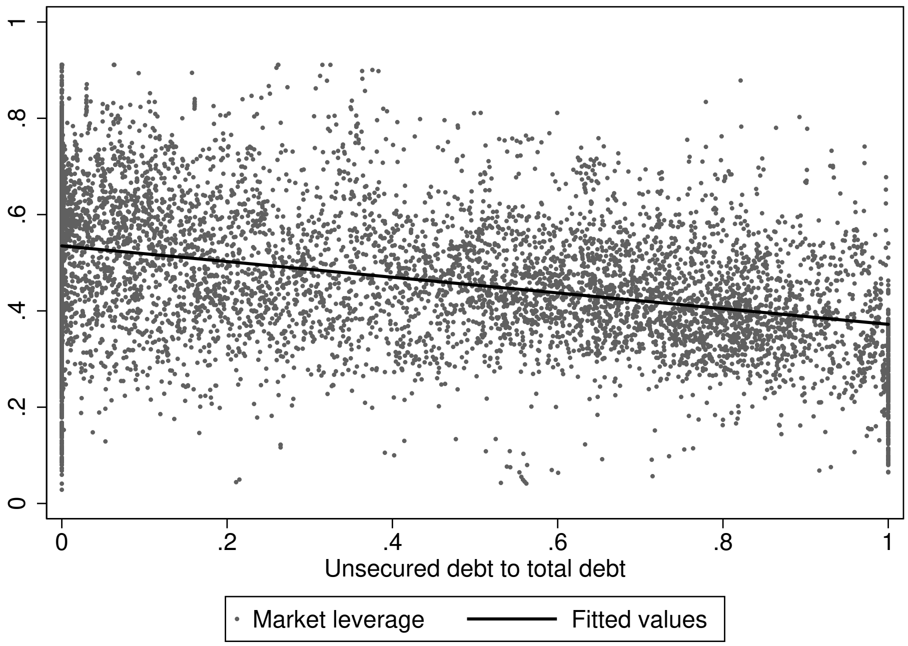

Figure 1: *The figure shows a scatter plot of the market leverage ratio of listed US equity REITs on the vertical axis as a function of the share of unsecured debt to total debt. A linear regression is fitted to the scatter plot.*

Scatter plots of stable regimes (5%) of market leverage versus unsecured debt to total debt

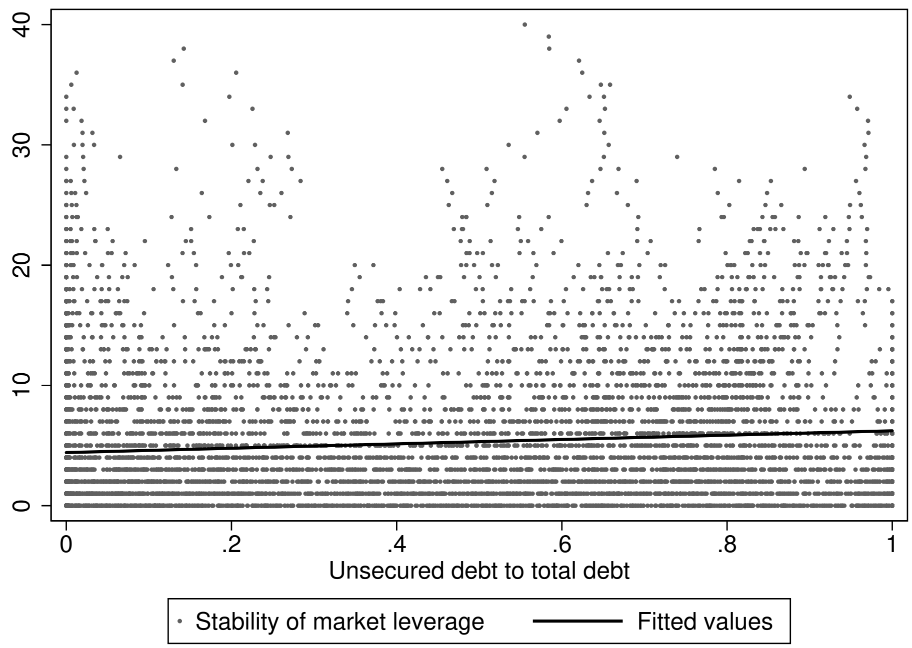

Figure 2: *The figure shows a scatter plot of the stability of market leverage of listed US equity REITs, measured as the duration (in quarters) of stable regimes (5%), on the vertical axis as a function of the share of unsecured debt to total debt. A linear regression is fitted to the scatter plot.*

Time series evolution of market leverage by secured/unsecured financing

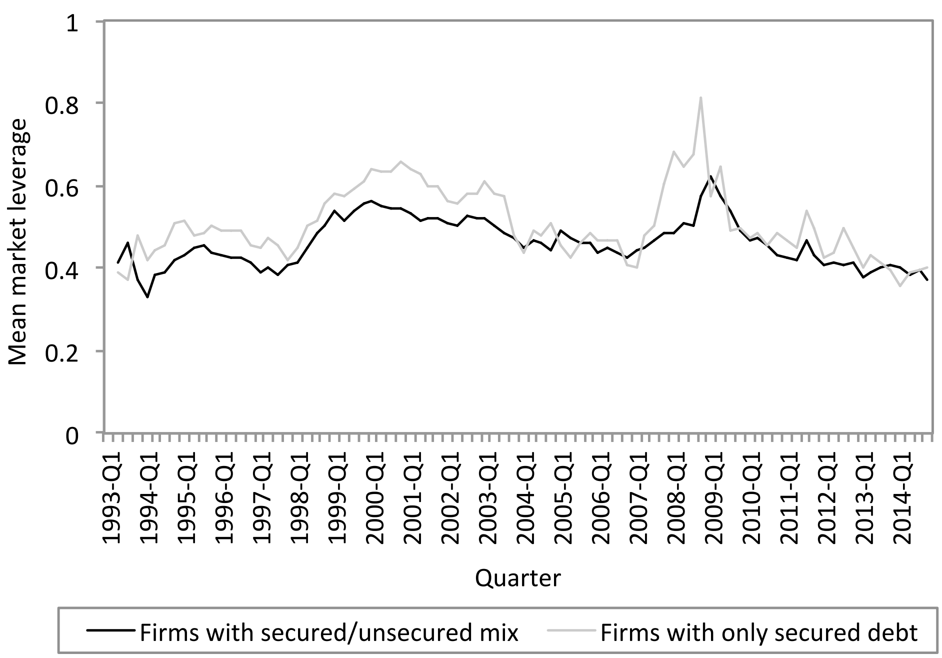

Figure 3: *The figure shows the time series evolution of mean leverage across firms that utilize only secured debt versus mean leverage across firms that utilize at least some unsecured debt.*

Scatter plots of MB ratio versus market leverage

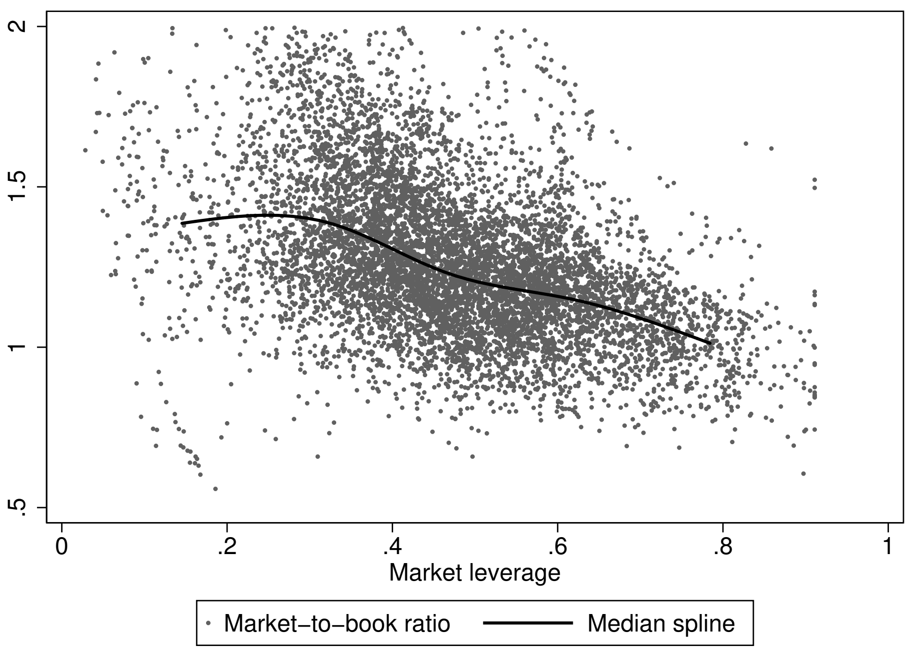

Figure 4: *The figure shows a scatter plot of the market-to-book (MB) ratio of listed US equity REITs as a function of leverage. A cubic median spline is fitted to the scatter plot.*

Scatter plots of MB ratio versus stable regimes (5%) of market leverage

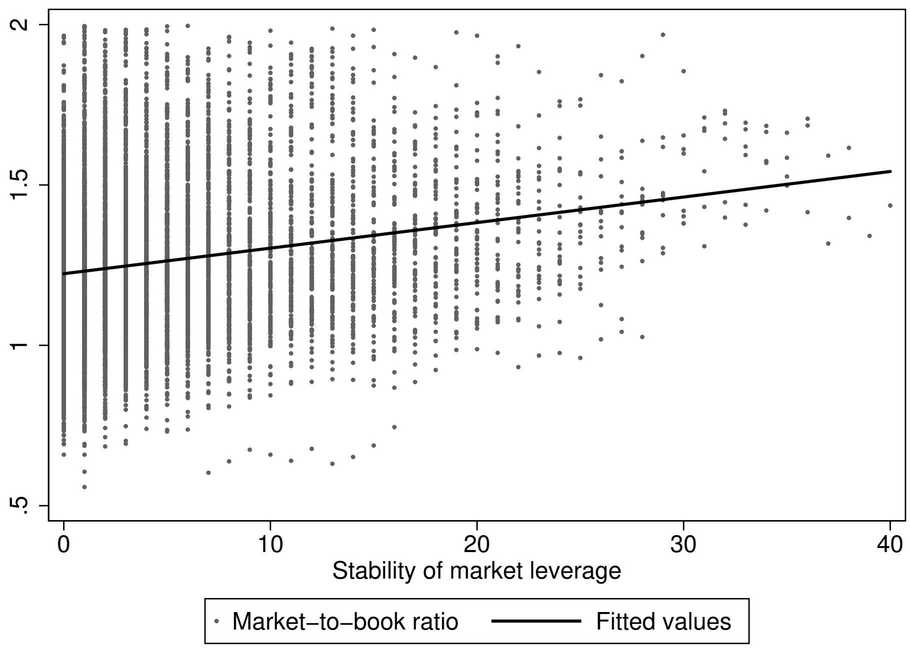

Figure 5: *The figure shows a scatter plot of the market-to-book (MB) ratio of listed US equity REITs on the vertical axis as a function of the stability of leverage, measured as the duration (in quarters) of stable regimes (5%). A linear regression is fitted to the scatter plot.*

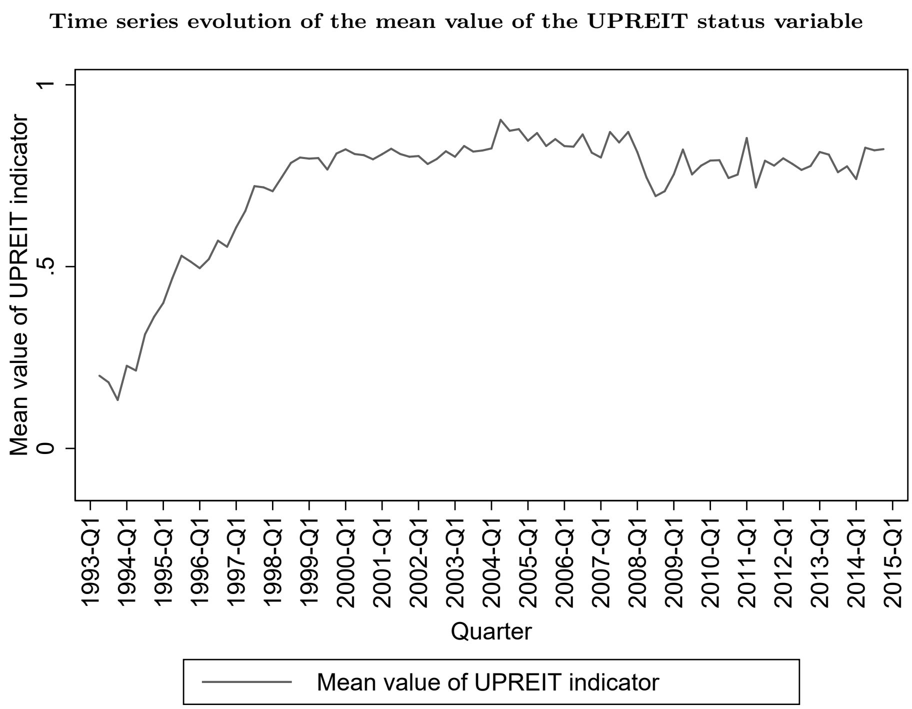

Figure 6: *The figure shows the time series evolution of the mean value of the UPREIT status variable.*

Firm characteristics by market-to-book ratio quintile, 1993–2014

VARIABLES	1	2	3	4	5	Difference	(t-statistic)
Market-to-book ratio	1.003	1.146	1.243	1.352	1.589	0.586***	(105.25)
Market leverage	0.550	0.511	0.472	0.441	0.398	-0.152***	(-30.49)
Stability of market leverage	3.813	4.355	4.972	5.783	6.553	2.739***	(13.21)
Unsecured debt to total debt	0.244	0.316	0.380	0.435	0.474	0.230***	(19.49)
Unsecured but no rating	0.401	0.459	0.368	0.316	0.355	-0.046**	(-2.66)
Log of firm size	16.987	17.494	17.733	17.950	17.877	0.891***	(18.53)
Earnings volatility	0.008	0.006	0.006	0.005	0.005	-0.003***	(-8.34)
Profitability	0.081	0.090	0.095	0.098	0.107	0.027***	(26.41)
Price to FFO multiple	10.634	11.721	12.392	13.139	14.115	3.481***	(17.95)
Fixed-assets ratio	0.837	0.847	0.838	0.828	0.826	-0.011**	(-2.71)
Cash to total assets	0.023	0.015	0.015	0.014	0.018	-0.005***	(-4.18)
RE investment growth	0.150	0.185	0.183	0.167	0.148	-0.002	(-0.11)
Firm age	10.875	10.891	10.873	10.891	10.859	-0.016	(-0.07)

Table 3: *The table presents the capital structure characteristics of the US equity REITs in our sample over the period 1993–2014 when sorted into quintiles by quarterly market-to-book ratio. All variables are defined as in Table 1. The Table also shows the spread (Difference) between the mean variable values across the 5th (highest) and 1st (lowest) market-to-book ratio quintile alongside the corresponding t-statistic from a two-group mean-comparison test. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Regression results for the levels of market leverage, 1993–2014

	(1) OLS		(2) OLS lagged	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
Unsecured debt to total debt	-0.048***	-2.65	-0.042**	-2.31
Price to FFO multiple	-0.004***	-5.33	-0.003***	-4.49
RE investment growth	0.000	0.12	-0.004	-1.22
Profitability	-0.920***	-3.84	-0.834***	-3.47
Fixed-assets ratio	0.031	0.63	0.032	0.67
Cash to total assets	-0.479***	-4.96	-0.357***	-3.56
Firm age	-0.034*	-1.82	-0.086***	-5.50
Log of firm size	0.022**	2.02	0.024**	2.15
Earnings volatility	0.620***	2.81	0.518***	2.62
Unsecured but no rating	-0.003	-0.36	-0.004	-0.45
Observations	7,985		7,985	
R-squared	0.345		0.332	
Number of firm clusters	275		275	
Firm FE	Y		Y	
Quarter FE	Y		Y	

Table 4: *The table presents the regression results estimating the firm-quarter observations of the market leverage ratio for US equity REITs as a function of unsecured debt and firm characteristic control variables. Variables are defined as in Table 1. Column (1) shows the baseline results of the contemporaneous relationships. Column (2) addresses simultaneity between leverage and unsecured debt by estimating the leverage ratio as a function of lagged capital structure and firm characteristics. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. All t-statistics are calculated based on standard errors clustered by firm. Significance is indicated as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*

Regression results for the stability of market leverage, 1993–2014

	(1) OLS		(2) OLS lagged	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
Unsecured debt to total debt	3.291***	4.07	3.037***	3.90
Price to FFO multiple	-0.041**	-1.99	-0.044**	-2.12
RE investment growth	-1.330***	-9.78	-1.071***	-8.22
Profitability	-3.306	-0.32	-4.647	-0.46
Fixed-assets ratio	2.415	1.13	2.655	1.24
Cash to total assets	-9.871***	-2.62	-8.574**	-2.32
Firm age	0.379	0.32	-0.232	-0.21
Log of firm size	-0.667*	-1.65	-0.465	-1.18
Earnings volatility	-46.343***	-4.24	-47.868***	-4.80
Unsecured but no rating	-0.813**	-2.15	-0.873**	-2.43
Observations	7,985		7,985	
R-squared	0.202		0.200	
Number of firm clusters	275		275	
Firm FE	Y		Y	
Quarter FE	Y		Y	

Table 5: *The table presents the regression results estimating the firm-quarter observations of stable regimes (number of consecutive quarters during which market leverage remained in a range of +/-5%) for US equity REITs as a function of unsecured debt and firm characteristic control variables. Variables are defined as in Table 1. Column (1) shows the baseline results of the contemporaneous relationships. Column (2) addresses simultaneity between leverage stability (stable regimes) and unsecured debt by estimating leverage stability as a function of lagged capital structure and firm characteristics. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. All t-statistics are calculated based on standard errors clustered by firm. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Regression results for the market-to-book ratio, 1993–2014

	(1) OLS		(2) OLS lagged	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
Market leverage	-0.665***	-7.28	-0.579***	-6.82
Stability of market leverage	0.002**	2.26	0.002*	1.87
Price to FFO multiple	0.006***	5.74	0.004***	4.07
RE investment growth	-0.009	-1.57	-0.008	-1.60
Profitability	2.424***	5.44	2.402***	5.32
Fixed-assets ratio	0.135**	2.41	0.157**	2.59
Cash to total assets	-0.075	-0.53	-0.075	-0.53
Firm age	0.203***	6.40	0.364***	9.98
Log of firm size	-0.005	-0.42	-0.009	-0.68
Earnings volatility	-0.354	-0.95	-0.235	-0.68
Unsecured but no rating	0.018	1.56	0.015	1.26
Observations	7,985		7,985	
R-squared	0.595		0.556	
Number of firm clusters	275		275	
Firm FE	Y		Y	
Quarter FE	Y		Y	

Table 6: *The table presents the regression results estimating the firm-quarter observations of the MB ratio for US equity REITs as a function of their capital structure characteristics and firm characteristic control variables. Variables are defined as in Table 1. Column (1) shows the baseline results of the contemporaneous relationships. Column (2) addresses simultaneity between leverage and the MB ratio by estimating the MB ratio as a function of lagged capital structure and firm characteristics. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. All t-statistics are calculated based on standard errors clustered by firm. Significance is indicated as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*

Alternative identification strategy: Independence of UPREIT status from prior capital structure

	Lag (1)		Lag (2)		Lag (3)	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Unsecured debt to total debt	4.361	1.48	0.715	0.31	0.614	0.21
Book leverage	2.657	0.44	-0.166	-0.04	-3.797	-0.55
Stability of book leverage	0.027	0.41	-0.03	-0.41	-0.017	-0.29
Price to FFO multiple	-0.022	-0.34	0.061	1.35	-0.137**	-2.25
RE investment growth	0.861	1.49	0.952*	1.72	-1.993**	-2.49
Profitability	59.508	1.42	-0.466	-0.02	-2.385	-0.06
Fixed-assets ratio	-8.501*	-1.80	-2.266	-0.69	-4.643	-0.96
Cash to total assets	3.675	0.24	4.048	0.42	-2.501	-0.29
Firm age	-4.075	-0.74	-5.935	-0.68	-4.531	-0.50
Log of firm size	2.802**	2.40	2.020**	2.15	2.089	0.95
Earnings volatility	-26.783	-0.99	-2.756	-0.05	-37.872	-0.71
Unsecured but no rating	0.306	0.45	-1.113**	-1.98	-0.327	-0.38
Observations	210		166		162	
Pseudo R-squared	0.2165		0.1849		0.2076	
Firm FE	Y		Y		Y	
Quarter FE	Y		Y		Y	

Table 7: *The table presents the results from a Logit model for the choice of UPREIT status by the firm as a function of earlier firm characteristics, especially capital structure characteristics. We focus on firms that have been active for more than one year before adopting the UPREIT status. The sample here also includes firms that may have adopted the UPREIT status, then redeemed the partnership units, and issued fresh partnership units again at a later point in time. Columns (1) to (3) include lags of the predictors one, two, and three quarters in the past. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Alternative identification strategy: Independence of leverage and leverage stability from UPREIT status

	(1) Leverage levels		(2) Leverage stability	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
UPREIT indicator	0.006	0.46	-0.365	-0.67
Price to FFO multiple	-0.002***	-3.75	-0.014	-0.37
RE investment growth	-0.006	-1.59	-1.861***	-7.94
Profitability	-0.056	-0.23	-6.460	-0.49
Fixed-assets ratio	0.093	1.40	-0.237	-0.10
Cash to total assets	-0.588***	-4.60	-14.524**	-2.28
Firm age	0.035*	1.76	-0.331	-0.19
Log of firm size	0.010	0.70	-0.107	-0.13
Earnings volatility	0.316	0.98	-71.574***	-4.63
Unsecured but no rating	0.004	0.37	-1.635***	-2.89
Observations	7,602		7,602	
R-squared	0.207		0.211	
Number of firm clusters	275		275	
Firm FE	Y		Y	
Quarter FE	Y		Y	

Table 8: *The table presents the regression results from Table 4 without unsecured debt but including the suggested IV, an indicator for whether the firm has adopted the UPREIT status, which we propose to use as an instrument for unsecured debt. Columns (1) and (2) show the OLS regressions for the level and stability of leverage, respectively. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Secured debt to total debt and firm age for UPREIT vs. Non-UPREIT firms

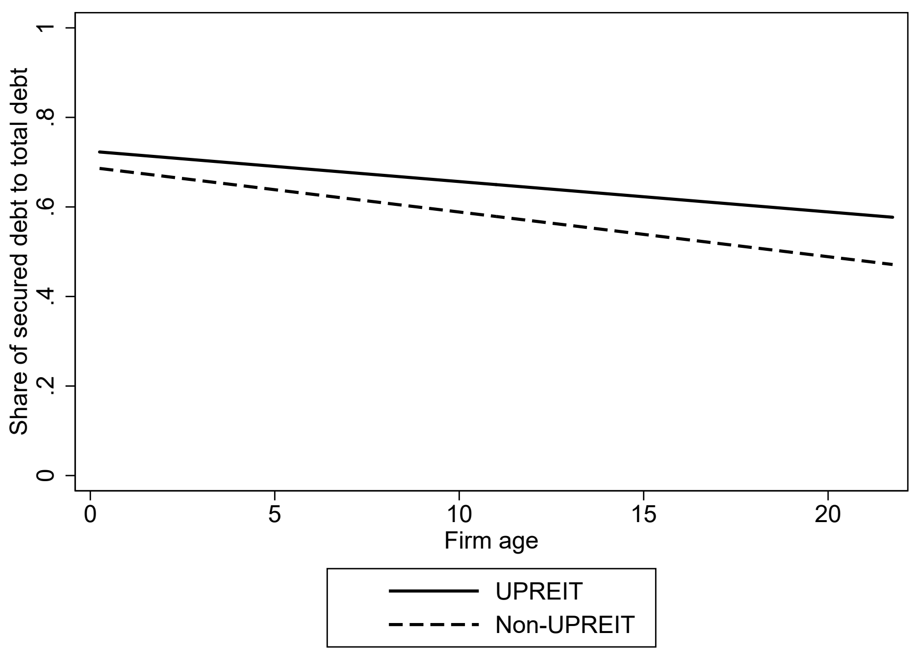

Figure 7: *The figure shows the linear regression lines fitted through the scatter plots of the the share of secured debt in the capital structure of listed US equity REITs as a function of their firm age (in years) for UPREITs (solid line) versus Non-UPREITs (dashed line). The scatter dots are suppressed for readability.*

Alternative identification strategy: Effect of suggested IV (UPREIT status) on endogenous variable (unsecured debt to total debt)

VARIABLES	Coefficient	t-statistic
UPREIT indicator	-0.087***	-3.00
Price to FFO multiple	-0.000	-0.03
Real estate investment growth	-0.017**	-2.44
Profitability	0.370	0.95
Fixed-assets ratio	-0.142	-1.52
Cash to total assets	-0.458**	-1.98
Firm age	0.120***	2.70
Log of firm size	0.085***	4.57
Earnings volatility	-0.789*	-1.70
Unsecured but no rating	0.037	1.61
Observations	7,602	
R-squared	0.149	
Number of firm clusters	275	
Firm FE	Y	
Quarter FE	Y	

Table 9: *The table presents the regression corresponding to the first stage of an IV-2SLS model where we estimate the endogenous variable, the share of unsecured debt to total debt, as a function of the proposed instrument, the time-varying indicator for UPREIT status, and the control variables. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Alternative identification strategy: IV-2SLS regression results for levels of leverage, 1993–2014

	(1) Market leverage		(2) Book leverage	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
Unsecured debt to total debt	-0.237***	-4.41	-0.091*	-1.69
Price to FFO multiple	-0.002***	-8.20	-0.002***	-9.27
RE investment growth	-0.007***	-2.67	-0.007***	-2.98
Profitability	-0.116*	-1.83	-0.145**	-2.29
Fixed-assets ratio	0.034**	2.20	0.075***	4.83
Cash to total assets	-0.513***	-9.73	-0.639***	-12.13
Firm age	0.050	1.14	0.035	0.81
Log of firm size	0.034***	6.58	0.019***	3.66
Earnings volatility	0.285**	2.42	0.291**	2.47
Unsecured but no rating	0.010***	2.98	0.007**	1.99
Observations	7,602		7,602	
R-squared	0.735		0.747	
Number of firm clusters	275		275	
Under-ID LM statistic	80.13		80.13	
Firm FE	Y		Y	
Quarter FE	Y		Y	

Table 10: *The table presents the regression results from Table 4 using an alternative identification strategy based on an IV-2SLS model where we employ an indicator for whether the firm was founded under the UPREIT structure as an instrument for unsecured debt. We also use book leverage as an alternative measure for debt levels. Columns (1) and (2) show the IV-2SLS results for market and book leverage levels, respectively. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. Significance is indicated as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*

Alternative identification strategy: Arellano-Bond regression results for stability of leverage, 1993–2014

	(1) Stability of market leverage		(2) Stability of book leverage	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
Unsecured debt to total debt	0.736**	2.38	0.816***	2.64
Price to FFO multiple	-0.022***	-2.78	-0.025***	-3.05
RE investment growth	-0.873***	-12.14	-1.044***	-14.44
Profitability	3.735	1.25	0.452	0.15
Fixed-assets ratio	1.443*	1.91	1.853**	2.42
Cash to total assets	-5.633***	-3.43	-8.123***	-4.91
Firm age	-0.016	-0.21	0.239***	3.25
Log of firm size	-0.493***	-2.88	-0.545***	-3.23
Earnings volatility	-10.079***	-2.58	-10.917***	-2.78
Unsecured but no rating	0.181	1.47	-0.055	-0.44
Observations	7,156		7,156	
Number of firm clusters	267		267	
Firm FE	N		N	
Quarter FE	Y		Y	
Lag of leverage stability	Y		Y	

Table 11: *The table presents the regression results from Table 5 using an alternative identification strategy based on an Arrellano and Bond (1991) model where we employ an indicator for whether the firm was founded under the UPREIT structure as an instrument for unsecured debt. We also use book leverage as an alternative measure for debt levels and calculate leverage stability on this basis. Columns (1) and (2) show the regression results for market and book leverage stability, respectively. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. Significance is indicated as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*

Alternative identification strategy: Arellano-Bond regression results for firm value, 1993–2014

	(1) With market leverage		(2) With book leverage	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
Leverage levels	-0.395***	-30.09	-0.054***	-3.58
Stability of leverage	0.001***	4.32	0.001***	4.08
Price to FFO multiple	0.002***	11.40	0.003***	14.38
RE investment growth	-0.031***	-21.25	-0.036***	-22.43
Profitability	0.276***	4.85	0.428***	6.77
Fixed-assets ratio	0.068***	4.45	0.054***	3.12
Cash to total assets	-0.210***	-6.49	-0.132***	-3.60
Firm age	-0.003**	-2.05	-0.008***	-4.34
Log of firm size	-0.014***	-4.09	-0.023***	-6.19
Earnings volatility	-0.158**	-2.03	-0.219**	-2.52
Unsecured but no rating	0.004*	1.86	0.004	1.35
Observations	7,156		7,156	
Number of firm clusters	267		267	
Firm FE	N		N	
Quarter FE	Y		Y	
Lag of MB ratio	Y		Y	

Table 12: *The table presents the regression results from Table 6 using an alternative identification strategy based on an Arrellano and Bond (1991) model where we employ firm size (by revenue) and earnings volatility as instruments for leverage levels. We also use book leverage as an alternative measure for debt levels. Columns (1) and (2) show the regression results with the main predictors of interest based on market and book leverage, respectively. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Actual amount of UPREIT shares outstanding: IV-2SLS regression results for levels of leverage and regression results for stability of leverage, 1993–2014

	(1) Market leverage		(2) Book leverage		(3) Stability of market leverage		(4) Stability of book leverage	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Unsecured debt to total debt	-1.168***	-9.55	-0.246***	-4.68	0.821***	2.66	0.924***	2.96
Price to FFO multiple	-0.003***	-5.12	-0.003***	-9.29	-0.017**	-2.17	-0.024***	-3.03
RE investment growth	-0.023***	-3.78	-0.010***	-3.83	-0.851***	-12.15	-1.006***	-14.22
Profitability	-0.218	-1.36	-0.162**	-2.35	3.269	1.13	0.870	0.30
Fixed-assets ratio	-0.116***	-3.04	0.050***	3.05	1.395*	1.89	1.804**	2.40
Cash to total assets	-0.974***	-7.47	-0.716***	-12.79	-5.310***	-3.32	-8.007***	-4.94
Firm age	0.129	1.16	0.049	1.02	-0.069	-1.00	0.205***	2.90
Log of firm size	0.111***	9.31	0.032***	6.17	-0.289*	-1.70	-0.488***	-2.91
Earnings volatility	-0.245	-0.82	0.202	1.58	-9.594**	-2.51	-13.086***	-3.38
Unsecured but no rating	0.043***	5.39	0.012***	3.52	0.120	0.99	-0.146	-1.20
Observations	7,602		7,602		7,540		7,540	
Number of firm clusters	275		275		275		275	
Firm FE	Y		Y		N		N	
Quarter FE	Y		Y		Y		Y	
Lag of leverage stability	n/a		n/a		Y		Y	

Table 13: *The table presents the regression results from Tables 10 and Table 11 using an alternative identification strategy based on an IV-2SLS model where we employ the actual amount of UPREIT shares outstanding as a share of total implied market capitalization as an instrument for unsecured debt. We also use book leverage as an alternative measure for debt levels. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Robustness tests with leverage thresholds: OLS regression results for firm value with market leverage, 1993–2014

	(1) Low threshold		(2) Medium threshold		(3) High threshold	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Market leverage $\leq$ 20%	-0.101	-0.19				
Market leverage $>$ 20%	-0.695***	-7.72				
Market leverage $\leq$ 25%			-0.221	-0.62		
Market leverage $>$ 25%			-0.708***	-7.98		
Market leverage $\leq$ 30%					-0.504**	-2.08
Market leverage $>$ 30%					-0.694***	-7.75
Stability of market leverage	0.002**	2.40	0.002**	2.46	0.002**	2.39
Price to FFO multiple	0.006***	5.88	0.006***	5.90	0.006***	5.95
RE investment growth	-0.009	-1.59	-0.009	-1.61	-0.009	-1.60
Profitability	2.437***	5.52	2.435***	5.53	2.441***	5.53
Fixed-assets ratio	0.146***	2.61	0.150***	2.66	0.145**	2.58
Cash to total assets	-0.055	-0.40	-0.051	-0.36	-0.059	-0.42
Firm age	0.197***	6.25	0.196***	6.17	0.196***	6.14
Unsecured but no rating	0.018	1.55	0.018	1.55	0.018	1.56
Observations	7,985		7,985		7,985	
R-squared	0.596		0.597		0.596	
Number of firm clusters	275		275		275	
Firm FE	Y		Y		Y	
Quarter FE	Y		Y		Y	

Table 14: *The table presents the OLS regression results from Table 6 using a stepwise specification with thresholds at various levels of market leverage, as indicated. Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. All t-statistics are calculated based on standard errors clustered by firm. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Robustness tests with deviations from target leverage: Lagged OLS regression results for firm value with market leverage, 1993–2014

	(1) Deviation from target		(2) Absolute deviation from target	
VARIABLES	Coefficient	t-statistic	Coefficient	t-statistic
Unsecured debt to total debt	-0.102***	-5.78	-0.029***	-2.63
Price to FFO multiple	0.000	0.18	0.000	-1.06
Real estate investment growth	-0.011**	-2.17	-0.004	-1.30
Profitability	0.227	1.02	-0.021	-0.17
Fixed-assets ratio	-0.018	-0.38	0.045*	1.83
Cash to total assets	-0.144	-0.82	0.308***	3.06
Firm age	0.012***	2.67	-0.002	-0.69
Unsecured but no rating	-0.002	-0.19	0.008	1.32
Constant	-0.130	-1.34	0.151**	2.44
Observations	7,985		7,985	
R-squared	0.158		0.084	
Number of firm clusters	275		275	
Firm FE	N		N	
Quarter FE	Y		Y	

Table 15: *The table presents the OLS regression results for deviations from target leverage as a function of unsecured debt. Target leverage is estimated as a function of typical firm characteristics following the literature. Residuals from this regression are collected as a measure for the difference between actual and target leverage (Column (1)). The absolute value of this measure of deviations from target leverage is regressed on unsecured debt and the control variables (Column (2)). Firm and quarter fixed effects are included as indicated to control for time- and firm-invariant unobservables, respectively. All t-statistics are calculated based on standard errors clustered by firm. Significance is indicated as follows:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Time series plot of the evolution of unsecured debt usage in the sample, 1993–2014

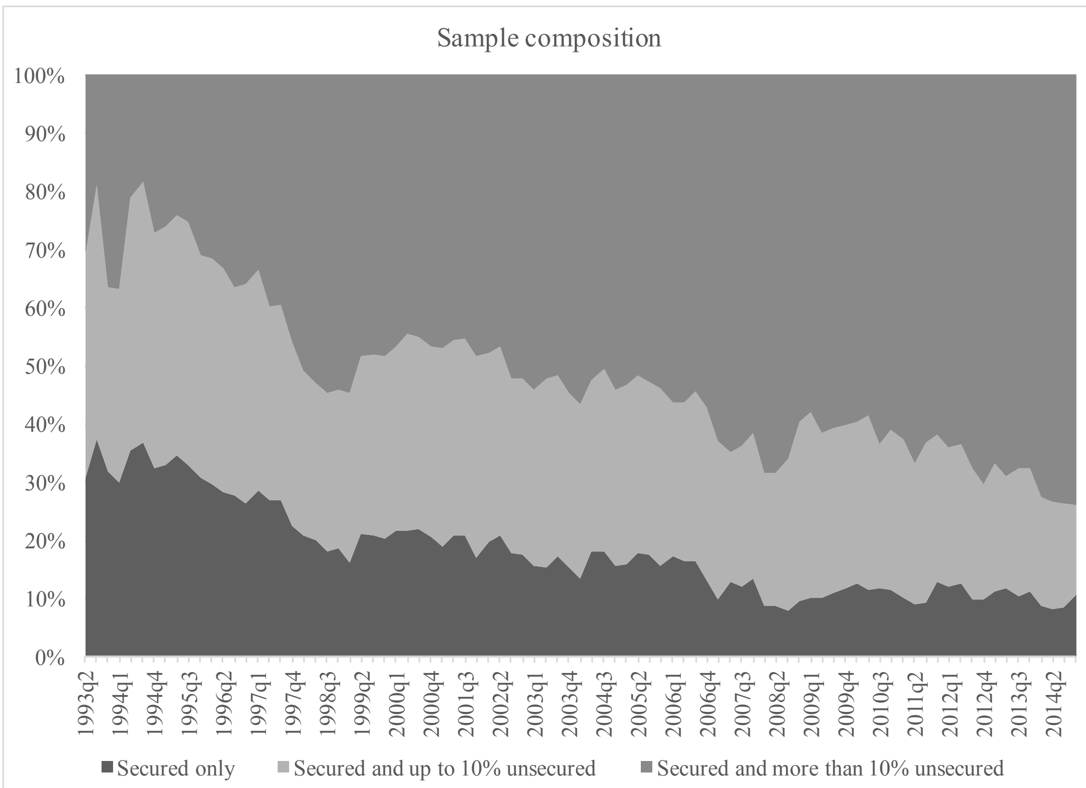

Figure 8: *The figure shows a time series plot of the evolution of unsecured debt usage in the sample of US equity REITs over the study period. Firms are grouped into (i) no unsecured debt usage, (ii) unsecured debt usage* $\leq 10\%$*, and (iii) unsecured debt usage* $> 10\%$.