

# Collateral and Debt Capacity in the Optimal Capital Structure\*

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## Abstract

*This paper considers how collateral is used to finance a going concern. We focus on firms that offer collateral with significant debt capacity, and a setting where debt is unconditionally an optimal contract. A theory is developed in which firms endowed with better quality collateral use that collateral to finance new investment opportunities with unsecured debt, while firms endowed with lower quality collateral use secured debt. Better quality firms must also issue equity (at a cost) to separate themselves from lesser quality firms, implying lower leverage and greater uncommitted cash flow from operations with which to meet debt service requirements. Empirical evidence from Real Estate Investment Trusts (REITs) support predictions of the theory, where we find that firms with less reliance on secured debt and lower total leverage invest more, are valued more highly and financially outperform firms with higher levels of secured debt and total leverage. Our findings provide alternative perspective on risk-shifting and the value of free cash flow, and demonstrate limits to the benefits of leverage as it depends on debt capacity.*

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# Collateral and Debt Capacity in the Optimal Capital Structure

## I. Introduction

The role of collateral in lending is important due to its effects on the real economy, as propagated through the credit channel. Because lenders have limited ability to enforce repayment, pledging collateral is indispensable to ameliorate credit frictions (Bernanke and Gertler (1989) and Kiyotaki and Moore (1997)). Recent events only serve to emphasize the importance of collateral and credit, particularly as related to “collateralizable” assets such a real estate. Yet, for all of the attention paid to the topic there remain numerous unanswered questions about how collateral is used by firms to invest and issue claims to finance their investments, and more generally how collateral affects debt capacity, which in turn helps govern the optimal capital structure of firms as going concerns.

Consider the case of Real Estate Investment Trusts (REITs), which are publicly traded companies holding what may be the most collateralizable of all assets—cash flow producing commercial real estate. For these firms, durability and redeployability of assets imply low marginal expected deadweight costs of financial distress as a function of leverage. Thus, even when a small wedge between the cost of issuing equity versus debt exists, firms will be tempted to exploit this wedge by utilizing significant amounts of debt (Almeida and Campello (2007)).

But, at the same time, REITs are publicly traded firms that do not pay taxes at the firm level and which are required to distribute a large percentage of operating cash flow as dividends. No-taxes removes a primary incentive to employ debt relative to equity. Moreover, traditional pecking order and free cash flow rationales for debt issuance are less compelling for these firms,

as significant constraints on the retention of cash reduces managerial discretion to redeploy retained earnings and free cash flow to fund investment.

Table 1 documents leverage for a sample of REITs from 1991 to 2007 as they compare to non-financial C-Corporations (the “Compustat Sample”), where we also classify debt based on whether it is secured or unsecured. This table shows that REITs employ significantly greater leverage and finance themselves with significantly more secured debt than the comparison group, suggesting that debt capacity of real estate assets create powerful incentives for REITs to lever themselves up, and that they do so with a lot of secured debt.

**Table 1 Here**

While REITs employ a lot of leverage, the existence of debt capacity does not necessarily imply that a capital structure with a lot of debt, particularly secured debt, is an optimal capital structure given the noted offsetting effects of no-taxes and an inability to retain cash flow. To begin to get at this issue, in Table 2 we calculate average  $q$  values of REITs. Firms are classified as being above or below the sample median in three different ways: 1) by the ratio of secured debt to total debt; 2) by the ratio of total debt to total assets; and 3) by the cross term of the two previous measures, the ratio of secured debt to total assets. Note that total assets used to calculate total leverage and secured leverage are reported on a market value as well as a book value basis.

**Table 2 Here**

Results show that firms that employ greater leverage and use a greater proportion of secured debt in their capital structure have lower  $Q$  values. These stylized empirical facts suggest that, at a minimum, there are limits to collateral as a mechanism to debt finance, particularly with secured debt. But what are the factors that would lead to an outcome where, say 40 percent total leverage with limited secured debt is an optimal capital structure for firms whose assets provide

terrific collateral value and received wisdom which suggests that debt, and often secured debt, is an optimal contract.

While real estate makes for excellent collateral in general, there can be significant differences in the productivity of the collateral in terms of its intrinsic qualities and how it is managed. To appreciate the robustness of the results noted in Table 2, in Table 3 we report financial performance results of REITs during the 1991-2006 time period—a period in which real estate asset prices generally increased—and the 2007-08 time period—which is the time frame covering the beginning and end of the most intensive period of the financial market crisis. The table shows that firms classified as being below the median in terms of the ratio of secured debt to total debt generated higher total returns for their shareholders than above-median firms *in both time periods*; i.e., firms that utilized less secured debt and less total leverage generated higher returns for their shareholders in good times as well as bad.<sup>1</sup>

### **Table 3 Here**

A separate computation also shows that firms that had below-median amounts of secured debt to total debt in their capital structures incurred lower interest expenses as a percentage of total debt outstanding, implying that secured debt is more expensive than unsecured debt. With this collection of stylized empirical facts in mind—REITs employ significantly more leverage and secured debt relative to industrial firms, but also that REITs which generate higher  $Q$  values, realize better stock market performance and incur lower debt financing costs are those that employ relatively less leverage and lower levels of secured debt—we consider theory and evidence on the optimal capital structure of going concerns that own collateralizable assets with significant debt capacity.

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<sup>1</sup> These results are consistent across the four major property types—office, retail, multi-family and industrial—considered in the study.

We develop a theoretical model that extends Bester (1985), and that also borrows from the seminal work of Stulz and Johnson (1985) and Myers and Rajan (1998). In our model, firms are characterized as going concerns with collateralizable assets in place. The assets in place have productive qualities that vary across firms and that are unobservable to outsiders. Debt has been used finance ownership of the assets in place. Debt is unconditionally an optimal contract because there are fixed costs associated with issuing equity. A new constant-quality positive NPV project is available for investment, and firms are interested in financing the investment. The firm is unable to credibly commit any of its existing liquid resources to finance the new project, but its real assets in place are available as additional collateral. If real assets in place are offered as collateral to finance the new project, we say the new financing is *unsecured* (that is, all of the available assets of the firm collateralize all of the debt of the firm). Otherwise, if only the new investment is available to collateralize the newly issued debt, we say that the debt is *secured*.

The critical question we consider is how firms, which are endowed with assets in place that have an unobservable component that varies in quality, should optimally finance their investment and how creditors should optimally screen firms in order to ascertain their true type. We show that, conditional on their identity being known to outside financiers, higher quality firms prefer to finance themselves with unsecured debt and lower quality firms prefer to finance themselves with secured debt. The basic intuition is that of Bester (1985), with a twist: better quality firms, which possess more valuable assets in place, can improve issuance proceeds by pledging those assets as collateral to finance the new investment. The opposite effect occurs with lower quality firms, so they finance investment with secured debt. The results are robust to any participation constraints that might be imposed by existing debtholders to limit wealth transfers associated with financing new investment.

The problem of course is that lower quality firms would like to represent to outsiders that they are higher quality firms in order to issue unsecured debt and thus increase issuance proceeds. Without some method to screen firms, lenders will pool. Competition between lenders will, however, result in screening, which is done by requiring firms that wish to finance themselves with unsecured debt to also issue equity. This leverage decreasing action, while costly to higher quality firms, is more costly for lower quality firms than it is for higher quality firms. As a result, screening is such that higher quality firms issue equity in sufficient quantity to make it too expensive for lower quality firms to mimic them, and a separating equilibrium results.

Equilibrium implies that, consistent with the stylized empirical facts considered earlier, higher quality firms will, through their financing decisions, separate themselves. Higher  $Q$  values are subsequently realized, thus generating greater returns to shareholders over time. They will also have lower incremental costs of debt finance, and will use less leverage with a greater proportion of unsecured debt to finance new investment opportunities. We expect these effects to be persistent and self-reinforcing. Less leverage by higher quality firms is a credible commitment to insuring creditors against the risk of loan default. To the extent that this cash relaxes financial constraints of firms, higher quality firms will also invest more.

Formal tests of model implications are undertaken using an unbalanced panel of annual equity REIT data over the years 1991 to 2007. In the first of two basic approaches, we match firms based on growth opportunities, size, profitability, earnings volatility and age, and assess the effects of financing decisions on firm performance. Based on our summary measure of the joint financing type-leverage decision—the ratio of secured debt to total assets—we categorize firms as being above and below the median value in the sample. Performance measures are

calculated at 12, 24 and 36 months into the future after the match date. For each and every performance measure considered—which includes investment, return on assets and value multiple—we find that below-median firms outperform above-median firms. We also document that below-median firms issue greater amounts of equity in the future as a percentage of investment, indicating that financing differences that distinguish firms persist into the future and therefore are self-reinforcing.

Our second approach is to estimate the relation between  $Q$  and financing decisions using a GMM estimation methodology. Consistent with predictions of the theory, we find a robust causal relation going from the joint financing choice-leverage decision to  $Q$ , where an increase in the secured debt-to-total asset ratio is negatively related to the change in  $Q$ . At the same time,  $Q$  is found to cause and have a negative effect on the secured debt-to-total asset ratio, suggesting feed-back and thus persistence in the categorization of firms as higher and lower quality. Results based on the summary financial measure are robust in the sense that  $Q$  is negatively related to the component parts of the joint financing decision, those being secured debt-to-total debt and total debt-to-total assets.

We believe that studying REITs, which are going concerns that possess collateralizable assets with high debt capacity, is useful for studying broader issues in corporate finance and macroeconomics. These firms do not pay taxes and are exogenously cash flow constrained, which provides a controlled environment for isolating effects associated with collateral, information and agency as they relate to issues of optimal capital structure and the role of collateral in the economy.

The bottom line is that our results clearly suggest that a number of the firms we analyze were over-levered and used secured debt to excess, and that they did so out of weakness. We

conclude that, just because assets are collateralizable with significant debt capacity, fully exploiting the debt capacity is not an optimal strategy. Rather, like everything else in the world, delicate and oftentimes subtle tradeoffs need to be considered.

## **II. Theory and Empirical Implications**

### **II.A. Model**

Our model contains elements of three seminal papers that consider collateral and debt financing: Bester (1985), Stulz and Johnson (1985) and Myers and Rajan (1998). The basic structure and much of the economic intuition follows from Bester (1985), which is a screening model in which collateral is used to induce separation between projects of varying quality. There are, however, some important modifications to the Bester model that are required to properly characterize financing decisions associated with a going concern as opposed to a one-off project financing.

As in Stulz and Johnson (1985), we distinguish between secured and unsecured debt, and consider incremental financing decisions when a firm is presented with a new investment opportunity. Major differences between their paper and our approach are, i) distinguishing between the collateralizability of existing assets as they relate to secured versus unsecured claims, ii) the consideration of equity issuance in addition to the possibility of debt issuance, and iii) our focus on asymmetric information as being instrumental in motivating financial decisionmaking.

Like Myers and Rajan (1998) we consider the commitment value of liquid versus illiquid assets, positing that cash on the balance sheet has no commitment value. But we further consider the issue of commitment as it occurs vis-à-vis equity issuance, arguing that firms can affect commitment value of operating cash flow by *reducing* debt service requirements. Thus, cash



from an equity issuance, in effect, substitutes for debt that would otherwise increase debt service requirements and hence the credit risk of the firm.

The formal model is as follows. Consider two types of firms (real estate firms) that are characterized by their assets in place. These assets are a project or a collection of projects of different measurable quality,  $w_j$ , where  $j=G,B$  indicates good or bad.

The assets in place collectively generate a binary payoff in one period, where the outcome is either high,  $H$ , or low,  $L$ . For simplicity, consider the outcomes to be equally likely. This assumption does not affect the results in any way, and makes the analysis cleaner and easier to follow. The expected payoff of the good project is higher than the expected payoff of the bad project; i.e.,  $E[w_G] > E[w_B]$ . However, a low outcome of a good project pays off less than a good outcome of a bad project: i.e.,  $w_G^L < w_B^H$ . This implies that the bad project is not necessarily riskier than the good project. Alternatively, we could have specified the quality of the projects using different probabilities of a low versus high outcome.

The assets in place, project  $w$ , were launched sometime in the past, say time  $t_{-1}$ . At the present time,  $t_0$ , outside financiers cannot distinguish between firm type in terms of whether the firm is endowed with  $w_G$  or  $w_B$ . Assume the firm previously issued debt with a current value equal to  $B_w$  to help fund project  $w$ . Because asset quality is indistinguishable *ex ante*,  $B_w$  is a price that reflects ignorance, or a pooling, with respect to the true  $w$ . Said differently, based on full information, a  $G$ -quality firm has lower current leverage and greater debt capacity than a  $B$ -quality firm at time  $t_0$ .

At time  $t_{0+}$  the firm has the opportunity of launching another project,  $u$ . Payoffs to the project do not depend on firm type, and will be realized in one period. These payoffs are binary outcomes, either high or low. The high payoff,  $u^H$ , is equal to the expectation of  $w_B^H$  and  $w_G^H$ ,

and the low payoff,  $u^L$ , equal to the expectation of  $w_B^L$  and  $w_G^L$ . Quality and size of the new project are thus exogenous, so they cannot be used to reveal information to outsiders. The new project is, furthermore, “average” as it compares to the assets in place of the two existing firms. More specifically, these payoffs imply that the new project has a lower expected payoff for the  $G$ -quality firm than the expected payoff to assets in place, whereas the opposite is true for the  $B$ -quality firm. To simplify the analysis, assume that the payoffs to the projects are independent; that is,  $w \otimes u = 0$ . This assumption is also not necessary to generate our results.

Unconditionally, the new project  $u$  is optimally financed with debt because equity issuance occurs at greater relative cost. For the moment assume that prospective creditors for  $u$ , who operate in a competitive loan market, are unable to identify the quality of the firm of a given type  $w$ . The issuance of new debt poses a problem to the creditors of project  $u$ . Should the debt offered to finance project  $u$  be secured or unsecured? How can creditors of project  $u$  screen borrowers in an attempt to identify their true quality? What does this do to the capital structure of project  $u$ , in terms of the price and quantity of debt offered?

To begin to answer these questions, consider payoffs to the bondholders as they depend on the type of debt issued to finance project  $u$ . For simplicity, we will assume that the project can be fully debt financed in the secured debt market. Secured debt financing is, by definition, “stand-alone”. By this we mean that contingent debt payoffs are completely unaffected by values or payoffs to non-secured assets. Thus, liability on secured debt is limited to collateral asset. Furthermore, there is no commitment value to any liquidity held by the firm that exists prior to (or after) investment in  $u$  (Myers and Rajan (1998)).

Consequently, if the new debt is *secured*, bondholders of  $w$  are unaffected by financing and investment in  $u$ . This follows because, in a  $w_j^H$  state, the asset is liquidated and debt is paid

in full in the amount of  $D_w$ , where  $D_w$  is the face value of the debt in place. Residual cash from the asset sale is not committable to fund payment of any other debt claims. In contrast, in a  $w_j^L$  state, default occurs and  $w_j^L < D_w$  is recovered by the creditor in lieu of full contractual debt repayment. Similarly, bondholders of  $u$  receive  $D_u$  in a  $u^H$  state; otherwise, they receive  $u^L < D_w$ . As stated earlier, payoffs to secured debt on  $u$  are independent of firm type.

We assume a zero discount rate and that all agents are risk neutral. By fixing the payment dates at loan maturity, we see that  $B_w$  and  $B_u$  are just the expected value of payoffs to bondholders of projects  $w$  and  $u$  in the next period,  $t_1$ , when the projects' payoffs are realized and the firm is assumed to be liquidated.

Now consider the case of issuing *unsecured* debt to finance  $u$ . Issuing unsecured debt to finance project  $u$  implies that either both projects pay off as promised or both projects default. Default is such that payoffs to  $w$  and  $u$  bondholders depend on the pooled payoffs across projects and a *pro rata* priority allocation rule that applies in the case of default. Consequently, in contrast to others that have characterized unsecured debt as having little or no recovery value in default, we do so in the context of cross-collateralizing all of the available assets (which have significant recovery value in default) to secure the debt of the firm.

To calculate proceeds from an unsecured debt issuance, we will need to consider whether bondholders are facing a  $G$ -quality firm or a  $B$ -quality firm. Suppose first that creditors of project  $u$  unknowingly face a  $B$ -quality firm with asset quality  $w_B$ . In this case default is only avoided if both projects  $w$  and  $u$  have a high state outcome. Thus, if either  $w$  or  $u$  experience a low state outcome, there will not be enough proceeds to repay the old and new creditors in full. As a result of default, creditors will receive their fair share of the default value of the firm across the two projects, where the fair share allocated to  $u$  creditors follows a *pro rata* distribution rule of

$\alpha_u = D_u / (D_u + D_w)$ . In order to simplify and maintain symmetry in the analysis, we will assume that  $D_u = D_w$ , implying that  $\alpha_u = 1/2$ . The model and results are easily generalizable to an arbitrary  $D_u$  and  $D_w$ .

Alternatively, suppose now that creditors of project  $u$  unknowingly face a  $G$ -quality firm with asset quality  $w_G$ . In this case default occurs only when  $u^L$  and  $w_G^L$  are jointly realized, implying that there are sufficient proceeds from  $u^L + w_G^H$  as well as  $u^H + w_G^L$  to fund the joint promised debt payoffs of  $D_u + D_w$ . Thus, from a financing perspective, the fundamental distinction between the  $G$ -quality firm and the  $B$ -quality firm is default risk associated with unsecured debt issuance, in which the  $B$ -quality firm is a greater credit risk than the  $G$ -quality firm. This credit risk manifests itself in the probability of default as well as in the severity of loss associated with default.

Payoffs to  $u$  creditors conditional on an unsecured debt issuance can now be stated, and are summarized in Table 4.

**Table 4**

**Payoffs to Project  $u$  Unsecured Creditors as a Function of State Outcome and Firm Type**

Firm Type	State Outcome Combination			
	$(u^H, w_j^H)$	$(u^H, w_j^L)$	$(u^L, w_j^H)$	$(u^L, w_j^L)$
$j=B$	$D_u$	$(u^H + w_B^L)\alpha_u$	$(u^L + w_B^H)\alpha_u$	$(u^L + w_B^L)\alpha_u$
$j=G$	$D_u$	$D_u$	$D_u$	$(u^L + w_G^L)\alpha_u$

Conditional on creditors knowing firm type, we are now in a position to consider the firm's preferred choice of debt to finance investment in  $u$ . Without any equity commitment value, existing equityholders are unable to affect management's financing decisions. This

implies that management will condition their financing choice on that which maximizes proceeds from security issuance. As a result, financing choice requires a comparison of expected payoffs to creditors conditional on the use of secured versus unsecured debt. The following proposition states the result.

***Proposition 1:*** *Assume that a firm, after being presented a profitable investment project,  $u$ , is motivated to undertake the investment based on maximizing security issuance proceeds (minimizing its current cost of capital). Conditional on firm type being known to the lender, the  $G$ -quality firm will prefer to finance project  $u$  with unsecured debt. A “moderate”  $B$ -quality firm will also prefer to finance the project with unsecured debt while a “low”  $B$ -quality firm will prefer to finance project  $u$  with secured debt. Debt issuance proceeds are always greater for the  $G$ -quality firm.*

***Proof:*** *See Appendix A.*

The intuition for this result is straightforward.  $G$ -quality firms can obtain greater proceeds, or equivalently a lower cost of debt capital, by offering its existing stock of high quality projects as collateral for the new unsecured loan. Doing so simultaneously decreases the risk of default on the new issuance and improves recovery conditional on default. This implies that the  $G$ -quality firm has higher *ex ante* debt capacity than the  $B$ -quality firm. In contrast, the existing stock of projects for the  $B$ -quality firm is of lower quality as compared to the new project. Pledging the existing stock as collateral for an unsecured loan is, consequently, less advantageous as compared to the  $G$ -quality firm.

For moderate  $B$ -quality firms, unsecured debt issuance proceeds exceed secured debt issuance proceeds even though the risk of default with unsecured debt exceeds that associated with secured debt. This follows because recovery proceeds conditional on default are high enough in the joint High-Low default states to offset the increased risk of default. Low  $B$ -quality firms—i.e., those firms with relatively lower recoveries in default states—do not generate high

enough proceeds in default to offset the increased risk of default. Consequently, these firms generate higher proceeds through a secured debt issuance.

Being able to undertake an unsecured debt issuance as described may depend on satisfying a participation constraint, stated as a bond covenant, that guarantees existing creditors they are no worse off as a result of a new investment-financing transaction. The following corollary states the result as it applies to firm preferences for unsecured debt.

***Corollary 1:*** *Firms that prefer to issue unsecured debt will satisfy a participation constraint, should it exist, that guarantees that w creditors are no worse off as a result of the financing decision.*

***Proof:*** *See Appendix A.*

This corollary is really about the risk of asset substitution. Very low quality firms would like to engage in asset substitution, but their revealed identity leads to secured debt issuance that eliminates asset substitution as a concern to creditors. Higher quality firms, in contrast, do not water down their claim with addition of new collateral. They can therefore issue unsecured debt at an attractive price. Note that asset substitution in this case is not as traditionally characterized, with firms undertaking a new high-risk negative NPV project, but rather is about bringing older assets to the table as potential collateral for financing a new project.

Results stated in the above proposition and corollary assume that  $u$  creditors can identify firm type prior to debt issuance. Creditors cannot, in fact, differentiate between firms at time  $t_0$ . They do know that, conditional on firm identity being known at that time of issuance, a  $G$ -quality firm would prefer to finance investment in  $u$  with unsecured debt, and that it will be given high issuance proceeds relative to a  $B$ -quality firm. But they also know that a  $B$ -quality firm would like to mimic the  $G$ -quality firm to obtain the same terms as a  $G$ -quality firm. Consequently,

without some way to screen firms or otherwise reveal type, unsecured debt to finance project  $u$  will not be offered to any firm at terms available to the known  $G$ -quality firm. This will cause financiers and the  $G$ -quality firm to explore mechanisms capable of revealing type.

Suppose that creditors of  $u$  can attempt to screen borrowers by way of requiring equity issuance coincident with unsecured debt issuance. This imposes a threshold cost on the issuing firm due to the costs of equity issuance. The question is whether firms are willing to issue equity, and, if so, how much and under what conditions.

Define equity issuance as a state contingent claim—a credible and enforceable guarantee made by the firm—that pays off to the unsecured lender in some or all of the default states. This guarantee is relatively low cost to the  $G$ -quality firm, since it has a lower probability of default than a  $B$ -quality firm. The commitment value embedded in equity issuance is therefore more costly to the  $B$ -quality firm that might wish to mimic the  $G$ -quality firm. As a consequence, the unsecured lender knows that the  $G$ -quality firm, if given the opportunity, will have an incentive to issue equity in an attempt to separate itself from the  $B$ -quality firm.

As a first step in this analysis, we will need to specify issuance proceeds associated with unsecured debt in a pooling equilibrium. This is because  $B$ -quality firms can increase issuance proceeds above their full-information value by mimicking the  $G$ -quality firm. Successful mimicry will, in turn, cause the unsecured creditors to pool. For the analysis that follows, we will benignly assume that  $G$ - and  $B$ -quality firms exist in equal proportion to one another and that  $u^H + u^L$  is less than  $D_u + D_w$ . Neither assumption is restrictive, but rather is made to simplify the analysis. With this, we state unsecured debt issuance proceeds under pooling in the following lemma.

**Lemma 1:** *Unsecured debt issuance proceeds in a pooling equilibrium are  $B_{Uns}^P = (D_u + u^H + 2u^L)/4$ . These proceeds exceed issuance proceeds available to the B-quality firm when its type is known, but are less than proceeds available to a known G-quality firm.*

**Proof:** *See Appendix A.*

This lemma establishes that a B-quality firm would like to try to mimic a G-quality firm, and that a G-quality firm would like to try to separate itself from a B-quality firm. The feasibility of separation comes down to the fixed cost of equity issuance as it applies to the G-quality firm and the relative cost of issuing a state-contingent equity claim for the B-quality firm.

Denote unsecured debt proceeds associated with a known G-quality firm as  $B_{Uns}^G$  and let  $\gamma_E$  be the fixed cost of equity issuance. The following lemma establishes conditions under which an unsecured debt issuance pooling equilibrium is realized.

**Lemma 2:** *If  $\gamma_E < B_{Uns}^G - B_{Uns}^P$ , unsecured creditors will consider screening firms by requiring coincident equity issuance. Otherwise, if  $\gamma_E \geq B_{Uns}^G - B_{Uns}^P$  unsecured creditors pool by offering unsecured debt with proceeds  $B_{Uns}^P$  with no equity issuance requirement.*

**Proof:** *See Appendix A.*

The pooling outcome is of course less interesting to us, as we do not believe it describes how markets actually function, so going forward we assume that  $\gamma_E < B_{Uns}^G - B_{Uns}^P$  so that separation through equity issuance is feasible.

Now, suppose that equity as a state-contingent claim has the defining characteristic of paying off to unsecured creditors in joint High-Low states. This implies that issuing equity creates no risk to the G-quality firm, since there is sufficient collateral value in those states to fully repay unsecured creditors. In contrast, issuing such a claim does create risk for the B-quality firm, since existing collateral is insufficient to fund full debt repayment in those states.



More specifically, for the  $B$ -quality firm there is a 0.5 cost of issuing equity for each unit of insurance provided to unsecured creditors.  $B$ -quality firms are willing to internalize this cost, in addition to the fixed cost of equity issuance, as long as the benefits to pooling exceed the associated costs. That is, the moderate  $B$ -quality firm will issue equity as long as  $B_{Uns}^P - B_{Uns}^B - \gamma_E \geq .5E$ , where  $B_{Uns}^B$  is proceeds from an unsecured debt issuance by a moderate  $B$ -quality firm and  $E$  denotes the face value of equity that pays off  $E$  units to unsecured creditors in a joint High-Low state. In comparison, the low  $B$ -quality firm will issue equity as long as  $B_{Uns}^P - B_u - \gamma_E \geq .5E$ , where we recall that  $B_u$  denotes issuance proceeds from secured debt. To make things interesting assume that the left-hand side of each of the previous two inequalities is positive (equity issuance costs are sufficiently low), implying that a non-trivial amount of equity must be issued by  $G$ -quality firms to induce separation.

We are finally in a position to state the major result in this section.

***Proposition 2:*** *Assume that fixed equity issuance costs are sufficiently low so that the  $G$ - and  $B$ -quality firms have incentives to issue equity. For the  $G$ -quality firm to separate itself from the moderate  $B$ -quality firm, it finances investment in  $u$  with unsecured debt and issues equity shares that exceed  $2[B_{Uns}^P - B_{Uns}^B - \gamma_E]$ . For the  $G$ -quality firm to separate itself from the low  $B$ -quality firm, it issues unsecured debt and more than  $2[B_{Uns}^P - B_u - \gamma_E]$  equity shares.*

***Proof:*** *See Appendix A.*

Thus, when equity issuance costs are sufficiently low, unsecured creditors can screen firms by requiring equity issuance in excess of the limits prescribed in Proposition 2. The  $G$ -quality firm will voluntarily issue the necessary shares of equity. If equity issuance costs were variable instead of fixed (requiring only cosmetic changes in the model), the  $G$ -quality firm would issue no more shares than necessary, since equity issuance would be costly at the margin.

In any case, the  $B$ -quality firm will not issue the minimum required amount of equity, since the marginal costs to equity issuance exceed the benefits associated with a pooling outcome.

The equilibrium outcome is fully revealing and incentive compatible. Moreover, as shown in corollary 1, participation constraints for  $w$  creditors are satisfied (should they exist) when unsecured debt issuance is optimal. This means that security issuance choice is incentive compatible as it relates to satisfying asset substitution concerns of existing debtholders.<sup>2</sup>

To the extent that issuing equity introduces not only screening but also monitoring, one can characterize management of better quality firms as willing to commit themselves to increased market scrutiny in order separate themselves from lower quality firms and hence increase their market valuation. This is consistent with characterizations presented in the introduction of this paper that puzzled over stylized facts associated with REIT firm valuation and capital structure.

## **II.B. Empirical Implications**

The model generates a rich set of empirical implications that can be tested with data. First, a separating equilibrium implies that higher quality firms have latent value and debt capacity that is revealed as a result of a joint issuance choice-leverage financing decision. That is, latent value, as summarized by  $q$ , is caused by and is negatively associated with incremental increases in secured debt outstanding and overall leverage. Higher quality firms, through the screening process that reveals type, alleviate asset substitution concerns of existing debtholders by employing less leverage and less secured debt when financing investment.

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<sup>2</sup> In a similar vein, it is straightforward to consider providing inside equityholders control rights, in the sense of having to satisfy a *status quo* participation constraint for existing equityholders as it relates to financing with unsecured debt. Doing so may impose a cost on the  $w$  creditors, however, who might be forced to surrender some of their gains associated with investment and financing of  $u$ .

Firms with liquid assets on their balance sheet have a commitment problem as it relates to facilitating new investment, as cash can easily be distributed to shareholders or otherwise diverted as a source of default insurance to creditors. Higher quality firms separate themselves from lower quality firms by maintaining lower total leverage, and thus higher levels of operating cash flow with which to service debt, to decrease credit risk. Thus, higher quality firms are predicted to have higher debt service coverage ratios. And to the extent that lower leverage and access to equity markets relaxes financial constraints, we would expect to observe higher rates of investment in the future by higher quality firms.<sup>3</sup> Finally, we would also expect to see a high incidence of equity issuances per unit of investment for the higher quality firms.

### **III. Data, Specification and Estimation Results**

#### **III.A. Data**

Our sample consists of REITs identified from SNL Datasource for the years from 1991 to 2007. These firms tend to concentrate their asset holdings by a particular property type, and are classified as such by SNL. The sample includes only multi-family, retail, office, and industrial REITs, which constitute the four major property type classifications. All other property types are excluded from the analysis. We include only firms that report full-year earnings in a particular year within the sample period, and exclude firm-years for which secured debt exceeds the amount of total debt outstanding, which we infer as a reporting mistake.

Table 5 reports summary statistics for variables used in estimation. As noted earlier, REITs are on average seen to operate at relatively high leverage ratios and to finance themselves with significant amounts of secured debt. In particular, the average REIT employs about 50

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<sup>3</sup> In our model we assumed that proceeds from secured debt issuance were sufficient to fund investment. In reality, absent additional guarantees or collateral, there are downpayment requirements with secured debt, implying that cash constraints may reduce investment.

percent debt in its capital structure as a percentage of market asset value, of which just less than two-thirds of the debt is secured. Further note the significant variation in these measures across firms as seen most clearly by the 25<sup>th</sup> and 75<sup>th</sup> percentile statistics.

### **Table 5 Here**

Other profitability measures and control variables are as follows. *EarningsChanges* is the ratio of next-year earnings minus this-year earnings to this-year common book equity; *Size* is book value of total assets (measured in billions of 2006 dollars using the Producer Price Index (PPI) published by the U.S. Department of Labor as the deflator); *Profitability* is the ratio of earnings before interest, taxes, depreciation, and amortization to the book value of total assets; *EarningsVolatility* is the ratio of the standard deviation of earnings before interest, taxes, depreciation and amortization using up to five years of consecutive observations to the average book value of total assets estimated over the same time horizon; *Age* is the number of years since the IPO year measured as of the end of the sample period in 2007.

As implied by our theory, we are particularly curious about how  $Q$  varies as a function of changes in capital structure. Following the literature,  $Q$  is the ratio of market value of total assets to book value of total assets. As discussed by Gentry and Mayer (2008), Hartzell, Sun and Titman (2006) and Riddiough and Wu (2010), REIT  $Q$  values are believed to provide more accurate and less noisy measures of marginal  $q$  than can generally be obtained with Compustat industrial data (see Erickson and Whited (2000) on the general noise issue).

We would like to identify a single variable that jointly measures the secured-unsecured debt choice and total leverage decision. The measure we employ is *SecuredMarket* (*SecuredBook*)*Leverage*, which is the ratio of secured plus mezzanine debt to the market (book) value of total assets. This measure is a composite of *SecuredDebt*, the ratio of secured plus

mezzanine debt to total liabilities plus mezzanine debt, and *Market (Book)Leverage*, the ratio of total liabilities plus mezzanine debt to the market (book) value of total assets. Thus, in the context of our theory,  $Q$  is hypothesized to be strictly decreasing in this measure as it reveals the quality characteristics of the firm.

Table 6 displays pair-wise correlation coefficient estimates between and among secured debt and leverage ratio measures, as well as how these measures correlate with  $Q$ . All debt ratio measures correlate negatively with  $Q$ , with the exception of total book leverage. Our model suggests that the relevant measures are based on market values, but we are cognizant of concerns regarding co-movement in  $Q$  and market leverage due to use of contemporaneous stock price in both measures. Observe the negative and significant correlations between secured leverage (market and book) and  $Q$ , where secured leverage is our measure of the joint secured-unsecured debt choice and leverage decision. Also note the significant positive correlations between the secured debt-to-total debt ratio and total leverage, implying that firms which employ secured debt relative to unsecured debt also employ greater overall leverage.

#### **Table 6 Here**

Table 7 shows the components of secured and unsecured debt given the available data. Secured debt is composed of first mortgages, mezzanine debt (which are junior mortgages that are issued together with a first mortgage) and secured bank lines of credit. We can see that first mortgages are by far the largest category of secured debt, but also that mezzanine debt contributes significantly to the total capital structure of REITs. There is also significant variation within each secured debt category where, for example, many firms do not finance with mezzanine debt at all. Note that secured bank lines of credit are only about 2 percent of the debt capital structure, and that less than 25 percent of all firms utilize secured bank lines at all.

### **Table 7 Here**

Excluding the catch-all category of subordinated debt and other liabilities, unsecured debt has two components: corporate-level debt and bank lines of credit.<sup>4</sup> Corporate-level unsecured debt is seen to comprise about three-fourths of the total unsecured debt. It is interesting to note that about 38 percent of REITs use secured mortgage debt to finance themselves but do not use corporate-level unsecured debt, while less than 3 percent of all REITs that use corporate-level unsecured debt do not use secured debt to finance themselves.

### **III.C. Specification**

We will take a two-pronged approach to formally testing our theory of optimal capital structure. First, we employ the matching methodology of Abadia and Imbens (2002) to assess the consequences of financing choice on firm performance outcomes. At a given point in time, firms are classified based on whether they are above or below the median value of our summary measure of the joint security choice-leverage decision, defined as the ratio of secured debt to total assets. Firms below the median are hypothesized to be higher quality firms based on their revealed capital structure decisions, as implied by our theory.

Firms in each group are matched based on observables, referred to as matching variables. An equally weighted sum of squared distances is calculated for matched firms based on matching variables. The criterion for the final matching of firms in the below-median to an above-median firm is a minimum squared distance measure. Once the match is determined, performance of matched firms is tracked over time to assess model predictions. We believe this methodology is apropos, since our theory suggests that latent value exists with better quality firms that is

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<sup>4</sup> Convertible debt and other types of debt-like liabilities are included in the subordinated debt and other liabilities category. Convertible debt, for example, constitutes 1.1 percent of total assets.

subsequently revealed as a result of (persistent) joint security issuance and leverage choices made by firms.

One possible concern with the Abadia-Imbens matching methodology is that financing decisions might endogenously react to our outcome measures (such as expected share price change). To address this concern, we employ a GMM approach to estimate how the joint debt security issuance-leverage decision affects firm value as measured by Tobin's  $Q$ . A GMM approach is attractive within our framework as a complement to the Abadia-Imbens matching methodology, since it addresses simultaneity issues. Moreover, estimation is cross-sectional in nature with a steady-state interpretation. Tobin's  $Q$  as a left-hand side variable has been used by McConnell and Servaes (1995) and Agrawal and Knoeber (1996) to identify the determinants of optimal capital structure. But we also note that capital structure studies starting from Rajan and Zingales (1995) have used  $Q$  to explain leverage, which is why the GMM approach is useful as it addresses endogeneity concerns.

### **III.C. Estimation Results**

We will first report the matching estimation results. For each firm in the treated group, we identify three REITs as a match in the control group. Matching criteria are based on five matching variables:  $q$ , Size, Profitability, Earnings Volatility and Age. Table 8 displays summary statistics for the five matching variables as they apply to the treatment and control samples, respectively. The key finding in Table 8 is that treatment and control firms do not differ in any significant way based on the matching variables.

**Table 8 Here**

Tables 9 through 11 display results on a 12- 24- and 36-month forward looking basis as they apply to investment, profitability, and equity issuance, respectively. The results are clear and distinct. Firms with secured debt-to-total asset ratios that are below the median invest more, generate higher returns, are valued more highly, and use a high proportion of equity to finance investment. The initial and latter results suggest persistence and self-reinforcement in the groupings, implying that once a firm makes capital structure choices that reveal type they tend to get “stuck” in that category.

### **Tables 9, 10, 11 Here**

The differences are statistically and economically significant. For example, firms with lower-than-median secured debt-to-total asset ratios invest approximately four percent more per year and earn approximately two percent more per year on assets on a look-forward basis. Firm value relative to initial total book assets for firms with lower-than-median secured debt-to-total asset ratios increase at a rate of approximately 3 percent faster than treatment group, although the statistical significance is not quite as strong with this measure than the other two measures.

We now offer results that are based on GMM estimation. In a GMM framework endogenous variables are estimated as part of a system in the cross section implying that simultaneity and timing concerns with respect to  $q$  and financing decisions are mitigated. All variables are first-differenced to control for firm-fixed effects and instrumented by their fourth to ninth lags in levels. The instrumental set also include a constant term.

Specifically, we regress changes in  $q$  and changes in the secured debt-to-total asset ratio (market as well as book) on each other, together with a set of appropriate control variables. Note that the earnings change variable is forward-looking, which goes to the issue of disentangling changes in  $q$  that are related to fundamentals versus unobservables. Estimation results are



displayed in Panels A and B in Table 12, where for comparison we report OLS estimation results in levels.

**Table 12 Here**

As seen in Panel A of the table, firms that make leverage-increasing secured debt financing choices generate lower  $q$  values. The results are economically significant, in which a 10 percent increase in the secured debt ratio results in almost a 4 percent decrease in  $q$  as measured in market value and almost a 3 percent decrease in  $q$  as measured by book value. OLS estimation results are consistent with GMM estimation results, where the OLS results in levels suggest strong persistence in financing-induced firm valuation outcomes.

Panel B shows that increases in  $q$  simultaneously cause a decrease in the total secured leverage ratio, a result that is statistically significant in the market value GMM regression. Together with results from Panel A, we infer a feedback that is consistent with implications of our model and the matching estimation results previously reported, in which higher secured leverage causes lower  $q$ -values that in turn cause increases in the secured debt ratio. In other words, firms reveal themselves through their financing decisions as higher or lower quality firms, an effect that is intertemporally self-reinforcing.

In Table 13 we report GMM estimation results where we now consider separately the component parts of the secured debt-to-total asset ratio: the ratios of secured debt to total debt and total debt to total assets. Prior to considering the results, recall the significant positive correlation that exists between the two component leverage measures. Strong positive correlation, in addition to being consistent with our theory, has the effect of biasing the relevant regression coefficients towards zero.

**Table 13 Here**

Results show that, in the case of using market leverage, total market leverage has a significantly negative effect on  $q$ , and, simultaneously,  $q$  has a significantly negative effect on market leverage. The secured debt-to-total debt ratio is insignificant. In comparison, in the case of using book leverage, secured debt-to-total debt has a significantly negative effect on  $q$ , and, simultaneously  $q$  has a significantly negative effect on the secured debt-to-total debt ratio. We interpret these results as consistent and complementary with our matching methodology results as well as previous GMM specification, and supportive of the theory outlined earlier in the paper.

Regarding the GMM models, the  $p$ -values for the Hansen  $J$ -test of overidentifying restrictions indicate that we never reject the joint null hypothesis that our instruments are uncorrelated with the error term in the  $q$  or leverage regressions and the model is well-specified. Furthermore, the low  $p$ -values associated with the first stage  $F$ -test of excluded instruments confirm that our instruments are relevant in explaining the variation of our endogenous variables.

As a final exercise, in Table 14 we compare allocation of income from operations to debt and equityholders. Firms with below-median levels of secured debt-to-total assets are slightly more profitable, in the sense that they generate greater cash from operations as a percentage of assets in place. They are seen to commit to lower debt service obligations, and thus generate higher pre-dividend cash flow relative to above-median firms. These results show strong persistence over time. But then observe that the below-median firms pay this cash out in the form of dividends to result in no difference in incremental cash directed to the balance sheet.

#### **Table 14 Here**

This is consistent with our model structure that follows from Myers and Rajan's (1998) argument that cash has little commitment value, and moreover that there is a significant

opportunity cost to retaining cash on the balance sheet. Instead, higher quality firms reduce debt service obligations relative to available cash flow from operations, which is the most credibly “commitable” cash flow available to mitigate default risk. Donaldson (1961) and Myers and Majluf (1984)’ pecking order of financing choices is consistent with this finding, in that firms with excess cash tend to pay down debt faster.

Thus, in summary, our results indicate that higher-quality firms show commitment to unsecured creditors by issuing equity and keeping leverage at a manageable level. In fact, unsecured debt often has covenants that formalize this commitment, which is something that management considers prior to placing the unsecured debt on its balance sheet. Lower quality firms, which often have only secured debt on their balance sheets, show no such commitment. And, even though higher quality firms have greater pre-dividend cash that they could save to the balance sheet (at a cost), they instead pay a greater percentage of this cash flow out to shareholders as dividends.

Our results complement those in Rajan and Winton (1995), who show that collateral along with covenants improves the creditor’s incentive to monitor the firm and lower quality firms collateralize more of the assets. In this paper, we show that higher quality firms use equity along with this commitment to keep leverage at reasonable levels, which causes creditors to require less collateral and lowers the cost of monitoring.

#### **IV. Summary and Conclusion**

Credit availability matters in the real economy, and collateral affects the availability of credit. We distinguish between cash and real collateral that has debt capacity, and consider the effects of collateral and debt capacity in the optimal capital structure of a going concern.

Theoretical results show, in an extension to Bester (1985), that firms with higher quality real collateral are willing to commit that collateral to issue unsecured debt while firms with lower quality collateral find that secured debt is a cheaper source of outside finance. Higher quality firms must also issue equity, however, in order to separate themselves from lower quality firms, implying less leverage and less reliance on secured debt. Separated firms thus have a latent value component that is revealed to the market as a result of their financing decisions.

Empirical implications of the model are tested with data from Real Estate Investment Trusts (REITs), which are firms that primarily hold that most collateralizable of assets—commercial real estate. Using the matching methodology of Abadia and Imbens (2002) and a GMM approach that simultaneously estimates  $q$  and measures of capital structure choice, we find strong and consistent support for our theory. We moreover show that firms identified as higher quality in our sample credibly commit to quality by keeping debt service obligations low, but otherwise do not maintain cash positions as these positions have no commitment value and result in high opportunity holding costs. We show that screening through collateral and an inability to commit cash changes standard pecking order relations. As a result, secured debt is issued out of weakness, not strength. Secured debt is issued by weaker firms because creditors are concerned about asset substitution as it relates to the existing stock of assets (rather than new investment). Free cash flow has commitment value only as it applies to servicing debt, which provides a new perspective on Jensen (1986).

An important final point is that, while assets with greater debt capacity may increase optimal leverage levels, it does not necessarily imply an optimal capital structure that approaches the upper limit of debt capacity. Moreover, secured debt, which is often associated with collateralizable assets such as real estate, is not necessarily the best kind of debt to employ to

finance asset ownership. This paper demonstrates with theory and evidence that there are limits to debt capacity and the kinds of claims that are issued to deploy that debt capacity.

## Appendix A

### Proofs of Lemmas, Propositions and Corollaries

#### Proof of Proposition 1

*Proving this proposition requires, given the two financing choices and assuming that firm type is known to creditors, comparing issuance proceeds and choosing a financing plan that generates the greatest proceeds (lowest cost of capital) from issuance.*

*Consider first the G-quality firm. Proceeds from issuing unsecured debt are  $B_{Uns}^G = \left(\frac{3}{4}\right)D_u + \left(\frac{1}{4}\right)\left(\frac{D_u}{D_u + D_w}\right)[w_G^L + u^L]$ . Unsecured debt issuance will be preferred if  $B_{Uns}^G > B_u$ ,*

*where we recall that  $B_u$  measures proceeds from a secured debt issuance. Consequently, unsecured debt proceeds exceed secured debt proceeds if and only if*

*$\left(\frac{3}{4}\right)D_u + \left(\frac{1}{8}\right)[w_G^L + u^L] > \left(\frac{1}{2}\right)D_u + \left(\frac{1}{2}\right)u^L$ . Rearranging terms we obtain the condition,*

*$\left(\frac{1}{2}\right)D_u + \left[\left(\frac{1}{4}\right)D_u + \left(\frac{1}{8}\right)(w_G^L + u^L)\right] > \left(\frac{1}{2}\right)D_u + \left(\frac{1}{2}\right)u^L$ , which holds because the second term on the left-hand side of the inequality exceeds the second term on the right-hand side.*

*Now consider the B-quality firm. Unsecured debt will be preferred when  $B_{Uns}^B > B_u$ , which*

*requires  $\left(\frac{1}{4}\right)D_u + \left(\frac{1}{4}\right)\left(\frac{D_u}{D_u + D_w}\right)[(w_B^H + u^L) + (w_B^L + u^H) + (w_B^L + u^L)] > \left(\frac{1}{2}\right)D_u + \left(\frac{1}{2}\right)u^L$ . After*

*some algebra, this condition holds when  $\left(\frac{3}{2}\right)w_B^H + w_B^L + \left(\frac{1}{2}\right)w_G^H > 2D_u + w_G^L$ . This condition does*

*not hold in general. Rewriting this condition, we obtain  $w_B^L > 2D_u + w_G^L - w_B^H - u^H$ . This tells us that a B-quality firm prefers to issue unsecured debt when it is of “moderate” quality; that is, when the payoff to the assets in place in a bad state of the world exceed a threshold value set on the right-hand side of the inequality. Alternatively, B-quality firms of particularly “low” quality, i.e., those firms with  $w_B^L < 2D_u + w_G^L - w_B^H - u^H$ , will prefer secured debt.*

*Finally, it is easy to see that  $B_{Uns}^G > B_{Uns}^B$ , implying that issuance proceeds are highest for the G-quality firm followed by the moderate B-quality firm.*

#### Proof of Corollary 1

*Proof of the corollary requires showing that w creditors of the revealed G-quality as well as moderate B-quality firm are no worse off than they were prior to the introduction of the u*

investment opportunity that is financed with unsecured debt. This amounts to showing that  $\left(\frac{3}{4}\right)D_w + \left(\frac{1}{4}\right)\left(\frac{D_w}{D_u + D_w}\right)[w_G^L + u^L] \geq \left(\frac{1}{2}\right)D_w + \left(\frac{1}{2}\right)u^L$ , which holds per conditions established in the proof of proposition 1. A similar argument establishes the same relation in the case of the moderate B-quality firm that also prefers to finance  $u$  with unsecured debt.

### **Proof of Lemma 1**

Given that  $u^H + u^L < 2D_u$  and that G- and B-quality firms are in equal proportion, there will be three default states inferred by the unsecured creditor when firm type is unrevealed. This implies that, given pooling in the unsecured debt market, proceeds from an unsecured issuance are

$B_{Uns}^P = \left(\frac{1}{4}\right)D_u + \left(\frac{1}{4}\right)\left(\frac{D_u}{D_u + D_w}\right)[2(u^L + u^H) + 2u^L]$ . This quantity is clearly lower than proceeds to a known G-quality firm, but are seen to exceed to  $B_{Uns}^B$  in the case of the moderate B-quality firm. They also exceed secured debt issuance proceeds,  $B_u$ , implying that the B-quality firm will have incentives to mimic the G-quality firm to cause a pooling equilibrium to occur, and that the G-quality firm is worse off relative to a separating equilibrium.

### **Proof of Lemma 2**

Straightforward.  $B_{Uns}^G - B_{Uns}^P$  is the benefit to the G-quality firm for undertaking an action to reveal type. The fixed cost of issuing equity is  $\gamma_E$ , and there are no additional costs to committing the equity to insure unsecured creditors in a high-low default state. If the costs to issuing equity exceed the benefits to revealing type, the G-quality firm will refrain from issuing equity and a pooling equilibrium results. Otherwise, the G-quality firm will consider issuing equity if doing so causes the B-quality firm not to mimic through an identical equity issuance strategy.

### **Proof of Proposition 2**

Given that the G-quality firm has an incentive to issue equity, the only remaining issues are to first establish the number of shares required to cause separation to occur and second to verify that the required number of shares are less than that required to fully insure against default loss in a high-low state.

Establishing the number of shares to issue to cause separation is straightforward. The cost to the B-quality firm of issuing equity to insure against default loss in a high-low state is  $.5E$ , where  $E$  is the number of equity shares issued that pay of 1 to unsecured creditors in a high-low state and zero otherwise. In the case of the moderate B-quality firm, the benefit to issuing equity to mimic the G-quality firm is  $B_{Uns}^P - B_{Uns}^B$ . The cost of doing so as a function of the number of equity shares issued is  $\gamma_E - .5E$ . Consequently, the G-quality firm will issue in excess of

$2[B_{Uns}^P - B_{Uns}^B - \gamma_E]$  equity shares to separate, and the moderate B-quality firm will issue unsecured debt with proceeds of  $B_{Uns}^B$ . In the case of the low B-quality firm, a similar logic results in the G-quality firm issuing  $2[B_{Uns}^P - B_u - \gamma_E]$  equity shares to separate, and the low B-quality firm will issue secured debt with proceeds of  $B_u$ .

Conditional on the minimum number of equity shares required to be issued, we must check to make sure that either high-low state is not fully insured at the required minimum level of share issuance. Otherwise, to the extent that a full insurance level has been reached, the cost of equity issuance drops to the issuing B-quality firm, thus complicating the analysis. Tedious algebra in both the moderate and low B-quality firm cases indeed verifies that the required minimum equity share numbers satisfy the no-full insurance condition.



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Table 1 – REIT and COMPUSTAT Samples

This table compares the capital structure of the equity REITs used in this paper with a sample of industrial firms from COMPUSTAT tapes over the sample period 1991-2007. The REIT sample includes multi-family, retail, office, and industrial REITs. The COMPUSTAT sample includes all firms, except financial, governmental firms, and utilities. Variable Definitions for the REIT Sample: *SecuredMarketLeverage*, the ratio of secured plus mezzanine debt (SNL item #6146 + item #18081) to the market value of total assets (item #220 – item #3799 + item#6111×1000); *SecuredBookLeverage*, the ratio of secured plus mezzanine debt (SNL item #6146 + item #18081) to the book value of total assets; *SecuredDebt*, the ratio of secured plus mezzanine debt to total liabilities plus mezzanine debt (SNL item #18081 + item #18083); *MarketLeverage*, the ratio of total liabilities plus mezzanine debt to the market value of total assets; *BookLeverage*, the ratio of total liabilities plus mezzanine debt to the book value of total assets. Variable Definitions for the COMPUSTAT Sample: *SecuredMarketLeverage*, the ratio of secured debt (COMPUSTAT item #241) to the market value of total assets, or (item #6 – item #60 + item#199×item#54); *SecuredBookLeverage*, the ratio of secured debt (item #241) to the book value of total assets (item #6). *SecuredDebt*, the ratio of secured debt to total liabilities (item #9 + item #34); *MarketLeverage*, the ratio of total liabilities to the market value of total assets; *BookLeverage*, the ratio of total liabilities to the book value of total assets.

Variable	REIT Sample			COMPUSTAT Sample		
	Mean	Median	Obs.	Mean	Median	Obs.
<i>SecuredMarketLeverage</i>	0.337	0.322	1,288	0.073	0.008	72,060
<i>SecuredBookLeverage</i>	0.407	0.393	1,376	0.099	0.017	84,542
<i>SecuredDebt</i>	0.643	0.758	1,376	0.338	0.170	84,542
<i>MarketLeverage</i>	0.493	0.498	1,298	0.190	0.141	72,060
<i>BookLeverage</i>	0.595	0.598	1,388	0.278	0.241	84,542

Table 2 –  $Q$  by Debt Groups

This table reports mean comparisons of  $Q$  by leverage groups.  $Q$  is the ratio of market value of total assets (or SNL item #220 – item #3799 + item#6111×1000) to book value of total assets (or SNL item #220). “Above Median Group” includes firms with *SecuredMarketLeverage*, *SecuredBookLeverage*, *SecuredDebt*, *MarketLeverage*, and *BookLeverage* above their respective sample medians. “Below Median Group” includes firms with *SecuredMarketLeverage*, *SecuredBookLeverage*, *SecuredDebt*, *MarketLeverage*, and *BookLeverage* below their respective sample medians. All firm level data are from SNL Datasource over the sample period 1991-2007. Refer to Table 1 for detailed variable definitions. The sample includes multi-family, retail, office, and industrial REITs.

	Above Median Group	Below Median Group	Difference Above – Below Median
By <i>SecuredMarketLeverage</i>	1.172	1.303	-0.132***
By <i>SecuredBookLeverage</i>	1.210	1.262	-0.052***
By <i>SecuredDebt</i>	1.191	1.282	-0.090***
By <i>MarketLeverage</i>	1.143	1.327	-0.185***
By <i>BookLeverage</i>	1.087	1.283	-0.196***

Note: \*\*\* indicates statistical significance at the 1% (two-tail) test level.

Table 3 – Stock Market Performance of Firms Pre-Crisis and During the 2007-2008 Financial Crisis, and Costs of Debt by Secured Market Leverage Group

This table reports average annual REIT returns by secured leverage groups over the periods 1991-2006 and 2007-2008. Annual Equity Returns are calculated as the sum of capital gains – (item #4412 at  $t$  minus item #4412 at  $t-1$ )/item #4412 at  $t-1$  – plus dividends – item #14126/item #214 at  $t$ . Annual Debt Returns are calculated as the ratio of total interest payments – item #7271 – to the sum of total liabilities plus mezzanine debt. All firm level data are from SNL Datasource over the sample period 1991-2007. Refer to Table 1 for detailed variable definitions. The sample includes multi-family, retail, office, and industrial REITs.

	Above Median Group	Below Median Group	Difference Above – Below Median
<i>By SecuredMarketLeverage</i>			
<i>1991-2006 Annual Equity Returns</i>	12.14	16.49	-4.35**
<i>2007-2008 Annual Equity Returns</i>	-35.47	-25.32	-10.15**
<i>1991-2006 Annual Debt Returns</i>	5.45	5.10	0.34***
<i>By SecuredBookLeverage</i>			
<i>1991-2006 Annual Equity Returns</i>	13.46	14.77	-1.31
<i>2007-2008 Annual Equity Returns</i>	-31.36	-26.00	-5.36
<i>1991-2006 Annual Debt Returns</i>	5.42	5.16	0.27**

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

Table 5 – Sample Descriptive Statistics

This table reports summary statistics for the main variables used in the paper’s empirical estimations. All firm level data are from SNL Datasource over the sample period 1991-2007. The exceptions are the mortgage and secured lines of credit data, which are available in SNL Datasource from 2001. The sample includes multi-family, retail, office, and industrial REITs.  $Q$  is the ratio of market value of total assets (or SNL item #220 – item #3799 + item#6111×1000) to book value of total assets (or SNL item #220). See Table 1 for definitions of *SecuredMarketLeverage*, *SecuredBookLeverage*, *SecuredDebt*, *MarketLeverage*, and *BookLeverage*. *EarningsChanges* is the ratio of next year earnings minus this year earnings (item #4430 at  $t+1$  – item #4430 at  $t$ ) to this year common book equity (item #3799). *Size* is book value of total assets (measured in billions of 2006 dollars using the Producer Price Index (PPI) published by the U.S. Department of Labor as the deflator). *Profitability* is the ratio of earnings before interest, taxes, depreciation, and amortization (SNL item #23504) to the book value of total assets. *EarningsVolatility* is the ratio of the standard deviation of earnings before interest, taxes, depreciation and amortization using up to five years of consecutive observations to the average book value of total assets estimated over the same time horizon. *Age* is the number of years since the IPO year until the end of the sample period in 2007.

Variable	Sample Statistics					
	Mean	Median	St. Dev.	25th Pct.	75th Pct.	Obs.
$Q$	1.236	1.203	0.279	1.078	1.366	1,298
<i>SecuredMarketLeverage</i>	0.337	0.322	0.214	0.153	0.508	1,288
<i>SecuredBookLeverage</i>	0.407	0.393	0.254	0.203	0.602	1,376
<i>SecuredDebt</i>	0.643	0.758	0.307	0.383	0.921	1,376
<i>MarketLeverage</i>	0.493	0.498	0.167	0.390	0.602	1,298
<i>BookLeverage</i>	0.595	0.598	0.205	0.489	0.721	1,388
<i>EarningsChange</i>	0.010	0.004	0.049	-0.004	0.019	1,390
<i>Size</i> (\$ Billion)	2.047	0.966	3.313	0.358	2.426	1,390
<i>Profitability</i>	0.088	0.090	0.036	0.075	0.106	1,388
<i>EarningsVolatility</i>	0.027	0.021	0.025	0.012	0.036	1,388
<i>Age</i> (Yr.)	10.991	8.012	9.775	4.395	13.014	1,226

Table 6 – Correlation between  $Q$ , Secured Leverage, and Total Leverage

This table reports pair-wise correlation coefficients between  $Q$ , *SecuredMarketLeverage*, *SecuredBookLeverage*, *SecuredDebt*, *MarketLeverage*, and *BookLeverage*. All firm level data are from SNL Datasource over the sample period 1991-2007. Refer to Table 1 for detailed variable definitions. The sample includes multi-family, retail, office, and industrial REITs.

	$Q$	<i>Secured MarketLeverage</i>	<i>Secured BookLeverage</i>	<i>Secured Debt</i>	<i>Market Leverage</i>	<i>Book Leverage</i>
$Q$	1					
<i>SecuredMarketLeverage</i>	-0.321***	1				
<i>SecuredBookLeverage</i>	-0.059***	0.938***	1			
<i>SecuredDebt</i>	-0.167***	0.859***	0.862***	1		
<i>MarketLeverage</i>	-0.366***	0.800***	0.712***	0.477***	1	
<i>BookLeverage</i>	0.169***	0.629***	0.735***	0.389***	0.815***	1

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

Table 7 – Components of Secured and Unsecured Debt

This table reports summary statistics for the different components of secured and unsecured debt. All firm level data are from SNL Datasource over the sample period 1991-2007. The exceptions are the mortgage and secured lines of credit data, which are available in SNL Datasource from 2001. The sample includes multi-family, retail, office, and industrial REITs. *MortgageDebt* is the ratio of mortgage debt (item #44331) to total liabilities plus mezzanine debt (item #18081 + item #18083). *SecuredLinesCredit* is the ratio of secured lines of credit drawn (item #6146 – item #44331) to total liabilities plus mezzanine debt. *MezzanineDebt* is the ratio of mezzanine debt to total liabilities plus mezzanine debt. *SecuredDebt* is the ratio of secured plus mezzanine debt to total liabilities plus mezzanine debt. *CorporateDebt* is the ratio of unsecured debt (item #8452) minus unsecured lines of credit drawn (item #6165 – (item #6146 – item #44331)) to total liabilities plus mezzanine debt. *UnsecuredLinesCredit* is the ratio of unsecured lines of credit drawn to total liabilities plus mezzanine debt. *Subordinated & OtherLiabilities* is the ratio of total liabilities plus mezzanine debt minus *SecuredDebt* and *UnsecuredDebt* to total liabilities plus mezzanine debt. This category includes junior debt, convertible debt and other liabilities, such as accrued expenses.

<i>Panel A</i>	Sample Statistics					
	Mean	Median	St. Dev.	25th Pct.	75th Pct.	Obs.
<b><i>SecuredDebt</i></b>	0.643	0.758	0.307	0.383	0.921	1,376
<i>MortgageDebt</i>	0.511	0.506	0.276	0.267	0.778	426
<i>MezzanineDebt</i>	0.071	0.034	0.105	0.000	0.110	1,388
<i>SecuredLinesCredit</i>	0.027	0.000	0.086	0.000	0.000	424
<b><i>Unsecured Debt</i></b>	0.314	0.273	0.285	0.009	0.580	422
<i>CorporateDebt</i>	0.244	0.145	0.263	0.000	0.501	422
<i>UnsecuredLinesCredit</i>	0.069	0.035	0.085	0.000	0.109	422
<b><i>Subordinated &amp; Other Liabilities</i></b>	0.078	0.070	0.041	0.052	0.091	422
<b><i>Panel B</i></b>						
<i>Firms with No SecuredLinesCredit</i>	0.757					
<i>Firms with No Unsecured BankLinesCredit</i>	0.306					
<i>Firms with No CorporateDebt</i>	0.377					
<i>Firms with MortgageDebt but No CorporateDebt</i>	0.377					
<i>Firms with CorporateDebt but No MortgageDebt</i>	0.023					



Table 8 – Descriptive Statistics for Treated and Control Firms

This table reports descriptive statistics for treated and control samples. Each treated firm is matched with two control firms identified as the closest matches based on  $q$ , size, profitability, earnings volatility, age, and industry segment using the Abadia-Imbens matching estimator technique. Refer to Table 4 for details on sample construction and variable definitions.

Matching Variables		Sample Statistics				
		Mean	Median	St. Dev.	25th Pct.	75th Pct.
$q$	Treated	1.224	1.195	0.239	1.089	1.336
	Control	1.252	1.222	0.278	1.109	1.377
Size (\$Billion)	Treated	1.988	0.917	3.367	0.295	2.191
	Control	2.399	1.321	3.466	0.554	2.987
Profitability	Treated	0.089	0.091	0.029	0.077	0.105
	Control	0.089	0.091	0.031	0.076	0.106
Earnings Volatility	Treated	0.026	0.022	0.019	0.011	0.035
	Control	0.026	0.021	0.022	0.012	0.035
Age (Yr.)	Treated	10.682	8.142	9.451	4.208	12.742
	Control	10.593	7.490	9.632	4.277	12.384

Table 9 – Investments: Treated and Control Firms

This table reports average investments (in percentage points) measured 12, 24 and 36 months after the reference period for treated and control firms. The table also reports difference in average investments for the two groups of treated and control firms. In Panel A, the treated (control) firms are those with *SecuredMarketLeverage* above (below) the sample median. In Panel B, the treated (control) firms are those with *SecuredBookLeverage* above (below) the sample median. Each treated firm is matched with two control firms identified as the closest matches based on  $q$ , size, profitability, earnings volatility, age, and industry segment using the Abadia-Imbens matching estimator as well as a bias-corrected version of the same estimator.  $Total-Investment_{t+12}$  is measured as the percentage change in real estate assets – SNL item #4338 – in the 12 months after the matching period. We use a similar definition for investments measured 24 and 36 months after the matching period. Refer to Table 4 for details on sample construction and variable definitions. Standard errors reported in parentheses are based on heteroskedastic consistent errors.

<b>Panel A – Treatment: <i>SecuredMarketLeverage</i>&gt;Median</b>	Treated Firm	Control Firm	Difference	Difference (Bias-Corrected)
<i>Total-Investment</i> <sub>t+12</sub>	12.37	17.25	-4.88*** (1.50)	-5.68*** (1.50)
<i>Total-Investment</i> <sub>t+24</sub>	24.69	32.40	-7.70*** (2.95)	-8.95*** (2.95)
<i>Total-Investment</i> <sub>t+36</sub>	42.98	56.37	-13.40*** (4.22)	-15.83*** (4.22)
<b>Panel B – Treatment: <i>SecuredBookLeverage</i>&gt;Median</b>				
<i>Total-Investment</i> <sub>t+12</sub>	12.67	16.45	-3.78** (1.52)	-5.01*** (1.52)
<i>Total-Investment</i> <sub>t+24</sub>	25.56	31.30	-5.73* (2.93)	-8.28*** (2.93)
<i>Total-Investment</i> <sub>t+36</sub>	42.69	54.97	-12.28*** (3.87)	-16.62*** (3.87)

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

Table 10 – Future Performance: Treated and Control Firms

This table reports average cumulative ROA (in percentage points) measured 12, 24 and 36 months after the reference period for treated and control firms. The table also reports difference in average ROA for the two groups of treated and control firms. In Panel A, the treated (control) firms are those with *SecuredMarketLeverage* above (below) the sample median. In Panel B, the treated (control) firms are those with *SecuredBookLeverage* above (below) the sample median. Each treated firm is matched with two control firms identified as the closest matches based on  $q$ , size, profitability, earnings volatility, age, and industry segment using the Abadia-Imbens matching estimator as well as a bias-corrected version of the same estimator.  $CumulativeROA_{t+12}$  is measured as the ratio of earnings before extraordinary items – SNL item #4430 – in the 12 months after the matching period to book value of total assets – SNL item #220 – lagged one period. We use a similar definition for cumulative ROA measured 24 and 36 months after the matching period. Refer to Table 4 for details on sample construction and variable definitions. Standard errors reported in parentheses are based on heteroskedastic consistent errors.

<b>Panel A – Treatment: <i>SecuredMarketLeverage</i>&gt;Median</b>	Treated Firm	Control Firm	Difference	Difference (Bias-Corrected)
<i>CumulativeROA</i> <sub>t+12</sub>	2.28	4.03	-1.74*** (0.18)	-1.82*** (0.18)
<i>CumulativeROA</i> <sub>t+24</sub>	4.94	8.32	-3.38*** (0.30)	-3.50*** (0.30)
<i>CumulativeROA</i> <sub>t+36</sub>	7.68	12.59	-4.91*** (0.43)	-5.14*** (0.43)
<b>Panel B – Treatment: <i>SecuredBookLeverage</i>&gt;Median</b>				
<i>CumulativeROA</i> <sub>t+12</sub>	2.36	4.05	-1.70*** (0.18)	-1.84*** (0.18)
<i>CumulativeROA</i> <sub>t+24</sub>	4.97	8.30	-3.32*** (0.29)	-3.63*** (0.29)
<i>CumulativeROA</i> <sub>t+36</sub>	7.60	12.71	-5.11*** (0.43)	-5.65*** (0.43)

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

Table 11 – Future Equity Issuance: Treated and Control Firms

This table reports average new equity financing for investments (in percentage points) measured 12, 24 and 36 months after the reference period for treated and control firms. The table also reports difference in average new equity financing for the two groups of treated and control firms. In Panel A, the treated (control) firms are those with *SecuredMarketLeverage* above (below) the sample median. In Panel B, the treated (control) firms are those with *SecuredBookLeverage* above (below) the sample median. Each treated firm is matched with two control firms identified as the closest matches based on  $q$ , size, profitability, earnings volatility, age, and industry segment using the Abadia-Imbens matching estimator as well as a bias-corrected version of the same estimator.  $EquityFinancedInvestment_{t+12}$  is the ratio of change in equity – (SNL item #214 at  $t+12$  – item #214 at  $t$ ) $\times$ item #4412 – to change in real estate assets – (item #4338 at  $t+12$  – item #4338 at  $t$ ). We use a similar definition for new equity financing measured 24 and 36 months after the matching period. Refer to Table 4 for details on sample construction and variable definitions. Standard errors reported in parentheses are based on heteroskedastic consistent errors.

<b>Panel A – Treatment: <i>SecuredMarketLeverage</i>&gt;Median</b>	Treated Firm	Control Firm	Difference	Difference (Bias-Corrected)
<i>EquityFinancedInvestment</i> $_{t+12}$	30.18	34.75	-4.57* (2.62)	-4.19 (2.62)
<i>EquityFinancedInvestment</i> $_{t+24}$	36.11	42.85	-6.74*** (2.42)	-7.03*** (2.42)
<i>EquityFinancedInvestment</i> $_{t+36}$	38.51	45.51	-7.00*** (2.47)	-7.48*** (2.47)
<b>Panel B – Treatment: <i>SecuredBookLeverage</i>&gt;Median</b>				
<i>EquityFinancedInvestment</i> $_{t+12}$	30.51	33.63	-3.12 (2.51)	-2.88 (2.51)
<i>EquityFinancedInvestment</i> $_{t+24}$	36.18	42.08	-5.90** (2.45)	-5.75** (2.45)
<i>EquityFinancedInvestment</i> $_{t+36}$	39.06	44.84	-5.78** (2.33)	-5.90** (2.33)

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

Table 12 – Value and Secured Leverage

This table reports regression results for OLS and generalized-system method of moments (GMM) estimations of the value and secured leverage models (Eq. (1) and Eq. (2) in the text) for our sample of equity REITs over the sample period 1991-2007. For the GMM estimations, variables are first-differenced to control for firm-fixed effects. OLS regressions also include property type and year fixed effects. In Panel A, the dependent variable is  $q$ . In Panel B, the dependent variables are respectively *SecuredMarketLeverage* and *SecuredBookLeverage*. All variables in the first-difference equation are instrumented by their fourth-ninth lags in levels. The instrumental set also includes a constant term. In Panel B, we also include *EarningsChange* as an “outside” instrument for  $q$ . All firm level data are from SNL Datasource. Refer to previous Tables for detailed variable definitions. The sample includes multi-family, retail, office, and industrial REITs. All regressions include year and dummies, and OLS regressions include property type dummies. Standard errors reported in parentheses are based on heteroskedastic consistent errors adjusted for clustering across observations of a given firm (Rogers, 1993).

Panel A: $q$	OLS		GMM	
	(1)	(2)	(3)	(4)
<i>SecuredMarketLeverage</i>	-0.361*** (0.083)		-0.383*** (0.100)	
<i>SecuredBookLeverage</i>		-0.120 (0.077)		-0.205** (0.098)
<i>EarningsChange</i>	1.447*** (0.315)	1.604*** (0.343)	0.602* (0.349)	0.779** (0.380)
<i>Size</i>	0.008 (0.016)	0.025* (0.014)	-0.032 (0.030)	-0.025 (0.030)
<i>Profitability</i>	3.145*** (0.655)	3.364*** (0.711)	4.956*** (1.380)	5.640*** (1.363)
<i>EarningsVolatility</i>	0.514 (0.787)	0.618 (0.835)	-0.619 (1.552)	-0.523 (1.389)
<i>FirmAge</i>	-0.006 (0.013)	-0.001 (0.014)	-0.018 (0.022)	-0.023 (0.024)
<i>Obs.</i>	1,162	1,162	1,027	1,027
$R^2$	0.479	0.430	N.A.	N.A.
<i>F</i> -test ( $H_0$ : Coeffs=0) ( <i>P</i> -Value)	0.000	0.000	0.000	0.000
Hansen’s <i>J</i> -Statistic ( <i>P</i> -Value)			0.215	0.454
<i>F</i> -test ( $H_0$ : Excluded Instruments=0) ( <i>P</i> -Value)			0.000	0.000

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

<b>Panel B:</b> <i>SecuredLeverage</i>	OLS		GMM	
	<i>Secured</i> <i>MarketLeverage</i>	<i>Secured</i> <i>BookLeverage</i>	<i>Secured</i> <i>MarketLeverage</i>	<i>Secured</i> <i>BookLeverage</i>
	(1)	(2)	(3)	(4)
<i>q</i>	-0.272*** (0.049)	-0.101 (0.065)	-0.230*** (0.089)	-0.021 (0.124)
<i>Size</i>	-0.062*** (0.011)	-0.076*** (0.013)	-0.059*** (0.014)	-0.066*** (0.018)
<i>Profitability</i>	0.384 (0.367)	0.538 (0.423)	0.637 (0.762)	0.816 (0.980)
<i>EarningsVolatility</i>	-0.212 (0.383)	-0.262 (0.438)	0.588 (0.751)	0.902 (0.925)
<i>FirmAge</i>	-0.026** (0.013)	-0.040*** (0.014)	-0.039** (0.019)	-0.057** (0.023)
<i>Obs.</i>	1,162	1,162	1,027	1,027
<i>R</i> <sup>2</sup>	0.342	0.330	N.A.	N.A.
<i>F</i> -test ( $H_0$ : Coeffs=0)	0.000	0.000	0.000	0.000
Hansen's <i>J</i> -Statistic ( <i>P</i> -Value)			0.225	0.221
<i>F</i> -test ( $H_0$ : Excluded Instruments=0) ( <i>P</i> -Value)			0.000	0.000

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

Table 13 – Value, Secured Debt and Leverage

This table reports regression results for generalized-system method of moments (GMM) estimations of the value, secured debt and leverage models (Eq. (1) - Eq. (3) in the text) for our sample of equity REITs over the sample period 1991-2007. Variables are first-differenced to control for firm-fixed effects. All variables in the first-difference equation are instrumented by their fourth-ninth lags in levels. The instrumental set also includes a constant term. We also include *EarningsChange* as an “outside” instrument for *q*. All firm level data are from SNL Datasource. Refer to previous Tables for detailed variable definitions. The sample includes residential, retail, office, and industrial REITs. All regressions include year dummies. Standard errors reported in parentheses are based on heteroskedastic consistent errors adjusted for clustering across observations of a given firm (Rogers, 1993).

	Models with Market Leverage			Models with Book Leverage		
	<i>q</i> (1)	<i>Secured Debt</i> (2)	<i>Market Leverage</i> (3)	<i>q</i> (4)	<i>Secured Debt</i> (5)	<i>Book Leverage</i> (6)
<i>MarketLeverage</i>	-0.535*** (0.180)	1.042*** (0.185)				
<i>BookLeverage</i>				0.166 (0.175)	0.964*** (0.156)	
<i>SecuredDebt</i>	-0.035 (0.086)			-0.225*** (0.063)		
<i>q</i>		0.050 (0.220)	-0.235*** (0.059)		-0.222** (0.109)	0.088 (0.085)
<i>EarningsChange</i>	0.600* (0.335)			0.967*** (0.369)		
<i>Size</i>	-0.006 (0.020)	-0.118*** (0.035)	-0.007 (0.011)	-0.010 (0.023)	-0.096*** (0.018)	-0.004 (0.013)
<i>Profitability</i>	4.722*** (1.239)	1.582 (1.500)	0.539 (0.531)	5.608*** (1.219)	0.023 (1.116)	0.819 (0.682)
<i>EarningsVolatility</i>	0.416 (1.472)	-0.396 (2.075)	0.782 (0.597)	0.698 (1.157)	-0.429 (0.956)	1.084 (0.686)
<i>FirmAge</i>	-0.016 (0.021)	-0.059* (0.034)	-0.022 (0.015)	-0.014 (0.020)	-0.011 (0.025)	-0.035* (0.019)
<i>Obs.</i>	1,027	1,027	1,027	1,027	1,027	1,027
<i>F</i> -test ( $H_0$ : Coeffs=0) ( <i>P</i> -Value)	0.000	0.000	0.000	0.000	0.000	0.000
Hansen’s <i>J</i> -Statistic ( <i>P</i> -Value)	0.369	0.319	0.346	0.487	0.503	0.170
<i>F</i> -test ( $H_0$ : Excluded Instruments=0) ( <i>P</i> -Value)	0.000	0.000	0.000	0.000	0.000	0.000

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

Table 14 – Allocation of Operating Income to Debt Service and Dividend Payout

This table reports average operating income allocated to debt service and dividend payout by secured market leverage. All firm level data are from SNL Datasource over the sample period 1991-2007. The sample includes residential, retail, office, and industrial REITs. “Above Median Group” includes firms with *SecuredMarketLeverage* above the sample median. “Below Median Group” includes firms with *SecuredMarketLeverage* below the sample median. EBITDA / Total Assets is the ratio of the sum of funds from operations plus interest expenses (SNL item #6116 + #17271) to book value of total assets (item #220). Interest Expense / Total Assets is the ratio of interest expenses to book value of total assets. EBITDA / Interest Expense is the ratio of funds from operations to interest expenses. Pre-Dividend CF / Total Assets is the ratio of funds from operations to book value of total assets. Dividends / Total Assets is the ratio of dividends on common stocks (item #14126) to book value of total assets. Dividends / Pre-Dividend CF is the ratio of dividends on common stocks to funds from operations. Post-Dividend CF / Total Assets is the ratio of the difference between funds from operations minus dividends on common stocks to the book value of total assets.

	Above Median Group	Below Median Group	Difference Above – Below Median
<i>EBITDA / Total Assets</i>	0.0880	0.0846	0.0034
<i>Interest Expense / Total Assets</i>	0.0254	0.0369	-0.0115 <sup>***</sup>
<i>EBITDA / Interest Expense</i>	3.2100	2.5300	0.6800 <sup>***</sup>
<i>Pre-Dividend CF / Total Assets</i>	0.0596	0.0489	0.0107 <sup>**</sup>
<i>Dividends / Total Assets</i>	0.0431	0.0281	0.0150 <sup>***</sup>
<i>Dividends / Pre-Dividend CF</i>	0.7107	0.6114	0.0993 <sup>*</sup>
<i>Post-Dividend CF / Total Assets</i>	0.0179	0.0196	-0.0017

Note: <sup>\*\*\*</sup>, <sup>\*\*</sup> and <sup>\*</sup> indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.