Further Evidence on the Capital Structure of REITs

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by

David M. Harrison
Box 42101
Rawls College of Business
Texas Tech University
Lubbock, TX 79409-2101
Phone: (806) 742-3190
Fax: (806) 742-3197
E-mail: david.m.harrison@ttu.edu

Christine A. Panasian
Robins School of Business
University of Richmond
Richmond, VA 23173
Phone: (804) 287-6008
Fax: (804) 289-8878
E-mail: cpanasia@richmond.edu

and

Michael J. Seiler
Professor and Robert M. Stanton Chair of Real Estate
Old Dominion University
2154 Constant Hall
Norfolk, VA 23529
Phone: (757) 683-3505
Fax: (757) 683-3258
E-mail: mseiler@odu.edu

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Abstract

This study examines the determinants of REIT capital structure decisions from 1990-2008. Using a broad sample of 2,409 firm-year observations, we find that asset tangibility is positively related to leverage, while profitability and market-to-book ratios are negatively related. Additional evidence suggests firm debt capacity varies systematically with the unique operating and financing mechanisms employed by REITs. Finally, our results provide further insight into competing capital structure theories, generally supporting empirical predictions derived from the market timing and trade-off theories, while failing to support pecking order theory predictions.

Key words: REITs, Capital Structure, Debt Capacity.

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Introduction

Capital structure theorists have long debated both the relative merits of the use of debt and equity to finance a firm's operations, as well as the distortions the use of borrowed money introduces into the firm's investment policies. Historically, the optimal capital structure has been viewed as that mix of debt and equity claims which optimizes the trade-off between the tax advantaged nature of debt financing and the associated increase in the potential costs of financial distress.[i] At the same time, the investment distortions include problems of underinvestment and asset substitution. More recently, the focus of these discussions has broadened to include alternative explanations of firm leverage decisions, such as the pecking order theory and market timing hypothesis.

Interestingly, most empirical studies exploring these relationships explicitly exclude real estate investment trusts (REITs), and other regulated firms, from their analyses. While valid reasons exist to justify (and perhaps necessitate) this exclusion,[ii] with a market capitalization that topped $438 billion by the end of 2006, a closer investigation and better understanding of the capital structure choices and decisions of REITs is clearly needed.[iii] The purpose of the current investigation is to begin filling this void by explicitly examining the determinants of leverage decisions and debt capacity for real estate investment trusts.

The remainder of this paper is organized as follows. Section two both reviews the relevant literature on general capital structure theories and examines how the unique regulatory and operating environment of REITs may influence firm-level decisions on capital structure.

Sections three and four describe the hypotheses and methodology employed to investigate the nature of these relationships within the REIT industry, while section five describes the Data. The results of the analysis are presented in section six. Finally, section seven reviews the major findings of this investigation and concludes.

Literature Review

Traditional discussions of capital structure within the corporate finance literature typically begin with an analysis of the trade-off theory between the marginal debt tax shield and marginal bankruptcy costs.[iv] However, the tax benefit argument would not appear to directly translate into the REIT market as REITs are statutorily permitted to avoid the payment of income taxes at the entity level provided they distribute at least 90% of their taxable income to shareholders in the form of dividends. Thus, in practice, most REITs serve as tax-exempt entities, passing their organizational profits directly through to the individual tax returns of their shareholders and eliminating the theoretical benefits of debt financing outlined by the trade-off theory.[v] Furthermore, regulatory mandates requiring REITs to focus their income generating activities on real estate related assets may effectively limit the firm's diversification opportunities – thereby increasing the probability of encountering financial distress and incurring the related deadweight bankruptcy costs. To the extent REITs hold relatively large, illiquid assets, which may be prone to the cyclicality and vagaries of local property markets, these potential bankruptcy costs may well be magnified. If debt provides no tax benefits to the organization (and hence to its shareholders), yet carries negative consequences in the form of increased potential for bankruptcy related capital costs, why should REITs hold any debt?[vi]

The pecking order theory provides one possible explanation. Specifically, as put forth by Myers (1984) and Myers and Majluf (1984), market participants, cognizant of both their information deficit and the incentives of issuing firms, will rationally discount their offer prices on equity issues under the assumption that only overvalued firms will choose to issue equity.[vii] These arguments can be particularly compelling with respect to the REIT marketplace, as Han (2006) argues REIT assets are uniquely difficult to value. As real estate transactions involve commercial properties which are heterogeneous, complex, and illiquid, effective valuation of such assets requires careful monitoring and specialized knowledge of both unique financing arrangements and local market conditions. Such monitoring, while difficult to obtain in any industry, is made potentially more problematic by the "five or fewer rule" for REITs.[viii] This requirement, which is designed to ensure diffuse ownership of the trust, could reduce the number of large blockholders with a direct incentive to exert sufficient monitoring efforts to overcome the informational opacity of this market sector, thus leaving REIT assets uniquely opaque from an information flow perspective.[ix]

While intuitively appealing, the application of the pecking order theory to describe capital structure decisions within the REIT industry faces potential difficulties. For example, due to the aforementioned regulatory restrictions governing distribution policies, REIT managers generally do not have access to the full range of financing options available to general corporate finance officers. Confirming this notion, both Brown and Riddiough (2003) and Ott, Riddiough, and Yi (2005) find that REITs fund long-term investments through debt and equity issuance rather than through retained earnings.[x]

The third widely examined theory of non-REIT capital structure choices, the market timing theory, also posits that managers with unique private information about the intrinsic value of their firm's securities will proactively utilize this information to strategically time the issuance of their offerings in order to maximize the long-run wealth of existing shareholders. Unlike the pecking order theory, adherents of market timing believe information barriers are sufficiently pronounced to allow some firms to profitably undertake such actions even in the face of potential signaling based discounts on their security issuances. Survey evidence provided by Graham and Harvey (2001) suggests that for a majority of financial executives, current market conditions do indeed materially influence their equity issuance decisions. More formally, Baker and Wurgler (2002) provide strong support for this hypothesis by demonstrating a significant negative relationship between firm leverage and market-to-book ratios within a large cross-section of non-REIT firms.

Within the REIT industry, two previous investigations have examined this hypothesis, arriving at starkly different conclusions. Feng, Ghosh, and Sirmans (2007) follow the methodological approach of Baker and Wurgler using a sample of REITs and find a positive relationship between a firm's current leverage ratio and lagged values of the market-to-book ratios. This result is inconsistent with both Baker and Wurgler's findings for non-REIT firms and general predictions of the market timing hypothesis.[xi] In contrast, Boudry, Kallberg, and Liu (2009) take a completely different approach and examine the determinants of security issuance decisions for REITs, rather than the aggregate debt levels employed by previous studies. Interestingly, under this alternative framework, they find strong evidence in favor of market timing based

explanations of REIT capital structure choices, some evidence consistent with the trade-off theory, and broadly reject the predictions of pecking order theory.

If the trade-off, pecking order, and market timing theories do not fully and consistently describe REIT capital structure decisions, what other factors may influence these financing policies? Jaffe (1991) puts forward three potential explanations for the use of financial leverage by REITs and other tax advantaged firms. First, and consistent with Hamill (1993), a REIT's choice of capital structure may well be irrelevant as individual investors can un-lever or re-lever the investment to match their individual investment preferences. Second, given the relatively small size of most publicly traded REITs, issuance/flotation costs are significantly lower for debt issues than equity issues. Consistent with this hypothesis, Berlin and Loeys (1988) find that capital structure choices of small firms are influenced by their informational deficiencies. Third, the tangible nature of the asset holdings of REITs increases their debt capacity. In the event of financial distress, real assets are easier to liquidate at, or near, their fair market value in a timely fashion.[xii] Thus, real assets should act as more effective collateral for the issuance of debt securities, and REITs, who hold disproportionately high levels of these assets, may be able to borrow at more attractive rates than their non-REIT counterparts.

Examining the limited existing literature on REIT capital structure and debt policy reveals several interesting findings. For example, consistent with the notion that REITs may rationally hold debt in their capital structure despite the lack of tax benefits at the entity level, both Howe and Shilling (1988) and Ghosh, Nag, and Sirmans (2001) find significant positive stock market responses to the issuance of debt securities by REITs. These findings stand in stark contrast to

those of non-REIT firms, where recent empirical evidence suggests such transactions have, at best, no significant influence on stock prices, and may even be detrimental to firm value if they are necessitated by cash flow shortfalls.[xiii] Second, Maris and Elayan (1990) find REIT debt usage to be significantly influenced by a variety of factors including the firm's size, growth rate, cash flow uncertainty, and investment in mortgages. They also note that the influences these variables exert on REIT borrowing decisions vary across mortgage and equity REITS. Continuing, Ghosh, Nag, and Sirmans (1997) find REIT borrowing decisions to be linked to the performance of the underlying property market in which the firm focuses its investment activities. Specifically, their results show that leverage increases (decreases) when the underlying property market performs poorly (well). Finally, Brown and Riddiough (2003) conclude "the type of debt is as important as the amount of debt within a REIT's capital structure."

Recently, a number of studies have begun to explicitly examine the relationship between the use of leverage and the characteristics of debt, primarily within non-REIT firms. For example, Johnson (2003) uses a sample of all non-financial firms covered by Compustat from 1986-1995 and finds that shortening the maturity of debt issues helps mitigate the negative influence of growth options on the firm's use of financial leverage.[xiv] Furthermore, Billett, King, and Mauer (2007) find that tighter debt covenants produce this same result. Interestingly, both relationships appear to be non-linear and more pronounced amongst the subset of high market-to-book value firms. Similarly, Faulkender and Petersen (2006) demonstrate that firms with access to public debt markets, and thus the ability to substitute protective covenants for costly monitoring associated with private loans, make higher use of financial leverage. Finally, Brown and Marble

(2007) provide a model of secured debt financing in which asset substitution problems decrease, and thus the firm's overall debt capacity increases, in direct relation to the fraction of the firm's debt which is secured. The current investigation adds to this developing literature on the relationship between leverage and debt structure by examining REIT capital structure decisions across firms which vary markedly in both their use of secured debt financing and in their access to public capital markets.

Hypothesized Determinants of REIT Capital Structures

The ultimate goal of this study is to systematically analyze the empirical determinants of leverage ratios for REITs. While intuitively straightforward, this task is complicated by the lack of consistent, guiding theoretical principles. As noted by Harris and Raviv (1991) in their comprehensive review article, while the literature has identified "a large number of *potential* determinants of capital structure," many of these theories are context specific and/or mutually exclusive leaving relatively few "general principles" which can be applied across industries or even across firms within a given industry. Rajan and Zingales (1995) further underscore this point and note "the theoretical underpinnings of [capital structure choice] are still largely unresolved," while Myers (1984) summarizes: "How do firms choose their capital structures? …the answer is, we don't know." Given these difficulties and the need to properly specify the leverage equation, what should determine leverage ratios for REITs?

Traditional Capital Structure Determinants

Asset Tangibility

To the extent that real assets provide more effective collateral for lenders in the case of borrower financial distress, increased use of tangible, real, or long-run fixed assets should be associated with increased debt capacity for the firm. Consistent with this notion, Myers (1977; 1984), Shyam-Sunder and Myers (1999), Baker and Wurgler (2002), Barclay, Smith, and Morellec (2006), and Brown and Marble (2007) all predict and/or find a positive relationship between asset tangibility and firm leverage.[xv]

Growth Options

A number of corporate finance investigations have examined the relationship between a firm's growth prospects and/or real options and its debt capacity. For example, Myers (1977) recognized that corporate borrowing introduces deadweight costs into the firm's decision-making processes due to a debt overhang problem. High-growth firms wishing to avoid these perverse incentives may thus lower their use of financial leverage ex-ante. More recently, Barclay, Smith, and Morellec (2006) document this same phenomenon, in a slightly different framework, and similarly conclude "the debt capacity of growth options is negative."[xvi] Baker and Wurgler (2002), while arriving at the same conclusion, take a completely different approach. They argue that firms attempt to time the market and issue stock when the market-to-book ratio is relatively high. Such behavior will also induce an observable negative relationship between a firm's use of leverage and its market-to-book ratio, particularly when analyzing changes in the firm's use of debt.

Titman and Wessels (1988) find no empirical support for any relationship between a firm's growth and its use of leverage, while recent empirical evidence from the REIT industry

seemingly conflicts with the above observed relationships. Specifically, Feng, Ghosh, and Sirmans (2007) find REITs with high market-to-book ratios have "persistently high leverage ratio[s]." They argue these increased growth options, which lead to high current valuations, cause the firm to fund capital expansions with debt rather than equity. While this result is potentially consistent with the pecking order theory, the authors contend it is driven primarily by the unique regulatory structure of the REIT industry.[xvii]

Firm Size

Multiple reasons exist to believe that firm size may influence a firm's financing policy. For example, Brown and Riddiough (2003) offer two potential explanations for leverage being positively correlated with firm size. First, larger debt offerings are more liquid (and thus less costly). Second, the expected future cash flows of larger firms should be more stable, and thus able to support a larger total debt capacity. Similarly, Rajan and Zingales (1995) note that if firm size proxies for decreasing bankruptcy costs, the trade-off theory would predict a positive relationship between size and leverage. On the other hand, if size proxies for decreasing information costs, as investors have easier access to information for larger firms, the pecking order theory would maintain that larger firms should face lower disincentives to equity issuance, and thus, we should expect a negative relationship between leverage and firm size. Other studies predicting a positive relationship between firm size and leverage include Maris and Elayan (1990), Fama and French (2002), Baker and Wurgler (2002), and Barclay, Smith, and Morellec (2006).[xviii]

Profitability

Profitability may also exert multiple influences on the firm's leverage decision. First, Jensen (1986) argues that if the market for corporate control is strong, good firms must commit to paying out their cash flows (thereby mitigating agency costs) by levering up. This discipline provided by the required periodic debt service payments should lead to a positive relationship between firm profitability and the use of financial leverage. Similarly, under the trade-off theory, as profitability increases the probability of encountering financial distress declines, and thus, so too do the expected bankruptcy costs. Finally, the pecking order theory suggests profitable firms will want to avoid the negative signal associated with equity issuance, and will therefore be more inclined to increase their use of financial leverage.

On the other hand, if the market for corporate control is weak or ineffective, Rajan and Zingales (1995) argue that managers would prefer to avoid the disciplining effect of debt, and reduce their use of financial leverage as profitability increases. Consistent with this notion, Titman and Wessels (1988), Fama and French (2002), and Barclay, Smith, and Morellec (2006) all find that more profitable firms have lower debt ratios. Finally, Baker and Wurgler (2002) argue that profitability influences debt ratios primarily through the retention of earnings. Given the relatively high payout ratios mandated for REITs, if Baker and Wurgler's contentions are correct, the relationship between profitability and debt ratios for the firms in our sample should be very weak. Given these opposing theories, we view the expected sign on the relationship between overall firm profitability and leverage as an open empirical question.

Additional Firm-Specific Determinants of Leverage

While the above considerations are generally regarded within the finance literature as being the primary determinants of firm capital structure decisions, a number of additional variables have also been found to influence individual firm borrowing.

Liability Structure

Brown and Riddiough (2003) demonstrate that the nature of the firm's existing debt may well influence the nature of future security offerings. Specifically, they find REITs with higher levels of secured debt are more likely to raise capital via equity issuance, while firms with higher levels of unsecured debt are more likely to raise capital through the issuance of additional public debt. They conclude that this negative relationship between pre-offer levels of secured debt and financial leverage is due to the increased agency costs associated with managing three distinct classes of claimholders. Opposing this view, Brown and Marble (2007) develop a theoretical model in which "debt capacity increases with the proportion of debt that is secured." This equilibrium is driven by secured debt's role in mitigating the asset substitution problem for the firm. The authors present empirical results for non-REIT firms which are generally consistent with their hypotheses. The conflicting nature of the previously reported empirical results leads to a neutral ex-ante expectation concerning the nature of this relationship for REITs.[xix]

On a related note, Faulkender and Petersen (2006) show that firms with access to public debt markets make higher use of financial leverage. They argue that this result is driven by the ability of these firms to substitute protective covenants for the costly monitoring activities required on private loans to avoid agency problems. Within the REIT industry, Boudry, Kallberg, and Liu (2009) also include controls for firms with rated debt outstanding in their investigation of capital

structure choices. Their rationale is that these flags may either identify firms with relatively low levels of asymmetric information – leading to less need to increase leverage in order to avoid free cash flow agency problems as posited by the pecking order theory – or simply identify firms with a relatively low transaction cost of issuing public debt – thus leading firms to increase their use of leverage. Within their empirical estimations, the effect of rated debt appears to be non-linear as it reduces the probability of issuing common equity and private debt while increasing the probability of issuing preferred equity and public debt.

Interest Coverage

According to classical static trade-off theory, firms with an increased likelihood of encountering financial distress possess higher expected bankruptcy costs. Under this paradigm, riskier firms would be expected to borrow less than their more financially secure counterparts. To control for this possibility, we include the one period lagged value of the firm's earnings before interest, taxes, depreciation, and amortization (EBITDA) to interest expense coverage ratio. Firms with high coverage ratios should possess relatively low bankruptcy costs, and thus exhibit an enhanced debt capacity.

Evolution of Leverage Over Time

Taggart (1985) documents that leverage steadily increased from World War II until the end of the 1970s. Moreover, Helwege and Liang (1996) note that leverage ratios continued to increase steadily throughout the 1980s. Given that our sample estimation period spans nearly twenty years, we include fixed effects for time throughout our various model specifications to control for potentially changing market usage of financial leverage. If the previous results can be

generalized to the REIT industry, we would expect to observe a positive relationship between leverage and estimation year.

In addition, Helwege and Liang (1996) posit that firm age should be related to the use of financial leverage. Specifically, they argue that firm age should be inversely related to the level of asymmetric information for the firm, as the market learns more about the firm's operations over time. Recent empirical evidence by Hadlock and Pierce (2009) provides additional support for this contention as they find firm size and age to be the primary determinants of the degree to which organizations are financially constrained. In particular, larger and older firms are more informationally transparent to the market, and thus, are typically less constrained. To the extent these findings translate into the REIT market, firm age should be positively related to an organization's debt capacity. On the other hand, if the pecking order theory is correct, the increased presence of asymmetric information should be related to the increased use of financial leverage. As younger firms are typically more informationally challenged, firm age should be associated with a lower use of financial leverage. To control for these possible effects, we include the number of years since the firm's initial public offering (IPO) as a control variable in many of our model specifications.

REIT Organizational Characteristics

Uniqueness

Titman and Wessels (1988) maintain that measurement problems plague previous studies of the determinants of firm capital structure. To overcome those deficiencies, they use a factor-analytic technique and find that "firms with unique or specialized products have relatively low debt

ratios." Consistent with the notion that specialization may lead to unexpected results, Feng, Ghosh, and Sirmans (2007) exclude both healthcare and hotel REITS. Similarly, Brown and Riddiough (2003) exclude healthcare REITs from their analysis and further stress that debt capacity may vary markedly by property type as more stable cash flows tend to support higher debt levels. While we do not explicitly exclude any observations based solely upon business orientation, to address this potential concern we do employ property type indicator variables throughout many of our model specifications.

REIT Era

Ott, Riddiough, and Yi (2005) document significant differences in REIT returns and financing policies between "Old-REITs" and "New-REITs". In particular, they note REITs formed since 1993 are characterized by significantly more complex financing structures, while REITs operating from 1981-1986 were able to benefit from much more favorable (accelerated) depreciation tax rules. In addition, they document dramatic changes in the characteristics of new firms entering the marketplace across the eras. Prior to 1993, the typical new REIT was a relatively small firm which generally employed modest levels of leverage. During the new REIT era, entering firms tended to be large, highly levered organizations, which invest heavily.[xx] Given the changing nature of the REIT marketplace, we include explicit controls for firms founded after 1993 throughout our results. Given the findings of Ott, Riddiough, and Yi (2005), we expect a positive coefficient on this variable.

State of Incorporation

The corporate finance literature provides numerous explanations for the preponderance of firms incorporated within Delaware. For example, Daines (2001) provides evidence that Delaware law enhances firm value, while Ramano (2005) outlines and critiques the role of regulatory competition in influencing U.S. corporate law and governance practices. Many of these same arguments may readily apply to REITs, and we note that a disproportionate number of our sample firms are indeed incorporated in Delaware. Interestingly, however, Maryland is the most common state of incorporation for REITs.[xxi] As outlined by Hartzell, Kallberg, and Liu (2008), Maryland REITs may be "more insulated from external pressure." To the extent such entrenchment creates agency conflicts, managers may wish to avoid the disciplining effect of debt while firm shareholders may wish to increase leverage usage to mitigate these potential conflicts. As such, indicator variables for REITs incorporated in Maryland and Delaware are included in our analysis.

Organizational Complexity

A number of the firms within our sample are organized as umbrella partnership REITs (UPREITs). Such an arrangement has both potential costs and benefits with respect to influencing a firm's debt capacity. First, under current U.S. federal income tax regulations, such structures facilitate the acquisition of properties by the REIT at below market prices, as property sellers may exchange their holdings for operating partnership units without experiencing a taxable event. The financial benefits from delaying the capital gains taxation on such transactions should theoretically be split between property sellers and the acquiring REITs. Thus, the book value of UPREITs may well understate the true value of their property holdings relative to REITs unable to participate in such tax sheltered arrangements. Therefore, the debt

capacity of UPREITs should exceed that of their non-UPREIT peers. Consistent with this notion, Sinai and Gyourko (2004) demonstrate that the market capitalizes expected tax benefits into the valuation of UPREIT shares.

On the other hand, the presence of an operating partnership increases the organizational complexity of the firm, may increase agency problems and incentive conflicts between firm stakeholders, and can reduce the organizational and financial transparency of the firm. While classic pecking order theory suggests firms should increase leverage to reduce agency conflicts, the increased complexity and opacity may well increase firm borrowing costs and make debt relatively less attractive. Consistent with this belief, Brown and Riddiough (2003) argue the potential for agency conflicts across distinct classes of firm claimholders may well influence the organization's security issuance decision, while Danielsen, et. al. (2009) find financial markets penalize financially opaque REITs with higher transaction costs.

REIT Operational and Financing Characteristics

Operating Strategies

A variety of unique aspects of the financial and operating strategies of REITs have the potential to influence their observed use of financial leverage. First, to the extent REITs participate in open market share repurchase operations, these activities will reduce the firm's equity level. In addition, share repurchases can be viewed by the marketplace as positive signals of the firm's long-run prospects. Both of these considerations lead us to expect a positive relationship between share repurchase activity and firm leverage.

In addition, firms may substitute operating leverage for financial leverage. Traditionally, corporate finance analysts define operating leverage as the percentage change in EBIT (or EBITDA) divided by the percentage change in sales revenue. Within the REIT industry, however, many analysts rely on funds from operations (FFO) rather than EBIT as their primary indicator of the firm's operating profit. Thus, we operationalize our measure of operating leverage by substituting in the percentage change in FFO, for the percentage change in EBIT, as our numerator in this calculation. To the extent firms choose between operating and financial leverage, we expect to observe a negative relationship between a firm's degree of operating leverage and their debt ratio.

Financing Strategies

To the extent a REIT is locked into the payment of future cash flows through existing lease contracts, their financial flexibility, and hence debt capacity, may be limited. Similarly, REITs frequently have existing lines of credit, or other credit facilities, pre-arranged with lenders to facilitate their acquisition activities. Larger lines of credit available may well exert two competing influences on the firm's debt capacity. First, to the extent these credit arrangements may substitute for traditional long-term debt by providing the firm an ability to increase leverage without returning to the capital market, we would expect a negative relationship between market leverage and the amount of credit lines available to the organization. On the other hand, in order to obtain and maintain access to substantial credit lines, the firm is required to submit to a rigorous, ongoing financial review by the prospective lender. Presumably, the information obtained from this review process provides credible information about the firm's financial condition to the marketplace.[xxii] To the extent the signaling benefits associated with line of

credit certification outweigh the possible substitution effects, increasing the magnitude of available credit lines may increase the firm's overall debt capacity.

Operationally, the use of these credit facilities increases the firm's effective leverage. Thus, we should observe a positive relationship between the percentage of funds taken down on these credit facilities and firm leverage. Finally, as these credit arrangements are typically employed by REITs to facilitate their acquisition activities, we would also expect the effects of these variables to be more pronounced for the high-growth REITs within our sample.

REIT Capital Structure Theory Metrics

Market Timing

To investigate the possible influence of market timing behavior influencing the capital structure choices of REITs, we include three additional variables in our final dataset. First, market timing would predict that a high price to net asset value (NAV) should increase the relative likelihood of issuing equity in the public market and, thus, be associated with lower debt ratios.[xxiii] Second, firms experiencing significant stock price appreciation should be characterized by lower leverage, as these firms would also be relatively more likely to issue equity than their low appreciation peers.[xxiv] Third, when market interest rates are high, firms should be reluctant to issue long-term fixed-income securities. To account for these three possibilities, we include measures of each REIT's price-to-NAV ratio at the end of the preceding year, the capital appreciation component of the firm's stock return for the twelve months immediately preceding our leverage observation, and the average ten year constant maturity Treasury rate calculated

from weekly observations, also calculated over the twelve months immediately preceding our leverage observation date.

Pecking Order Theory

Under classic pecking order theory, firms which are informationally opaque have an incentive to signal their quality to the marketplace by levering up and pre-committing to the disgorgement of potential free cash flows via the higher required debt service obligations. To capture potential information opacity, we include two measures in our analysis. First, while the National Association of Real Estate Investment Trusts (NAREIT) issued a national policy bulletin in 2000 attempting to standardize the reporting of FFO, no such requirements exist under generally accepted accounting principles (GAAP). This leaves firms with considerable flexibility in their accounting disclosures. To the extent firm-specific disclosures differ from those suggested by NAREIT, increased investor confusion and valuation difficulty is likely.[xxv] To control for this potential source of informational opacity, we measure FFO dispersion as the percentage deviation between company reported FFO and NAREIT standardized FFO as reported by SNL. Second, Livingston, Naranjo, and Zhou (2007) note that informational opacity is a key, causal variable in explaining split bond ratings across rating agencies. As such, we construct a binary indicator variable to identify those firms whose notch ratings differ across S&P, Moody's, and/or Fitch as of the date of our leverage observations.[xxvi] As both of these metrics are designed to capture informational uncertainty, pecking order theory would predict they should both be positively related to firm leverage utilization.

As an additional check on pecking order predictions, we examine excess dividend payments by REITs. While current IRS regulations require these organizations to pay out at least 90% of their taxable income as dividends in order to retain their pass-through status, pecking order theory suggests firms would prefer to retain as much equity as possible to minimize the adverse signaling consequences associated with issuing larger amounts of public equity. Thus, if pecking order theory is correct, we would expect REITs with payout ratios further above the 90% minimum regulatory threshold to be disproportionately likely to prefer issuing debt over public equity and, hence, exhibit higher leverage ratios. We also expect these effects to be more pronounced amongst the relatively high-growth firms in our sample, as they are disproportionately more likely to be frequent participants in the capital markets. We further recognize the possible second-order effect that dividend payments, by definition, will marginally increase leverage ratios as they remove equity from the firm.

Trade-off Theory

Under traditional trade-off theory, firms balance the tax shelter advantage of debt financing against the potential increase in bankruptcy costs associated with increased leverage. While REITs do not typically enjoy these tax shelter benefits, increasing bankruptcy costs should still reduce the relative attractiveness of debt financing to the organization. As such, in the spirit of Boudry, Kallberg, and Liu (2009) we define three additional measures to investigate the influence of potential bankruptcy costs on REIT capital structure decisions. First, we estimate the average default risk spread, defined as the yield on BBB rated securities minus the yield on AAA rated securities, using weekly data over the twelve months immediately preceding our leverage observation date. While Boudry, Kallberg, and Liu cogently argue that increasing the

default spread should decrease the attractiveness of issuing debt, their empirical results do not support this contention. We posit, alternatively, that the default risk spread is more broadly a measure of the market's general level of risk aversion. When risk aversion increases, the relative attractiveness of issuing riskier securities decreases. As equity interests are subordinate to creditor claims, increased market risk aversion should thus decrease the relative attractiveness of equity more than debt, and hence, increase leverage ratios.

Second, consistent with Boudry, Kallberg, and Liu (2009), we estimate the firm-specific yield spread as the average interest rate on the firm's debt minus the yield on BBB rated securities. Ceteris paribus, higher interest rate differentials on borrowed money should decrease the relative attractiveness of issuing debt, and thus decrease leverage ratios. Finally, and also as noted by Boudry, Kallberg, and Liu (2009), REITs holding assets which generate relatively high cash flows are able to support higher debt levels. To capture this potential effect, we calculate the ratio of net operating income (NOI) to net property investments (NPI) for each firm-year observation. If bankruptcy costs are indeed important to REIT capital structure decisions, we expect this ratio to be positively related to firm leverage.

Methodology

The Basic Model

In estimating our base case model specification, we synthesize the existing theoretical and empirical literature to test the following generalized regression:[xxvii]

Leverage = *f*(asset tangibility, growth options, firm size, profitability, and error)

Subsequent models add measures of the firm's liability structure, organizational structure, operational and financing characteristics, and a series of variables to explicitly investigate competing capital structure theory hypotheses. Specific definitions for the variables employed throughout the analysis are as follows:

Dependent Variable:

Leverage = ratio of total book debt to the sum of book debt and the market value of equity.

Independent Variables:

Traditional Capital Structure Determinants

Asset Tangibility = Fixed Assets = ratio of net property investments to total assets;
Growth Options = firm market value divided by total assets;
Firm Size = book value of total assets;
Profitability = ratio of funds from operations (FFO) to total assets;
Lagged Leverage = firm market leverage ratio as of the end of the previous period;

Additional Capital Structure Determinants

Secured Debt = ratio of secured debt and mortgages to total debt;
Rated Debt = indicator variable taking the value of one if the firm has a S&P long-term issuer credit rating, zero otherwise;
Lagged Coverage Ratio = earnings before interest, taxes, depreciation, and amortization (EBITDA) to interest expense coverage ratio for the year immediately preceding our leverage observation;
Firm Age = number of years since the firm's initial public offering;

REIT Organizational Characteristics

Modern (Post '93) REIT = indicator variable taking the value of one if the firm was created after 1993, zero otherwise;
Maryland REIT = indicator variable taking the value of one if the REIT is incorporated in the state of Maryland, zero otherwise;
Delaware REIT = indicator variable taking the value of one if the REIT is incorporated in the state of Delaware, zero otherwise;
UPREIT = indicator variable taking the value of one if the REIT is an umbrella partnership REIT, zero otherwise;

REIT Operating and Financing Characteristics

Repurchases = indicator variable taking on the value of one if the REIT repurchased any

common shares during the year immediately preceding our leverage observation, zero otherwise;

Operating Leverage = percentage change in FFO divided by the percentage change in total revenue calculated between the year of our leverage observation and the preceding year;

Lease Payments = sum total of all future lease payments already contractually committed to by the REIT divided by total assets;

LOC Available = total dollar amount of revolving credit lines available to the REIT divided by total assets;

LOC % Drawn = total dollar value of revolving credit lines in use by the REIT divided by the dollar value of credit lines at their disposal;

REIT Competing Capital Structure Theory Variables

Price-to-NAV = common stock price per share divided by the net asset value per share for the REIT;

Appreciation Return = capital appreciation component of the REIT's common equity return over the twelve months immediately preceding our leverage observation;

10 Year Treasury Rates = average ten year constant maturity Treasury rate estimated from weekly observations over the twelve month period immediately preceding our leverage observation;

FFO Dispersion = percentage deviation between the firm's reported level of FFO and FFO calculated in compliance with NAREIT policy bulletins;

Split Bond Ratings = indicator variable taking on the value of one if the REIT has differential bond ratings from S&P, Moody's, and/or Fitch as of the date of our leverage observation;

Excess Dividends = dollar amount of common stock dividends minus 90% of taxable income, divided by total assets;

Default Spread = average yield on BBB rated securities minus the average yield on AAA rated securities, calculated using weekly observations over the twelve months immediately preceding our leverage observation;

Firm Yield Spread = average interest rate on the firm's debt minus the average yield on BBB rated securities, calculated using weekly observations over the twelve months immediately preceding our leverage observation;

NOI-to-Net Prop. Inv. = ratio of net operating income to net property investments for the REIT.

Data

Data necessary to empirically implement these models comes primarily from SNL. Sample construction begins by identifying all REITs traded on the New York Stock Exchange, American Stock Exchange, or NASDAQ at any point between 1990 and 2008. After dropping firms with

missing variables, the resulting sample comprises 2,409 firm-year observations from a total of 473 firms.

The characteristics of these REITs are outlined in Table 1. Note that the typical REIT has an average total debt ratio of 48.4%, of which over two-thirds (67.2%) is secured. These numbers are very similar to those reported in previous studies of the REIT industry and confirm the notion that REITs are, in general, more highly levered than their typical non-REIT counterparts.[xxviii] Continuing, firms in the sample range from relatively modest in size to quite large, with General Growth Properties, Inc. (ticker symbol: GGP) possessing nearly $30 billion in assets for fiscal year 2008. Turning to profitability, the ratio of funds from operations (FFO) to total assets varies widely with some firms noting negative funds from operations, while the typical firm averaged a 5.5% operational return on assets. Approximately 30% of the firms (708 of 2,409) have rated debt outstanding, defined as the existence of a S&P long-term issuer credit rating for the organization, while the average market-to-book (MTB) value ratio for our sample firms is approximately 1.2 times – again with a very wide range of observed values across firms (from 0.01 to 3.98 times).

Turning to REIT organizational characteristics, and consistent with both Subramanian (2001) and Hartzell, Jallberg, and Liu (2008), we find the majority (61.5%) of our sample firms are incorporated in Maryland. Delaware is the second most common state of incorporation, accounting for 6.7% of our sample observations. Finally, we also note that over 60% of our firms are organized as UPREITs.[xxix]

Operationally, more than one in five REITs participate in open market share repurchase operations, while the typical trust has total revolving credit lines available equal to nearly 15% of total assets. On average, our sample firms exhibit price-to-NAV ratios in excess of one, experience solid capital appreciation of over 4%, and pay dividends only slightly in excess of the 90% regulatory minimum required to retain pass-through status for income tax purposes. Further descriptive information about variation in both the typical use of leverage and average EBITDA coverage ratios across property type segments is provided in Table 2. In general, Regional Malls appear to exhibit the highest leverage ratios and lowest coverage ratios, while Self-Storage facilities possess the lowest leverage ratios and highest coverage ratios.

Results

Determinants of Market Based Leverage Ratios

Table 3 presents the results of our base case firm leverage regressions. In column 1, we replicate the reduced form approach of Rajan and Zingales (1995) and evaluate leverage as a simple function of asset tangibility, growth options, firm size, and profitability. Not surprisingly, our fixed asset measure of asset tangibility is strongly positive, consistent with the notion that real assets provide better collateral on outstanding loans and thus serve to increase the debt capacity of the firm. Turning to growth options, we find the estimated coefficient on MTB to be negative and strongly significant. This result is consistent with the overwhelming majority of theoretical predictions and empirical findings for non-REIT organizations as outlined above, but stands in partial contrast to the recent findings of Feng, Ghosh, and Sirmans (2007) who document a positive relationship between firm leverage and MTB ratios for the REITs within their sample.

As will be discussed later, these seemingly disparate results may very well be due to the differing nature of the two investigations.[xxx]

Column 1 also includes the book value of total assets as our indicator of firm size. The resulting coefficient is positive, but not statistically significant. Our results also suggest that REIT profitability is inversely related to the organization's use of financial leverage. While these results are consistent with the theoretical predictions of both the trade-off and pecking order theories, as well as the empirical findings for industrial firms presented in Titman and Wessels (1988), Fama and French (2002), and Barclay, Smith, and Morellec (2006), they are seemingly at odds with Jensen's (1986) agency cost explanation in which good firms must commit to paying out cash flows by levering up.[xxxi] In the context of Rajan and Zingales (1995), these results would also seem to be consistent with the notion that the market for corporate control within the REIT industry is relatively weak and/or ineffective, thus allowing self-interested managers to strategically avoid the disciplining effect of relatively large, required periodic debt service obligations. Not surprisingly, the final variable included in column 1, Lagged Leverage, is also positive and strongly significant indicating a substantial level of stability within a firm's capital structure from period to period.

Column 2 of Table 3 extends the analysis to include additional firm-specific determinants of leverage including the structure of the firm's liabilities, the organization's access to capital markets, the firm's lagged EBITDA coverage ratio, and firm age. The addition of these explanatory variables has little qualitative impact on the results of the primary determinants of leverage previously reported. Specifically, fixed assets continue to exhibit a significantly

positive coefficient, market-to-book retains its negative relationship with leverage, firm size remains positive and is now statistically significant, while our profitability metric remains significantly negative.

Turning to the newly included variables, the ratio of secured debt to total debt exhibits a positive, though statistically insignificant, coefficient. This result is directionally consistent with the theoretical predictions and empirical findings for industrial firms presented by Brown and Marble (2007), but inconsistent with the findings of Brown and Riddiough (2003) who contend that firms prefer to minimize the number of distinct classes of claimholders in order to minimize agency costs. Continuing with our findings on access to capital, the significant negative coefficient on rated debt is inconsistent with both the findings of the previous literature (e.g., Faulkender and Petersen (2006), Boudry, Kallberg, and Liu (2009), etc.) and our ex-ante expectations. This unexpected result would seem to suggest there is limited, if any, substitutability between the protective covenants associated with public debt issues and the monitoring function associated with private debt issues for REITs. The final two variables included in model 2, the firm's lagged coverage ratio and the number of years since the firm's initial public offering, are both statistically insignificant.

The final two columns in Table 3 attempt to further clarify the role of industry specific influences on REIT capital structure decisions. Column 3 explicitly adds property type indicator variables to our analysis. The inclusion of the variables has very little impact on the results of our previous analysis, with the only noteworthy change being the renewed statistical insignificance of total assets. While individual property type coefficients are not reported in

Table 3, relative to the omitted classification of "Diversified", REITs focusing their investments in "Manufactured Homes" and "Regional Malls" use higher amounts of leverage, while "Self-Storage" REITs use relatively modest amounts of leverage. These findings for malls and self-storage facilities are entirely consistent with the raw, univariate data presented in Table 2; while the results for manufactured homes suggests the marketplace views these properties as attractive collateral, perhaps due to their relatively sizable and predictable cash flow stream generated from property rents.

Turning to column 4, we next add nine additional measures of each REIT's organizational structure, operating behavior, and financing characteristics. Once again, the qualitative nature of the previous coefficients remains remarkably consistent, with all previously significant variables retaining both their directionality and statistical significance. Within this framework, total assets regains marginal significance and, though not reported, the property type indicator variables for manufactured homes, regional malls, and self-storage REITs are also statistically significant and consistent with the results in column 3. Examining our newly included variables, we find that after controlling for the additional firm characteristics, "Modern REITs" do not appear to hold significantly higher debt levels than their older vintage counterparts. While the positive coefficient is directionally consistent with the findings of Ott, Riddiough, and Yi (2005), the lack of statistical significance after controlling for additional firm characteristics suggests that the previously documented higher debt levels for "New-REITs" may well be driven by their relatively large size and/or the nature of the assets in which they have chosen to invest. Consistent with Hartzell, Kallberg, and Liu (2008), our findings also suggest that managers of Maryland REITs may well be more insulated from external pressure and self-select lower

leverage levels to avoid the disciplinary effect of debt service obligations. While directionally consistent with their Maryland counterparts, the negative coefficient for Delaware REITs does not attain statistical significance. UPREITs within our sample are also found to use (marginally) lower leverage. This finding, while inconsistent with the predictions of pecking order theory, is consistent with the notion that more complex organizational structures may be more informationally opaque and/or difficult to manage. Turning to operational and financing characteristics, the estimated coefficients on Repurchases, Operating Leverage, and Lease Payments are all consistent with a priori expectations, though none attain statistical significance at conventionally accepted levels. Line of credit characteristics, on the other hand, do appear to materially influence firm capital structure decisions in a predictable manner. Firms with relatively large revolving lines of credit at their disposal are characterized by significantly lower leverage ratios. This finding suggests the marketplace recognizes the potential effect these off balance sheet credit facilities have on the firm's overall capital position. Furthermore, consistent with expectations, firms which have drawn down larger fractions of their available credit lines are characterized by higher leverage ratios.

REIT Evidence on Competing Capital Structure Theories

In order to provide more insight into the relative importance of the three major capital structure theories: market timing, pecking order, and trade-off theory to the REIT industry, Table 4 presents a series of twelve additional regressions. Within each panel of Table 4, three alternative variables designed to test a specific capital structure theory's implications within the REIT marketplace are added to the fully specified model IV from Table 3. The variables are first added individually in columns one through three, then as a group in column 4.

Market Timing

Panel A of Table 4 investigates the implications of market timing behavior on REIT capital structure decisions. Following the approach of Boudry, Kallberg, and Liu (2009), column I adds the ratio of the firm's stock price per share to its net asset value per share. Consistent with the prediction of market timing theory, this ratio is negatively related to firm leverage, suggesting management may well choose to issue equity when it is relatively highly valued by the marketplace. Similarly, in column II, leverage is negatively related to the capital appreciation in the firm's common stock values over the previous twelve months. This finding is again consistent with the notion that firms may well prefer to issue equity when market conditions are relatively favorable. Next, column III results indicate REIT debt usage is negatively related to market wide interest rates. The coefficient is strongly significant and in line with the notion that firms are hesitant to commit themselves to long-term fixed-income debt service obligations when interest rates are high. The results are robust to the simultaneous inclusion of all three metrics – see column IV – and provide strong evidence in support of the idea that market timing considerations materially influence REIT capital structure decisions.

Pecking Order Theory

Panel B of Table 4 investigates the implications of pecking order theory on REIT capital structure decisions. Columns I and II add measures of informational opacity to our base case specification. If pecking order theory is correct, firms with greater uncertainty surrounding their true financial condition should signal their high quality to the marketplace by increasing their use of financial leverage and pre-committing to the financial discipline mandated by debt service

obligations. Interestingly, neither the dispersion of reported FFO from NAREIT benchmark guidelines (column I) nor the presence of split bond ratings (column II) appear to materially influence the debt capacity of REITs. In fact, the (insignificant) negative coefficient on our split ratings metric is directionally inconsistent with the predictions of pecking order theory. Column III takes a somewhat different approach and investigates the payment of excess dividends. If the pecking order theory is correct, we would expect firms with payout ratios further above the 90% regulatory minimum threshold to be disproportionately likely to prefer issuing debt over public equity, and hence exhibit higher leverage ratios. Contrary to the above expectations, our findings suggest firms with higher payout ratios actually exhibit marginally lower market leverage ratios. Once again, the simultaneous inclusion of all three metrics in column IV provides results which are entirely consistent with our original findings. In sum, the evidence presented in panel B of Table 4 fails to provide any meaningful support for the predictions of the pecking order theory of capital structure within REIT markets.

Trade-off Theory

Panel C of Table 4 investigates the predictions of trade-off theory on REIT capital structure decisions. Column I adds the default risk spread, measured as the average yield of BBB rated securities minus the average yield on AAA rated securities, to our analysis. As outlined above, we view this variable as a general indicator of the market's level of risk aversion. Therefore, we believe the trade-off theory would predict a positive relationship between the market's default risk spread and firm leverage usage, and this is exactly the result we find. Column II adds the firm-specific yield spread. Consistent with our expectations and the predictions of trade-off theory, higher firm-specific yield spreads lower the relative attractiveness of issuing debt and

decrease firm leverage ratios. Finally, column III adds the ratio of net operating income to net property investments as an explanatory variable. To the extent properties generate relatively high cash yields, they should possess lower expected bankruptcy costs and, under trade-off theory, should exhibit an increased debt capacity. While directionally consistent with these predictions, our coefficient estimate in column III is not statistically significant, thus failing to provide additional support for trade-off theory implications. Interestingly, while the results in columns I and II are qualitatively invariant to the simultaneous inclusion of all three trade-off theory constructs in model IV, our NOI-to-Net Property Investment variable now attains statistical significance. Taken together, these results are generally consistent with the predictions of trade-off theory.

Growth Implications

Given Billett, King, and Mauer's (2007) findings that leverage relationships may vary between high and low MTB firms, we next split our sample along this dimension. Specifically, the first column of Table 5 presents results from our fully specified model including all nine variables added through our tests of competing capital structure theories, while columns two and three present results using this identical model specification on the lowest and highest quartile of observations, respectively, sorted along the dimension of market-to-book ratios. In general, the results in column one are broadly consistent with our previous findings as fixed assets, total assets, and lagged leverage are all positively related to firm leverage, while market-to-book and profitability ratios are negatively related to debt utilization. Similarly, firms incorporated in Maryland and those with rated debt outstanding continue to possess significantly lower leverage ratios than their peers, while revolving lines of credit, market timing characteristics, and trade-off

theory indicators all continued to exhibit previously identified and statistically significant relationships with firm debt levels. Close examination of the data in the table, and particularly comparisons across the three columns, reveals a number of additional noteworthy observations. For example, the significantly negative relationship between firm growth options and leverage usage appears to be concentrated within the lowest quartile of MTB firms. In fact, for high MTB REITs growth options exhibit a positive coefficient which approaches, though does not attain, marginal significance at conventionally accepted levels.[xxxii] Similarly, secured debt enhances debt capacity for high-growth firms, while its use does not appear to alter firm wide leverage for low-growth firms. In the context of Brown and Marble (2007), Brown and Riddiough (2003), and Ott, Riddiough, and Yi (2005), these results support the notion that high market-to-book firms, which may anticipate returning to the capital market to finance their continuing growth plans, may increase their use of secured debt financing to mitigate asset substitution related problems/incentives and ensure their continued access to capital. Continuing, the lagged coverage ratio is negatively related to firm leverage for low-growth firms, but insignificantly positive for high-growth REITs. We interpret this finding as evidence that firms with low-growth prospects and relatively high existing debt burdens will have difficulty obtaining additional credit. On the other hand, highly levered firms with transparent growth opportunities are able to continue raising capital in the marketplace by issuing public debt. Similarly, contractually obligated lease payments and existence and use of revolving lines of credit appear to be more important for high-growth REITs. Finally, turning to our analysis of competing capital structure theory variables, we find the influence of both price-to-NAV and NOI-to-Net Property Investment effects to be concentrated solely within the subset of high-growth REITs. These results are not entirely unexpected, as high-growth firms may well be more frequent

participants in the capital market than their low-growth peers, and thus may rationally be more sensitive to current market conditions. Taken together, these results appear to be in line with the findings of Billett, King, and Mauer (2007) as the determinants of firm leverage do display non-trivial variation across high- and low-growth (MTB) firms.

Conclusions

This paper systematically investigates the capital structure choices of real estate investment trusts since 1990. We find REIT capital structure to be driven by many of the same traditional factors which influence non-REIT corporate borrowing. For example, firm size and asset tangibility appear to be positively related to the organization's use of financial leverage, while increased profitability, and the presence of growth opportunities (as measured by the firm's market-to-book ratio) are both negatively related to the use of leverage. We also find some evidence that firms with rated debt outstanding, and hence better access to capital markets, exhibit an enhanced debt capacity, while high-growth firms may enhance their overall debt capacity by increasing their use of secured debt.

Unique industry specific regulatory, operational, and financing characteristics also appear to influence REIT leverage decisions. Specifically, REITs incorporated in Maryland use less financial leverage than their peers, while the availability and use of revolving lines of credit both appear to exert significant influence on firm leverage decisions. Furthermore, REITs concentrating their investment activities within either the Regional Mall or Manufactured Homes property type segments tend to use relatively high amounts of leverage, while firms focused on Self-Storage properties exhibit relatively low leverage ratios.

Finally, our results provide strong support for both the market timing and trade-off theory explanations of REIT capital structure decisions, but broadly reject predictions derived from the pecking order theory. Specifically, with respect to market timing predictions, we find that firm market leverage ratios are negatively related to price-to-NAV ratios, the capital appreciation component of the previous year's return, and average market wide interest rates. Similarly, with respect to the trade-off theory, we find firm leverage being positively related to market wide risk aversion, negatively related to firm-specific borrowing costs, and positively related to the ability of the firm's investments to generate cash yields. On the other hand, in contrast to the predictions of pecking order theory, our results fail to find evidence of a significant relationship between firm leverage and the informational opacity of the firm, and additionally document a (marginally) significant negative relationship between a firm's excess dividend payments and their market leverage ratio. Taken together, these results provide additional insights into under-examined determinants of REIT capital structure choices.

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Table 1 - Summary Statistics

This table presents summary statistics of the variables employed in this investigation. Our dataset covers annual observations from all U.S. publicly traded real estate investment trusts, from 1990 through 2008, with complete data available from SNL. The first column contains the total number of observations. We report means, standard deviations, minimum, and maximum values. Our dependent variable, *Leverage*, is the ratio of total debt to total REIT value. Our independent variables are grouped into four distinct blocks corresponding to differential focal points within our analysis. All independent variables which represent ratios of financial data are Windsorized at the three standard deviation level to minimize the influence of potential outliers on our empirical results.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent Variable					
Market Leverage	2,409	0.484	0.189	0.001	0.995
Traditional Capital Structure Determinants					
Fixed Assets	2,409	0.822	0.150	0	1.004
Market-to-Book	2,409	1.235	0.627	0.014	3.976
Total Assets ($,000)	2,409	1,893,680	3,137,458	5,242	29,600,000
Profitability	2,409	0.055	0.029	-0.216	0.253
Lagged Leverage	2,409	0.463	0.187	0	0.995
Additional Capital Structure Determinants					
Secured Debt	2,409	67.185	34.525	0	100
Rated Debt	2,409	0.294	0.456	0	1
Lagged Coverage Ratio	2,409	4.946	11.008	-4.75	111.10
Firm Age (years)	2,409	21.406	30.232	0	108
REIT Organizational Characteristics					
Modern (Post '93) REIT	2,409	0.355	0.478	0	1
Maryland REIT	2,409	0.615	0.487	0	1
Delaware REIT	2,409	0.067	0.250	0	1
UPREIT	2,409	0.608	0.488	0	1
REIT Financing Characteristics					
Repurchases	2,409	0.225	0.418	0	1
Operating Leverage	2,409	1.324	2.789	-4	8
Lease Payments	2,409	1.170	0.594	0	1.730
LOC Available	2,409	0.147	0.114	0	0.620
LOC % Drawn	2,409	0.363	0.310	0	1

Variable	Obs.	Mean	Std. Dev.	Min	Max
REIT Capital Structure Variables					
Price-to-NAV	2,409	1.318	0.570	0	2
Appreciation Return	2,409	0.044	0.301	-0.969	2.409
10 Year Treasury Rates	2,409	5.330	1.037	3.761	7.867
FFO Dispersion	2,409	0.201	0.171	0	0.800
Split Bond Ratings	2,409	0.074	0.262	0	1
Excess Dividends	2,409	0.008	0.019	0	0.382
Default Spread	2,409	0.875	0.271	0.603	1.702
Firm Yield Spread	2,409	-1.141	1.977	-7.938	12.098
NOI-to-Net Prop. Inv.	2,409	0.157	0.068	0	1.083

Table 2 - Property Type Breakouts

This table presents main summary statistics for leverage and coverage ratio variables separated by the main property types of REITs in the sample. The first column contains the total number of observations in each property type. We report means, standard deviations, minimum, and maximum values. *Leverage* is the ratio of total debt to total REIT value, *Coverage Ratio* is the value of EBITDA divided by total interest expenses for the REIT.

		Leverage				**Coverage Ratio**			
Property Type	Obs.	Mean	Std	Min	Max	Mean	Std	Min	Max
Diversified	253	0.47	0.21	0.01	0.96	7.45	17.47	-4.75	111.10
Health Care	193	0.38	0.19	0.01	0.89	4.64	4.25	-1.98	26.69
Hotel	219	0.51	0.21	0.03	0.97	5.71	12.75	-3.68	111.10
Industrial	177	0.52	0.18	0.23	0.97	2.86	1.54	-1.27	11.25
Manufactured Homes	62	0.44	0.14	0.19	0.75	3.66	2.90	0.77	24.45
Multi-Family	392	0.52	0.16	0.07	0.92	3.30	3.27	-3.55	60.05
Office	346	0.49	0.14	0.10	0.99	3.35	1.74	-4.75	12.36
Regional Mall	151	0.60	0.14	0.05	0.99	2.86	1.81	-1.76	14.12
Retail: Other	131	0.44	0.22	0.00	0.99	8.26	17.91	-0.03	111.1
Self-Storage	81	0.33	0.26	0.02	0.99	20.30	34.14	-4.75	111.1
Shopping Center	337	0.48	0.17	0.02	0.97	3.59	3.85	-4.75	37.65
Specialty	67	0.49	0.16	0.02	0.90	4.91	6.83	-4.75	36.23
Total	2,409	0.48	0.19	0.00	0.99	4.95	11.01	-4.75	111.10

Table 3 - Determinants of Market Leverage

This table reports OLS regression coefficients and t-statistics (in parenthesis) for factors affecting REITs' leverage ratios. All models include *Fixed Assets, Market-to-Book* ratio*, Total Assets, Profitability*, and *Lagged Leverage* as well as fixed effect *Year Indicators* as explanatory variables. Model (2) includes *Secured Debt, Rated Debt, the firm's Coverage Ratio from the preceding year,* and *Firm Age* apart from the variables in Model (1); Model (3) adds property type indicator variables as additional explanatory characteristics, while Model (4) adds a variety of REIT specific characteristics designed to capture the unique organizational, operational, and financing characteristics of the firm.[xxxiii] The last three rows present the number of observations in each specification and tests of the statistical significance of the overall regressions.

	(1)		(2)		(3)		(4)	
Traditional Capital Structure Determinants								
Fixed Assets	0.071	***	0.071	***	0.076	***	0.064	***
	(6.07)		(6.09)		(6.42)		(5.45)	
Market-to-Book	-0.029	***	-0.028	***	-0.037	***	-0.037	***
	(-8.55)		(-8.10)		(-10.07)		(-10.33)	
Total Assets	0.073		0.205	***	0.105		0.120	*
	(1.25)		(3.20)		(1.56)		(1.79)	
Profitability	-0.945	***	-0.939	***	-1.010	***	-0.956	***
	(-11.86)		(-11.73)		(-12.55)		(-12.24)	
Lagged Leverage	0.735	***	0.717	***	0.692	***	0.680	***
	(60.06)		(53.45)		(50.88)		(50.56)	
Additional Capital Structure Determinants								
Secured Debt			0.089		-0.032		0.068	
			(1.40)		(-0.48)		(1.04)	
Rated Debt			-0.019	***	-0.018	***	-0.013	***
			(-3.69)		(-3.48)		(-2.62)	
Lagged Coverage Ratio			-0.025		-0.015		-0.023	
			(-1.43)		(-0.85)		(-1.33)	
Firm Age			-0.009		-0.006		-0.008	
			(-1.57)		(-0.92)		(-1.21)	
REIT Organizational Characteristics								
Modern (Post '93) REIT							0.005	
							(1.22)	
Maryland REIT							-0.012	***
							(-3.15)	
Delaware REIT							-0.006	
							(-0.75)	
UPREIT							-0.007	*
							(-1.67)	

	(1)		(2)		(3)		(4)	
REIT Financing Characteristics								
Repurchases							0.030	
							(0.07)	
Operating Leverage							-0.068	
							(-1.13)	
Lease Payments							-0.002	
							(-0.50)	
LOC Available							-0.070	***
							(-3.98)	
LOC % Drawn							0.078	***
							(12.96)	
Constant	0.131	***	0.135	***	0.168	***	0.176	***
	(7.65)		(7.62)		(9.08)		(9.28)	
Property Type Flags	No		No		Yes		Yes	
Observations	2,409		2,409		2,409		2,409	
F (k=22/26/37/46; 2,408 – k)	443.12	***	380.24	***	278.61	***	244.95	***
Adjusted R-squared	0.8016		0.8037		0.8101		0.8233	

*** Indicates statistical significance at one percent level, ** Indicates statistical significance at five percent level, * Indicates statistical significance at ten percent level.

Table 4 - Determinants of Market Leverage: Competing Capital Structure Theories

This table reports OLS regression coefficients and t-statistics (in parenthesis) for factors affecting REITs' leverage ratios. All models include the complete set of explanatory variables from Model (4) in Table 3. Panels A, B, and C augment this data with three measures designed to test the relative importance of market timing theory, pecking order theory, and trade-off theory, respectively. Within each panel, the first three columns add one capital structure metric at a time, while column four includes the complete set of all three capital structure metrics simultaneously. The final two rows in each panel present measures of the goodness-of-fit and tests of the statistical significance of the overall regressions. Each model is estimated over 2,409 firm-year observations.

	I		II		III		IV	
Panel A: Market Timing Theory								
Price-to-NAV	-0.032	***					-0.017	***
	(-9.36)						(-5.52)	
Appreciation Return			-0.165	***			-0.159	***
			(-25.90)				(-24.49)	
10 Year Treasury Rates					-0.031	***	-0.010	***
					(-8.31)		(-3.05)	
Adjusted R^2	0.8296		0.8623		0.8233		0.8640	
F(47/47/47/49; 2,408-k)	250.40	***	321.97	***	244.95	***	319.83	***
Panel B: Pecking Order Theory								
FFO Dispersion	0.006						0.007	
	(0.61)						(0.67)	
Split Bond Ratings			-0.009				-0.008	
			(-1.28)				(-1.18)	
Excess Dividends					-0.184	*	-0.181	*
					(-1.87)		(-1.83)	
Adjusted R^2	0.8233		0.8234		0.8235		0.8235	
F(47/47/47/49; 2,408-k)	239.68	***	239.83	***	240.06	***	230.29	***
Panel C: Trade-off Theory								
Default Spread	0.158	***					0.127	***
	(11.37)						(9.61)	
Firm Yield Spread			-0.016	***			-0.016	***
			(-16.94)				(-17.41)	
NOI-to-Net Prop. Inv.					0.011		0.117	***
					(0.36)		(3.84)	
Adjusted R^2	0.8233		0.8424		0.8233		0.8433	
F(47/47/47/49; 2,408-k)	244.95	***	274.85	***	239.65	***	270.99	***

*** Indicates statistical significance at one percent level, ** Indicates statistical significance at five percent level,
* Indicates statistical significance at ten percent level.

Table 5 - Determinants of Market Leverage
Low vs. High Market-To-Book Values

This table reports OLS regression coefficients and t-statistics (in parenthesis) for factors affecting REITs' leverage ratios. All models include the complete set of explanatory variables from Model (4) in Table 3 as well as the complete set of nine competing capital structure theory measures investigated in Table 4. Column 1 presents results from this fully specified model over all 2,409 available observations. Column 2 restricts the estimation to those REITs possessing market-to-book (MTB) ratios falling within the lowest twenty-five percent of all available observations. Column 3 symmetrically completes the analysis by restricting the estimation to those REITs possessing market-to-book (MTB) ratios falling within the highest twenty-five percent of all available observations. The final three rows of this table report the number of observations employed in each regression, tests of the statistical significance of each specification, and the adjusted R-squared value of model.

Variable	Full Model		Low MTB REITs		High MTB REITs	
Traditional Capital Structure Determinants						
Fixed Assets	0.065	***	0.066	***	0.099	***
	(6.51)		(3.26)		(5.98)	
Market-to-Book	-0.015	***	-0.160	***	0.007	
	(-4.98)		(-8.76)		(1.50)	
Total Assets	0.098	*	0.220		0.067	
	(1.79)		(1.63)		(0.96)	
Profitability	-0.770	***	-0.504	***	-1.203	***
	(-110.6)		(-4.00)		(-9.62)	
Lagged Leverage	0.744	***	0.703	***	0.699	***
	(67.42)		(33.73)		(31.29)	
Additional Capital Structure Determinants						
Secured Debt	0.013	**	0.012		0.021	**
	(2.54)		(1.00)		(2.36)	
Rated Debt	-0.007	*	-0.010		0.001	
	(-1.72)		(-0.97)		(0.20)	
Lagged Coverage Ratio	-0.055	***	-0.281	***	0.001	
	(-3.84)		(-6.01)		(0.04)	
Firm Age	-0.004		-0.010		0.000	
	(-0.67)		(-0.89)		(1.20)	
REIT Organizational Characteristics						
Modern (Post '93) REIT	0.083		-0.406		-0.299	
	(0.24)		(-0.52)		(-0.50)	
Maryland REIT	-0.008	***	-0.007		-0.006	
	(-2.57)		(-1.00)		(-1.13)	
Delaware REIT	-0.005		-0.008		0.005	
	(-0.87)		(-0.44)		(0.56)	
UPREIT	-0.005		-0.010		0.005	
	(-1.57)		(-1.28)		(0.97)	

	Full Model		Low MTB REITs		High MTB REITs	
REIT Financing Characteristics						
Repurchases	0.003		0.002		0.001	
	(0.75)		(0.32)		(0.09)	
Operating Leverage	-0.033		0.098		-0.042	
	(-0.68)		(1.16)		(-0.54)	
Lease Payments	-0.004		0.005		-0.014	***
	(-1.36)		(0.87)		(-3.01)	
LOC Available	-0.071	***	0.044		-0.038	*
	(-5.09)		(1.35)		(-1.83)	
LOC % Drawn	0.042	***	0.019	*	0.034	***
	(8.58)		(1.85)		(4.21)	
REIT Capital Structure Variables						
Price-to-NAV	-0.028	***	0.003		-0.032	***
	(-9.69)		(0.51)		(-6.34)	
Appreciation Return	-0.184	***	-0.143	***	-0.175	***
	(-36.06)		(-17.04)		(-18.49)	
10 Year Treasury Rates	-0.010	***	-0.016	***	-0.003	
	(-4.86)		(-3.44)		(-1.06)	
FFO Dispersion	0.001		0.009		0.008	
	(0.14)		(0.58)		(0.56)	
Split Bond Ratings	-0.008		-0.001		-0.013	*
	(-1.36)		(-0.04)		(-1.66)	
Excess Dividends	-0.313	***	-0.389	***	-0.481	***
	(-3.93)		(-2.63)		(-3.55)	
Default Spread	-0.029	***	-0.041	***	-0.019	*
	(-4.33)		(-2.99)		(-1.70)	
Firm Yield Spread	-0.018	***	-0.022	***	-0.014	***
	(-23.00)		(-14.68)		(-9.56)	
NOI-to-Net Prop. Inv.	0.025		-0.052		0.155	***
	(0.96)		(-1.27)		(2.81)	
Constant	0.254	***	0.375	***	0.159	***
	(11.77)		(7.35)		(4.74)	
Observations	2,409		602		604	
F(38; 2,370/563/603)	496.18	***	126.51	***	148.93	***
Adjusted R-squared	0.8865		0.8881		0.9031	

*** Indicates statistical significance at one percent level, ** Indicates statistical significance at five percent level,
* Indicates statistical significance at ten percent level.

[i] See Modigliani and Miller (1958 & 1963) for the theoretical foundations of trade-off theory.
[ii] Reasons for REIT exclusions include markedly different regulatory structures, differences in informational transparency, and tax implications.
[iii] Market capitalization estimates obtained from the National Association of Real Estate Investment Trusts, composite year-end figures. By the end of 2008, this number had fallen to under $192 billion. For further detail, see http://www.nareit.com/library/marketcap.cfm.
[iv] Harris and Raviv (1991) provide a comprehensive review of the theoretical capital structure literature and discuss not only this classic paradigm, but also models driven by agency costs, product/input market interactions, and corporate control considerations.
[v] Myers (1984) argues this situation is not unique to REITs and specifically claims no available studies "clearly demonstrat[e] that a firm's tax status has predictable, material effects on its debt policy."
[vi] See Howe and Shilling (1988) for further discussion of why REITs should limit their use of debt financing.
[vii] Numerous corporate finance articles have investigated the validity of the pecking order theory. Studies finding empirical support for this theory include Shyam-Sunder and Myers (1999) and Fama and French (2002), while Helwege and Liang (1996) and Baker and Wurgler (2002) both provide evidence seemingly at odds with the model's implications.
[viii] The "five or fewer" rule mandates that no more than fifty percent of the REIT's outstanding shares may be held by five or fewer investors.
[ix] While corporate finance could argue that the market for corporate control might mitigate this problem via the threat of takeovers for informationally opaque firms, Campbell, Ghosh, and Sirmans (2001) find no evidence of an active market for hostile takeovers of REITs. This may well be partially attributable to regulatory restrictions on the nature of REIT asset holdings – at least 75% of assets must be real estate related, at least 75% of gross income must be derived from real estate related assets -- which effectively precludes inter-industry takeovers of REITs.
[x] While most academics discount the ability of REITs to fund growth through retained earnings, empirical studies of REIT dividend policy raise doubts about the binding nature of these regulatory payout restrictions. Specifically, while REITs are forced to distribute at least 90% of their income to shareholders (95% prior to 2001), large depreciation deductions can dramatically boost the free cash flow available to managers. Consistent with the idea that REIT distribution requirements are non-binding, both Wang, Erickson, and Gau (1993) and Bradley, Capozza, and Seguin (1998) report REIT dividend payout ratios well in excess of 100% of taxable income.
[xi] In general, the findings of Feng, Ghosh, and Sirmans (2007) tend to support the pecking order hypothesis over either the trade-off theory or market timing explanations of REIT capital structure decisions.
[xii] See Williamson (1988), Titman and Wessels (1988), and Pulvino (1998) for further discussion on the relationship between leverage and tangible assets.
[xiii] See, for example, Eckbo (1986) and Akhigbe, Easterwood, and Pettit (1997).
[xiv] Recent work by Giambona, Harding, and Sirmans (2008) extends this framework to model the importance of asset liquidation values and again finds leverage to be inversely related to debt maturity.
[xv] Interestingly, Titman and Wessels (1988) find no empirical evidence that the collateral value of the firm's assets influences its use of debt.
[xvi] A number of additional studies also document a negative relationship between a firm's use of leverage and their ex-ante growth options, typically as measured by their market-to-book ratios. These studies include Myers (1984), Shyam-Sunder and Myers (1999), and Fama and French (2002).
[xvii] The dominant variable in their market leverage regressions, Table 8, is lagged market-to-book. Consistent with the corporate finance literature, the variable takes on a negative sign in this model specification.
[xviii] Baker and Wurgler (2002) actually offer somewhat conflicting expectations as to the relationship between firm size and leverage. On one hand, they find that a firm's capital structure is largely the result of past profitability and the opportunity to finance growth via retained earnings (not a viable option for most REITs). On the other hand, they also demonstrate that "large firms issue less equity as a percentage of total assets" during their IPO phase. Thus, either positive or negative signs on the relationship between firm size and leverage may be rationalized under the Baker and Wurgler framework.
[xix] Brown and Marble (2007) model the optimal recourse nature of firm debt and conclude "the attractiveness of recourse debt increases with the size of the firm." Given the non-recourse nature of most secured debt borrowing by REITs, their model implies a potential interaction between firm size and the liability structure of REIT debt.

[xx] Ling and Ryngaert (1997) and Cotter and Stevenson (2007) also identify time variations in REIT return patterns. Specifically, Ling and Ryngaert find REIT IPOs during the 1970s and 1980s were initially overpriced, while REIT IPOs during the 1990s were underpriced. They attribute this change, in part, to the increased presence of institutional investors in the REIT marketplace since 1990. Cotter and Stevenson take a substantively different approach and find REIT volatility is highly time variant in nature, and the linkages across both REIT sub-sectors and with broader equity markets also exhibit significant time variation.

[xxi] Subramanian (2001) also finds REITs and other investment firms are disproportionately likely to incorporate in Maryland.

[xxii] See, for example, Billett, Flannery, and Garfinkel (1995).

[xxiii] See, Boudry, Kallberg, and Liu (2009) for additional discussion of price-to-NAV considerations, including issues of public versus private market valuations. For those REITs in our sample for which NAV estimates are unavailable, we assume a price-to-NAV ratio equal to one. Our results are qualitatively similar when these observations are simply excluded.

[xxiv] We also note that, by definition, market leverage in the empirical work which follows will decline as stock prices rise. However, this construction is unlikely to account for the entirety of the relationship we find as similar results are found using book leverage as the dependent variable.

[xxv] It is certainly possible that firms could knowingly deviate from NAREIT guidelines in attempts to provide more, rather than less, clarity to the marketplace about their financial condition. In the absence of meaningful information about the incentives for firms not choosing to follow NAREIT guidelines, we view deviations in FFO calculations as indicative of greater variability in potential firm valuations.

[xxvi] Notch ratings refer to the qualifiers placed on letter ratings by agencies. Thus, a firm with an S&P rating of BB+ and a Moody's rating of Ba2 would be flagged as having split ratings.

[xxvii] Leverage is constrained, for firms not already encountering financial distress, to fall within the range of zero to one. Thus, the censored tobit model may be theoretically superior to an OLS specification. In practice, our results are robust to either modeling approach.

[xxviii] For example, Brown and Marble (2006) report the REITs in their 1990-2003 sample had mean leverage ratios of 47.4%, of which 66.8% was secured. Their non-REIT counterparts over that same interval had mean leverage ratios of only 27.5%, of which only 33.0% was secured. Similarly, Maris and Elayan (1990) find total debt ratios (on a market value basis) averaged 49.7% for the REITs in their earlier, 1981-1987 estimation window.

[xxix] In determining UPREIT status, SNL reports only the current status of the organization. To augment this data, we also examined UPREIT status flags contained in annual copies of NAREIT's REIT Handbook. Unfortunately, UPREIT status is not reported by NAREIT after 2000. As such, we did identify a handful of observations for which the last available NAREIT UPREIT identifier code does not match the current UPREIT status of the organization as reported by SNL. Where available, we have used the NAREIT classification rather than the SNL classification. On the margin, we note the possibility that some REITs may have been misclassified along this dimension. In addition, to limit the influence of outlier observations on our empirical results, we Windsorize all independent variables which enter our analysis as ratios at the three standard deviation level.

[xxx] The primary focus of the current investigation is on existing debt utilization by real estate investment trusts. The panel dataset and associated methodology we employ provides the advantage of offering significant degrees of freedom which enhance our ability to detect and delineate potential relationships between a firm's debt capacity and their financial and/or operating characteristics. On the other hand, Feng, Ghosh, and Sirmans focus on the evolution of REIT leverage over time, and attempt to identify factors which influence REIT financing decisions. Thus, while the two investigations are clearly related, they address uniquely different and important aspects of REIT capital structure design.

[xxxi] While Feng, Ghosh, and Sirmans (2007) include controls for both size and profitability in their REIT capital structure regressions, they fail to find consistently significant results along either dimension.

[xxxii] Somewhat surprisingly, when our models are estimated using book leverage rather than market leverage, the coefficient on MTB is often significantly positive. Given that Myers (1977) predictions would suggests these effects should be strongest for the high MTB REITs rather than the low MTB segment that we find, we believe future researchers may well want to explore the nature of the relationship between growth options and debt capacity more fully.

[xxxiii] For brevity reasons, coefficients for the individual Year and Property Type indicators are not reported, but are available from the authors upon request.