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Dividend Taxes and Share Prices: Evidence from Real Estate Investment Trusts

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ABSTRACT

Prior empirical evidence regarding the impact of dividend taxes on firm valuation is mixed. This study avoids some of the complications encountered in previous empirical work by exploiting institutional characteristics of REITs, such as their limited discretion over dividend policy and the relative transparency of REIT assets. We regress the market value of equity on the market value of assets and tax basis, which creates tax deductions that lower future dividend taxes without affecting future pretax cash flow. We find that firm value is positively related to tax basis, suggesting that future dividend taxes are capitalized into share prices.

FINANCIAL ECONOMISTS have debated the impact of dividend taxes on firm valuation and the cost of equity capital for decades. In 1970, Brennan proposed that investors should impose a price penalty on the shares of high-dividend firms because capital gains are tax-preferred relative to dividends. In 1978, Miller and Scholes countered that prices may not reflect shareholder taxes because the marginal investor could be a tax-exempt institution. Simultaneously, King (1977), Auerbach (1979), and Bradford (1981) posited that dividend taxes should be capitalized into share prices for all firms that will eventually distribute earnings through dividends, not just for firms that pay current dividends. Theoretically, all three arguments have potential strengths and weaknesses, so empirical investigation is required.

Empirical investigation of the share price effects of dividend taxes has followed two primary lines of inquiry. First, studies use long event windows to ex-

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amine the hypothesis that dividend taxes increase pretax returns, which would indicate they also affect prices.[1] Despite extensive research in this area, no consensus has emerged, largely because it has proven difficult to control for the nontax determinants of returns (e.g., risk). Second, researchers use ex-dividend-day share price behavior to examine the hypothesis that taxes result in less-than-dollar-for-dollar declines in share prices on ex-dividend days. Despite numerous studies supporting this hypothesis, several questions persist.[2] For example, arbitrage trading could offset price reactions (see, e.g., Kalay (1982), Karpoff and Walkling (1988), and Naranjo, Nimalendran, and Ryngaert (2000)), discreteness in trading prices could lead to spurious results (Bali and Hite (1998)), or other nontax factors could influence ex-dividend day share price movements (see, e.g., Frank and Jagannathan (1998)).

Given the mixed prior evidence, Fama and French (1998) adopt a cross-sectional approach, focusing on prices rather than on returns. They regress the market value of firm equity on dividends and controls for expected future profitability. They scale the regression by the book value of assets, which serves as a proxy for the market value of assets. Fama and French hypothesize that if investors impose a tax penalty on the prices of high-dividend firms, the coefficient on dividends should be negative. Instead, they find a positive coefficient on dividends, expressing concern that imperfect controls for future profitability and the market value of assets may cause the signaling attributes of dividends to obscure tax effects. Indeed, the information content of dividends potentially confounds interpretation of any study that uses dividend policy to examine tax effects.

In this study, we examine the share price effects of dividend taxes by focusing on Real Estate Investment Trusts (REITs). REITs are exempt from corporate income taxes but must limit their activities to owning and managing portfolios of real estate assets and must pay out the bulk of their taxable income as dividends. These institutional features of REITs allow us to overcome some of the obstacles that complicate previous studies of dividend taxes and share prices.

Given the relatively straightforward nature of REITs, for example, analysts typically evaluate REITs by estimating the value of their properties. These estimates allow us to control for the fair market value of assets. In addition, tax rules significantly restrict the activities REITs undertake, so management has less impact on the value of a REIT than it has for typical industrial corporations. Therefore the market value of properties should capture much of a REIT's value,

[1] Litzenberger and Ramaswamy (1979, 1982), Rosenberg and Marathe (1979), and Blume (1980) are among the studies supporting a positive relationship between pretax returns and dividends, while Black and Scholes (1974), Gordon and Bradford (1980), Miller and Scholes (1982), and Fama and French (1993) do not find this relationship. Chen, Grundy, and Stambaugh (1990) argue that risk contributes to the alleged tax effects. While Naranjo, Nimalendran, and Ryngaert (1998) find a positive relationship between returns and dividend yields, they claim the positive relationship is too large to be a pure tax effect and show that it is unrelated to changes in tax rates over time.

[2] For support, see Elton and Gruber (1970), Poterba and Summers (1984), Barclay (1987), Lamdin and Hiemstra (1993), and Green and Rydqvist (1999), among others.

but not potential tax effects. Our empirical work exploits this feature by testing whether the difference between the market value of a firm's properties and its equity value depends on firm-level tax characteristics. When conducting this test, we also control for nontax factors that may affect value.

Tax law also requires REITs to pay out most of their taxable income as dividends each year, so their dividend policy is less discretionary than that of other corporations, which allows us to largely sidestep dividend signaling issues. The dividend distribution requirement also implies share repurchases are not viable substitutes for REIT dividends. For other firms, the tax advantages of share repurchases cloud predictions regarding the valuation of dividend taxes (see, e.g., Green and Hollifield (2001)).

Finally, REITs are generally exempt from corporate income taxes. Rather than reducing corporate taxes, REIT tax deductions pass straight through to shareholders by reducing the taxable component of dividends. Many of the tax deductions are from REITs' tax basis in properties because the tax basis provides depreciation tax shields and offsets taxable gains when they sell properties. Therefore, we examine the hypothesis that firm value increases in the amount of tax basis REITs have in their assets, holding the market value of assets constant. Given the pass-through nature of REITs, finding that investors value the inside tax basis of REIT assets is essentially equivalent to finding investors price shareholder-level dividend taxes.[3]

Empirically, we examine the price effects of REITs' tax basis in their assets for a sample of 389 observations (85 firms) from 1992 to 1999. We find investors assign a positive value to tax basis. In particular, we estimate that each dollar of tax basis is associated with an additional nine to 27 cents of firm value, depending on our empirical specification, with most estimates ranging from nine to 20 cents. These estimates reflect the present value of future depreciation and other tax benefits from tax basis, so they imply REIT prices appear to capitalize dividend taxes at high tax rates. This finding is consistent with a tax interpretation for the ex-dividend day evidence and serves as a benchmark for assessing the impact of dividend taxes on share prices in more general settings, in which corporate taxes are assessed, dividend policy is more discretionary, and firms can use tax-favored share repurchases in lieu of taxable dividends.

The remainder of the paper proceeds as follows. In Section I, we discuss REIT tax factors. In Section II, we present a simple valuation model with taxes. Section III discusses our data and empirical methodology and Section IV presents our empirical results. Section V concludes by discussing the implications and limitations of our results.

[3] Using event-study methodology, previous research (e.g., Cutler (1988) and Givoly and Hayn (1991)) finds that share prices reflect the corporate tax benefits of depreciation. REITs do not pay corporate taxes, however, so finding investors value inside tax basis for REITs would provide evidence that share prices are a function of shareholder-level taxes in addition to entity-level taxes.

I. REIT Tax Factors

With certain key exceptions, REITs are similar to other corporations. Like other corporations, for example, REITs often initiate operations by raising capital from external markets and investing the capital in operating assets. Although some REITs invest in real estate mortgages, we focus on equity REITs, which primarily invest in rental properties. For each property acquired, the REIT's initial tax basis is based on the original purchase price. Tax depreciation on the structure reduces the remaining tax basis of each property, just as book depreciation reduces the remaining book value of properties for financial reporting purposes.[4] As for other corporations, tax depreciation may vary from book depreciation, but REITs generally use straight-line depreciation for both book and tax purposes.

The depreciation expense REITs claim each year reduces taxable income, and capital gains on the sale of assets increase taxable income. Unlike regular corporations, however, REITs receive an annual tax deduction for dividends paid out to shareholders. These dividends retain their character as ordinary income or capital gains in the hands of shareholders, and for our sample period, REITs only qualify for the dividend deduction if they distribute at least 95 percent of their taxable income to shareholders.[5] As a practical matter, REITs often distribute all of their taxable income to shareholders each year, which eliminates the corporate tax altogether.

By reducing taxable income, depreciation decreases the amount of taxable dividends REITs must pass out to shareholders. However, depreciation does not reduce cash flow, so operating cash flow typically exceeds taxable income. Therefore REIT managers make annual decisions to either reinvest the excess cash flow in improvements, new properties, or other assets, or to distribute the excess cash as tax-free return-of-capital dividends to shareholders. In our sample, approximately half of the REITs made at least some voluntary tax-free return-of-capital distributions to shareholders at least once during our sample period. In addition, tax-free distributions account for 23 percent of total distributions, and there is a positive correlation between depreciation expense and tax-free return-of-capital distributions.[6] Occasionally REITs use excess cash flow to repurchase shares. Given the option to distribute the excess cash flow as tax-free dividends, however, share repurchases do not offer the tax advantages for REITs that they provide for regular corporations.

[4] Note that an owner is able to depreciate the structure, but not the land for any real estate owned.

[5] See Brueggeman and Fisher (1997) for a list of REIT tax rules. The REIT Modernization Act of 1999 relaxed some restrictions. As begun in 2001, the distribution requirement is only 90 percent of taxable income and REITs can own taxable subsidiaries that conduct some previously prohibited activities.

[6] Specifically, the correlation between depreciation expense (scaled by the book value of assets) and the percentage of total distributions that represent nontaxable returns of capital is 0.18 (with a p-value of 0.001).

Over the life of a real estate property, tax depreciation is likely to exceed the true economic depreciation of the property, which creates a wedge between tax basis and market value. Indeed, growth in demand often causes a property to appreciate in value despite the tax depreciation deductions recognized. Eventually the REIT may exchange or sell the property. According to current tax rules, if the REIT exchanges the property for another property in a qualified transaction, no capital gain is recognized and the remaining tax basis in the original property is transferred to the new property for continued depreciation. If the REIT sells the property, it recognizes a taxable capital gain that it must pass out to shareholders. Any remaining tax basis in the property, including any basis in land, reduces the taxable gain. Over the life of the property, therefore, the REIT's tax basis in the property reduces taxable income for shareholders by (a) reducing the taxable component of annual distributions through depreciation deductions, and/or (b) reducing the taxable capital gain upon sale of the property. In the next section, we model the potential valuation effects of these tax benefits.

II. Valuation Model

We begin by assuming the market value of equity (*MVE*) equals the market value of assets (*MVA*) less the market value of debt (*D*) plus all other factors influencing *MVE* (μ) as follows:

$$MVE = MVA - D + \mu. \qquad (1)$$

Our primary objective is to specify how shareholder taxes affect the relationship between *MVE* and *MVA*. That is, we consider how taxes affect the value of owning equity in an existing REIT relative to owning the assets directly as a new owner. In our empirical work, *MVA* reflects property appraisals that represent the fair market values of comparable properties, that is, the market prices outside investors would be willing to pay for the firm's assets. These comparable prices would incorporate any general equilibrium effects of taxes on asset prices. If an outside investor purchased all of the REIT's properties for their market value of *MVA*, the buyer's tax basis in the assets (*TB*) would equal *MVA*, or $TB = MVA$, implying the outside investor would have full tax basis in the properties.

In contrast to outside investors, REITs typically do not have full tax basis in their properties because they already have exhausted some of the depreciation tax deductions from the properties, and because property values may have changed since their purchase dates. To the extent *TB* is less than *MVA*, REITs face greater future tax liabilities on earnings from their properties than outside investors would face. REITs pass out the additional tax liabilities to shareholders through taxable ordinary dividends or occasionally through taxable capital gain dividends. Given that *MVA* reflects the market value of assets for outside investors, the after-tax value of the assets to REIT shareholders is only *MVA* - *INCTAX*, where *INCTAX* equals the present value of the incremental tax burden faced by the REIT owners.[7] After taxes, therefore, equation (1) can be rewritten as

$$MVE = MVA - D - INCTAX + \mu. \tag{2}$$

To define *INCTAX* more precisely, we let it equal $\tau(MVA - TB)$, where τ is the capitalized effective tax rate for the marginal investor. *A priori*, it is not possible to specify a value for τ because the marginal investor could be a tax-exempt institution, a high-tax individual, or some other entity. Hence, we infer the value of τ from the data. Our primary research question is whether $\tau > 0$, although we also use the magnitudes of our empirical estimates of τ to at least roughly infer the tax rate for the marginal investor. To illustrate, note that τ represents the present value of capitalized expected future tax benefits from basis. Therefore if we assume a REIT uses tax basis to generate tax depreciation deductions over a 27.5 year period, as it would for residential rental property, and the after-dividend-tax discount rate for the tax benefits ranges from four to eight percent (low risk is likely to be associated with the future tax benefits), then estimated values for the tax rate for the marginal investor equal between 1.7 (four percent discount rate) and 2.5 (eight percent discount rate) times the estimated value for τ. The midpoint between these two multiples is 2.1, which corresponds to an after-tax discount rate of six percent.[8] As discussed later, we use this midpoint as a rough guide for interpretation of the results.

Substituting our definition for *INCTAX* into equation (2) yields:

$$MVE = (1 - \tau)MVA + \tau TB - D + \mu. \tag{3}$$

[7] To focus on the differential taxation of REIT equity and properties, we assume REIT shareholders face similar tax treatment to the marginal outside property buyer. We believe three factors support this assumption. First, both corporate and individual investors in real estate face similar tax rates during our sample period, so it is plausible that these investors capitalize their common tax rate into *MVA*. Second, many real estate purchases are conducted through organizational forms, such as limited partnerships or limited liability companies, that face essentially the same tax consequences as investment through REITs. Third, REITs bought many properties during our sample period, so for any one REIT property, other REITs often are the potential outside buyer.

[8] To illustrate, assume tax basis in a depreciable asset is \$2,750, the REIT depreciates \$100 of basis per year, and the tax rate for the marginal investor is 0.396, so the annual tax savings is \$39.60. In this case, total tax savings for the 27.5-year period are \$1,089 (i.e., 27.5 $\times$ \$39.60). At a six percent discount rate, the present value of the tax savings is \$527, so τ is 0.192 (i.e., \$527/\$2,750), and the tax rate for the marginal investor is 2.1 times the value of τ (i.e., 0.396/0.192). This calculation is subject to errors in either direction. If a REIT's tax basis is composed of non-depreciable assets such as land or securities, or if the REIT owns assets with a 39-year depreciable life, the multiple will rise. However, if the REIT reclassifies certain assets to take advantage of shorter depreciation rules, as they often do, the estimated multiple on τ would be lower. Also note that our model concentrates on the effects of the REITs' tax basis in their inside assets, while abstracting from investors' outside tax basis in REIT shares. Accounting for the investors' outside tax basis could decrease the estimated value for τ to some degree (see Malkiel (1977) for a discussion of this issue in relation to closed-end mutual funds).

If the REIT has full tax basis in its assets so $TB = MVA$, then the REIT has no incremental tax relative to the outside owner and the expression simplifies back to equation (1). Over time, tax depreciation expenses and changes in asset values can cause the REIT's tax basis to diverge from the market value of its assets. Equation (3) implies that this divergence drives a wedge between the market value of equity and the market value of assets. If the marginal investor is taxable, equation (3) leads to the testable prediction that *MVE* should increase in the firm's inside tax basis in its assets.

Rather than focusing on the market value of gross assets, REIT analysts report the market value of net assets (*NAV*), where $NAV = MVA - D$, so that $MVA = NAV + D$. Making this substitution and simplifying results in

$$MVE = (1 - \tau)NAV + \tau TB - \tau D + \mu. \tag{4}$$

With this substitution it is apparent that debt has the opposite tax effect from tax basis. Algebraically, the negative tax effect for debt is a mechanical result of substituting $NAV + D$ for *MVA*. Intuitively, increasing debt while *NAV* is constant implies that *MVA* must increase; because *TB* remains constant, this increase in *MVA* is associated with a larger incremental tax burden for the shareholders, and this incremental tax burden decreases equity value at rate τ.

As discussed more fully later, we use two different measures for a REIT's tax basis in its assets. In our first tests, we use the book value of real estate properties (*BVA*) to measure the tax basis. Like other corporations, however, REITs typically have inside tax basis in all of their assets, not just in their real estate holdings. For example, their tax basis in the securities of other corporations equals their original purchase price for the securities. In a second set of tests, therefore, we define *TB* as the book value of total assets. The book value of total assets equals the book value of common equity (*BVCE*) plus debt, so $TB = BVCE + D$.[9] Note that when we substitute $BVCE + D$ for *TB*, debt falls out of the equation.

Equation (4) focuses on the manner in which shareholder taxes affect the difference between the value of a firm's equity and the value of its assets. We include μ to capture nontax factors, such as size and liquidity, which we attempt to control in our empirical work.

III. Data and Empirical Specification

A. Data

Our sample period begins in 1992, which corresponds with a boom in the REIT industry that began in the early 1990s. The number of equity REITs grew from 89

[9] Defining total tax basis as $BVCE + D$ is especially appropriate for REITs because they have essentially no retained earnings, so their *BVCE* consists almost entirely of contributed capital. This is critical, for as Harris and Kemsley (1999) point out, shareholders are taxed on distributions of assets that have been financed with retained earnings. In effect, therefore, shareholders only benefit from the tax basis a firm has in the assets it has financed with contributed capital. That is, contributed capital (or *BVCE* for REITs) is a summary measure of the amount of assets a firm can distribute to shareholders as a tax-free return of capital.

in 1992 to 167 in 1999 and their market capitalization grew from \$11 billion in 1992 to \$118 billion in 1999, with a consequent gain in liquidity and trading volume.[10]

The REIT boom brought increased analyst coverage. For example, Green Street Advisors, Inc.—our source for *NAV* estimates – covered 29 REITs in 1992 but 64 REITs by 1999. Several factors motivate using the Green Street *NAV* estimates. Industry observers and participants almost uniformly agree that Green Street produces the most careful and accurate estimates in the REIT industry. It is the only analyst firm to have a consistent set of estimates prior to 1996. Green Street focuses exclusively on real estate firms and each of its analysts follows only a few firms. These analysts specialize by type of property and compute *NAV* by determining the fair market value of each property owned by a REIT, often visiting larger properties. Finally, Green Street performs no investment banking functions for REITs, so it is immune from the potential conflicts of interest that may impact the research of banks that underwrite securities.

In addition to the *NAV* estimates from Green Street, we obtain accounting data from SNL Securities, Inc., and share price data from the University of Chicago's Center for Research in Security Prices (CRSP). While Green Street provides *NAV* estimates for 40 percent of equity REITs in 1999, the firms they cover represent 73 percent of REIT value. Given that REITs do not consistently disclose tax basis information, we use the accounting book value of assets (*BVA*), which is net of accumulated depreciation, to proxy for the tax basis of the assets.[11] In a separate set of tests, we use the book value of common equity as a measure of the REIT's tax basis in total assets. Discussions with industry accountants and analysts suggest that book value is a good approximation for the tax basis of most REITs. Furthermore, the financial accounting data provide the only publicly available proxies for tax basis that investors can use to value REITs. After merging the three data sets, we have 389 REIT-year observations from 85 firms.[12]

B. Empirical Specifications

Given these data, we translate equation (4) into our empirical equations. Equation (4) suggests the use of some version of the following equation to estimate tax effects:

$$MVE_{it} = \alpha_0 NAV_{it} + \alpha_1 BVA_{it} + \alpha_2 D_{it} + \mu_{it}, \tag{5}$$

where the subscripts i and t refer to firms and time periods, respectively. If investors capitalize future shareholder-level taxes into share prices, then we would expect α_1 to equal τ and α_2 to equal $-\tau$, so that $\alpha_1 = -\alpha_2$.

[10] This information is from the web site of the National Association of Real Estate Investment Trusts at www.nareit.com/researchandstatistics.

[11] The book value of (real estate) assets is reported as net investment in real estate.

[12] We exclude observations with missing data (or zero) for net investment in real estate, with $BVCE/NAV < 0.1$, or with real estate properties/total assets < 0.8. In general, the capital structures of the REITs covered by Green Street are similar to the capital structures of other REITs.

An additional complication is that many REITs operate as UPREITs, or umbrella partnership REITs (see Sinai and Gyourko (2000) for details regarding the UPREIT structure). UPREITs have a separate class of stakeholders who own partnership units that are freely convertible one for one into REIT common shares. These partnership units arise when investors contribute appreciated properties to the umbrella partnership in exchange for partnership units, deferring any unrealized capital gains taxes on the properties. Given the advantages of tax deferral, UPREITs have become quite popular; approximately 82 percent of our observations come from UPREITs. The partnership units are essentially equivalent to REIT shares, so we include the partnership units as common shares when computing MVE in our regressions. We also include a firm-level dummy variable equal to one for UPREITs, largely because Sagalyn (1996) argues UPREITs face certain conflicts of interest and restrictions on sales and refinancings that could reduce firm value relative to *NAV*.

Finally, because we focus on the valuation of common equity, we control for the book value of preferred stock (BVPE). The coefficient on preferred stock has the same predictions as the coefficient on the debt variable. However, preferred stock is concentrated among a few REITs, so this variable may also capture any unobserved differences between REITs that issue preferred stock and those that do not.[13]

This simple model sweeps nontax factors into the error term, μ_{it}. Although nontax factors pose potential estimation problems, three factors suggest they are less important for REITs than for other firms. First, analysts use comparable properties to appraise the market value of REIT properties. Therefore, even though *NAV* may be measured with error, it is generally much more transparent for REITs than for industrial corporations. Second, tax restrictions on REIT operating and financing decisions, including the requirement to distribute essentially all of their taxable income to shareholders each year, limit the effects of intangible factors like managerial discretion or agency costs. Third, REIT debt often consists of secured, nonrecourse loans, which reduces potential bankruptcy costs.

Despite these mitigating factors, the error term remains a concern. Therefore, we take several measures to control for it. For example, REIT shares are much more liquid than real estate properties. If this liquidity has value, then REITs could be valued at a premium relative to *NAV*. This is of concern to us if liquidity varies across firms and illiquid firms sell at a discount relative to more liquid firms. To control for liquidity and size as determinants of share prices, therefore, we include a dummy variable (*SMALL*) for small, potentially illiquid firms, equal to one if equity capitalization is less than \$400 million (which approximately includes the smallest quartile of the sample), and zero otherwise. We also include

[13] For example, market analysts report that only "top-flight" REITs issue preferred stock because investors are averse to buying preferred stock from weaker REITs (see Schwimmer (1995)). Overall, preferred stock is a small component of REITs' capital structure. Only about one-third of the REIT-years in our sample use preferred stock, and for these REITs, the average amount of preferred is approximately seven percent of *NAV*.

the average bid-ask spread (*SPREAD*) as a fraction of the midpoint of the bid and ask price for the month of December for each firm-year observation.[14]

In addition to observable factors, unobservable factors, such as investor sentiment, may affect share prices. Indeed, Clayton and MacKinnon (2000) find a common time-series component in REIT share prices relative to property values, which may reflect time-series variation in investor sentiment. To control for time effects, we include year-specific intercepts and we allow the coefficient on *NAV* to vary by year. By estimating separate coefficients on *NAV* for each year, we allow investor sentiment to affect the ratio of average REIT share prices relative to *NAV*.

The error term in equation (5) may also include an unobservable firm-specific (but time-invariant) component. For example, managerial ability could vary across firms. If this firm-specific component is uncorrelated with the other regressors, then estimating an ordinary-least-squares (OLS) model would generate consistent but inefficient estimates of the parameters, and estimating a random-effects model (i.e., generalized least squares) would generate consistent, efficient estimates. If the firm-specific component is correlated with the other regressors, however, then both the OLS and the random-effects estimates may be biased. In this case, it is necessary to use firm fixed effects to avoid bias. Nevertheless, estimating a fixed-effects model consumes a large number of degrees of freedom. In our sample, we have data for 85 REITs that are in the panel for an average of 4.6 years. With a relatively short panel, using firm fixed effects may exacerbate measurement error and lead to noisy parameter estimates.

Given the relative strengths and weaknesses of the different methods of controlling for the firm-specific component of the error term, we present OLS estimates (as a naive benchmark) and both random and fixed-effects estimates for the following equation:

$$\begin{aligned} MVE_{it} = {} & \sum_t \gamma_t NAV_{it} + \alpha_1 BVA_{it} + \alpha_2 D_{it} + \alpha_3 BVPE_{it} \\ & + \sum_j \delta_j X_{jit} + \sum_t \phi_t + \sum_i \theta_i + \varepsilon_{it}, \end{aligned} \tag{6}$$

where the γ_t are the year-specific coefficients for *NAV*, X_{jit} are the observable firm-specific characteristics (δ_j are the associated coefficients), ϕ_t are the year-specific constants, θ_i are the firm-specific components of the error term (specified with either random or fixed effects), and ε_{it} captures any remaining error. We measure *MVE* as common share price times the number of common shares outstanding plus the number of convertible partnership units outstanding. Similarly, in measuring *NAV*, we multiply the *NAV* per share estimates from Green Street by the number of common shares outstanding plus the number of convertible partnership units outstanding. We use both common shares and convertible partnership

[14] We construct the spread variable from the NYSE's TAQ data. We use December data because it corresponds most closely with year-end stock prices and *NAV*. We equally weight all quotes from the month, but we exclude quotes from regional exchanges. Due to data constraints, we use data from January 1993 for December 1992.

units to measure *MVE* and *NAV* because REITs use both shares and units to finance *BVA*, which is our measure of tax basis.

In equation (6), we express the variables in levels form. However, REITs vary considerably in size, so this specification could suffer from heteroskedastic errors. To control for potential heteroskedasticity, we also estimate a version of equation (6) in which we scale the dollar-denominated variables by *NAV*. While scaling by *NAV* mitigates potential heteroskedasticity, it also could magnify the effects of any measurement error in *NAV*, inducing a positive bias in the estimated *BVA* and *D* coefficients. If measurement error in *NAV* is a problem, scaling by *NAV* should make it easier to reject the hypothesis that $\alpha_1 = -\alpha_2$.

In a second set of tests, we use *BVCE* in lieu of *BVA* to measure tax basis. Our measure of *MVE* includes the value of convertible partnership units, so we include the book value of these interests (recorded as minority interests in the financial statements) in our measure of *BVCE*. If investors capitalize tax basis into share prices, then we expect α_1 to be positive. When using *BVCE* as our measure of tax basis, we expect the debt coefficient (α_2) to be zero. However, we include debt and preferred stock in the equation to control for possible effects of capital structure on firm value.

The actual magnitudes of our estimates for τ should depend on the identity of the marginal investor, as well as on the applicable tax rate and the timing of the tax benefits for shareholders. *A priori*, it is not possible to identify the marginal investor in REIT shares. As high-dividend-yield stocks, it could be argued that REITs should attract investors that pay little or no tax on dividends, such as corporations or tax-exempt institutions.[15] However, the corporate tax deduction for intercorporate dividends does not apply to dividends from REITs, so corporations do not have a tax incentive to invest in REITs. In addition, approximately half of all REITs make voluntary nontaxable return-of-capital distributions to shareholders, which should be attractive to high-tax investors. Given these ambiguities regarding the natural tax clientele for REITs, we do not impose any assumptions regarding the marginal clientele. Instead, we simply infer the applicable tax rate from the data.

C. Potential Measurement Error

Despite Green Street's best efforts to estimate *NAV*, real estate markets are often relatively thin.[16] Therefore we are concerned about potential measurement error in *NAV*. For example, suppose reported *NAV* equals true *NAV* (NAV^{T}) plus an error term, so $NAV = NAV^{T} + \eta$. The error term is probably best described as

[15] Empirically, Chan, Leung, and Wang (1998) report that institutional ownership of REITs was similar to other corporations over their sample from 1984 to 1995. However, the term "institutional investor" mixes taxable and tax-exempt investors so it is unclear how well it captures tax clienteles.

[16] Most REITs in our sample own large investment-grade properties that tend to have a number of well-capitalized potential buyers. The sample also occurs at a time when real estate markets are improving. Anecdotal evidence suggests that liquidity has not been a big issue over this time period.

an "optimal prediction error" (see Hyslop and Imbens (2000)). An optimal prediction error occurs when the error is correlated with the true value of a variable but is independent of the reported value. An example of this type of error would be an agent gathering several noisy signals of the true variable and processing these signals into a "best" estimate of the truth, which describes the process analysts use to generate *NAV* estimates. Under this type of error, the biases in the coefficient estimates depend on the correlation between the error and the variables of interest.

Whether any estimation error in *NAV* is correlated with *BVA* or *D* is unclear because Green Street analysts have access to data on *BVA* and *D* when estimating *NAV*. Nevertheless, we take three steps to provide some assurance that measurement error does not materially influence our results. First, we focus on the hypothesis that $\alpha_1 = -\alpha_2$. The bias in the estimated *BVA* coefficient depends on the covariance between *BVA* and η, whereas the bias in the estimated *D* coefficient depends on the covariance between *D* and η. Unless measurement error biases α_1 and α_2 by a similar magnitude but opposite sign, substantial measurement error would lead us to reject our hypothesis that $\alpha_1 = -\alpha_2$. Second, we conduct sensitivity tests in which we add control variables for factors that may be correlated with η. If the estimated coefficients for *BVA* or *D* are driven by correlation between *BVA* or *D* and η, then adding the control variables should reduce the magnitude of the estimated *BVA* and *D* coefficients. Third, we directly address potential measurement error biases by regressing future profits on *NAV* and *BVCE*. If noise in *NAV* biases the estimated *BVCE* coefficient when we regress *MVE* on *NAV* and *BVCE*, then we would generally expect to find a similar bias when we regress future profits on *NAV* and *BVCE*. We discuss the rationale for this test in more detail in the next section.

IV. Empirical Results

A. Descriptive Statistics

As reported in Table I, the mean *MVE*/*NAV* ratio is 1.09. In contrast to the discount that would result from tax factors alone, REITs trade at an average premium over the market value of assets for our sample period. This premium may reflect nontax benefits of the REIT form of organization, such as the value of public trading or managerial talent, suggesting it is important to control for nontax factors. On average, sample REITs hold 95 percent of their total assets in real estate properties. The mean dividend yield is a rather high 6.8 percent, reflecting the dividend distribution requirement for REITs.

B. Primary Results

In Panel A of Table II, we report results from estimating equation (6). The estimated *BVA* coefficient is positive and statistically significant at the 95 percent confidence level whether we estimate the equation with OLS (0.17), random effects (0.18), or fixed effects (0.25), which is consistent with the hypothesis that in-

Table I

Summary Statistics for the REIT Sample

The table reports summary statistics for the sample used in the analysis. All variables have 389 observations except for dividend yield (388 observations). Dollar figures are in millions. The variable *MVE* is the market value of common equity (including the value of OP units in UPREITs), *BVA* is the book value of real estate properties, *D* is the book value of debt, *BVPE* is the book value of preferred equity, *BVCE* is the book value of common equity, *NAV* is the net market value of assets, *SMALL* is a dummy variable equal to one if market capitalization is less than $400 million, *SPREAD* is the average bid-ask spread as a fraction of the midpoint of the bid and ask prices for the month of December, and *UPREIT* is a dummy variable equal to one if the REIT is an umbrella partnership.

Variable	Mean	Median	Standard deviation
MVE	1,050	724	1,110
BVA	1,500	782	2,000
D	760	393	1,110
BVPE	91.5	0	185
BVCE	638	341	861
MVE/NAV	1.09	1.07	0.21
BVA/NAV	1.41	1.41	0.44
D/NAV	0.72	0.68	0.35
BVPE/NAV	0.07	0	0.1
BVCE/NAV	0.56	0.55	0.23
SMALL	0.23	0	0.42
SPREAD	0.01	0.0096	0.0041
UPREIT	0.82	1	0.39
Proportion of total assets in net properties	0.95	0.95	0.03
Dividend yield (%)	6.8	6.8	2.6

vestors capitalize dividend tax savings from tax basis into share prices.[17] Also consistent with expected tax effects, the estimated *D* coefficient is negative and statistically significant at the 95 percent confidence level whether we use OLS (-0.15), random effects (-0.17), or fixed effects (-0.26). Furthermore, we cannot reject our prediction that $\alpha_1 = -\alpha_2$; the absolute value of the estimated *D* coefficient is not statistically different from the estimated *BVA* coefficient for any of the specifications. The similarity of our *BVA* and *D* estimates of the implied tax rate provides some preliminary evidence that measurement error does not materially bias our estimates of the capitalized tax rate.[18]

[17] Hausman specification tests indicate that the random effects and fixed effects specifications are statistically different from each other (with a p-value of 0.001) in Panels A and B of both Tables II and III.

[18] Equation (4) implies τ equals one minus the estimated *NAV* coefficient. To exploit this prediction, in a supplementary test, we restrict the estimated *NAV* coefficient to be constant across years. Imposing this restriction drops our control for investor sentiment and related unobservable factors that vary across years, which reduces the reliability of our estimates; furthermore, F-tests reject imposing this restriction at the 99 percent confidence level. Nevertheless, the estimated *NAV* coefficients are largely consistent with predictions; they are 0.88 (OLS), 0.86 (random effects), and 0.68 (firm fixed effects), so the implied estimates of τ are 0.12 (OLS), 0.14 (random effects), and 0.32 (firm fixed effects), with the random effects and firm fixed effects estimates statistically different from zero at the 95 percent confidence level. In

Table II

Regressions Measuring Tax Basis with Property Value

The table reports the results from ordinary least squares, random effects, and firm fixed effects regressions of the market value of equity on the firm's tax basis (as measured by the book value of assets) and other covariates. Panel A reports results for specifications using the levels of dollar values; Panel B reports results for specifications that scale the dollar-denominated variables by *NAV*. The symbol * denotes estimated coefficients that are statistically different from zero at the 90 percent confidence level; **denotes estimated coefficients that are statistically different from zero at the 95 percent confidence level; and ***denotes estimated coefficients that are statistically different from zero at the 99 percent confidence level. All regressions use 389 observations and include a constant and year fixed effects; in Panel A, the regressions include interactions between the year effects and *NAV*. Standard errors are in parentheses; in the OLS specifications, the standard errors are adjusted for heteroskedasticity according to White (1980). In Panel A, dollar figures are in millions of dollars. The variable *MVE* is the market value of common equity (including the value of OP units in UPREITs), *NAV* is the net market value of assets, *BVA* is the book value of real estate properties, which proxies for tax basis in assets, *D* is the book value of debt, *BVPE* is the book value of preferred equity, *SMALL* is a dummy variable equal to one if market capitalization is less than $400 million, *SPREAD* is the average bid-ask spread as a fraction of the midpoint of the bid and ask prices for the month of December, and *UPREIT* is a dummy variable equal to one if the REIT is an umbrella partnership. The *R*-squared is defined as the correlation squared between the predicted and actual values of the dependent variable, accounting for the reported variables, the year effects, and the year **NAV* variables (but not the random or fixed effects).

Panel A: Dependent Variable: *MVE*

Variable	(1) Ordinary least squares	(2) Random effects	(3) Firm fixed effects
BVA	0.17**	0.18***	0.25***
	(0.071)	(0.026)	(0.048)
D	− 0.15***	− 0.17***	− 0.26***
	(0.055)	(0.029)	(0.069)
BVPE	0.15*	0.096	− 0.14
	(0.079)	(0.063)	(0.091)
SMALL	− 33.5***	− 43.2**	− 37.0
	(11.2)	(20.8)	(22.9)
SPREAD	− 10,100.0***	− 6,370.0***	− 2,240.0
	(2,420.0)	(1,960.0)	(2,070.0)
UPREIT	− 30.6	− 2.85	
	(22.8)	(25.6)	—
R-squared	0.99	0.99	0.98
F-test *p*-value: $\alpha_1 = -\alpha_2$	0.61	0.54	0.66

In Panel B of Table II, we report results from regressions that scale the dollar-denominated variables by *NAV*. The estimated *BVA* (*D*) coefficients remain positive (negative) and statistically significant at the 95 percent confidence level, but scaling the variables by *NAV* reduces the magnitude of the coefficients. Specifically, the estimated *BVA* (*D*) coefficients are 0.092 (− 0.091), 0.094 (− 0.097), and

addition, imposing the restriction on the *NAV* coefficient does not alter the signs of the estimated *BVA* and *D* coefficients.

Table II—*continued*

Panel B: Dependent Variable: MVE/NAV

BVA/NAV	0.092**	0.094**	0.18***
	(0.039)	(0.039)	(0.067)
D/NAV	− 0.091**	− 0.097**	− 0.19**
	(0.040)	(0.046)	(0.079)
BVPE/NAV	0.005	− 0.047	− 0.22*
	(0.091)	(0.086)	(0.11)
SMALL	− 0.11***	− 0.12***	− 0.096***
	(0.018)	(0.021)	(0.025)
SPREAD	− 11.29***	− 6.26***	1.17
	(2.43)	(2.02)	(2.30)
UPREIT	0.0026	0.042*	—
	(0.023)	(0.026)	
R-squared	0.62	0.61	0.53
F-test *p*-value: $\alpha_1 = -\alpha_2$	0.97	0.92	0.83

0.18 (− 0.19) when using OLS, random effects, and firm fixed effects, respectively. As in Panel A, the absolute values of the estimated *D* coefficients in Panel B are not statistically different from the estimated *BVA* coefficients as predicted. Hence the evidence in both panels of Table II suggests that investors capitalize substantial shareholder taxes in REIT share prices, but the magnitudes of the estimates depend on the specifications used.

The estimated *BVPE* coefficient is positive in the OLS specifications which is inconsistent with a tax interpretation, suggesting that highly regarded REITs may issue preferred equity. Consistent with this interpretation, when we use fixed effects to control for unobserved differences in REIT quality, the estimated *BVPE* coefficient is negative, which is consistent with predicted tax effects. Given the conflicting effects from the preferred equity variable, we concentrate on the estimated tax rates associated with tax basis and debt.[19]

In regard to the other variables, small REITs trade at a discount relative to larger REITs. Consistent with illiquidity being associated with a discount relative to *NAV*, the estimated *SPREAD* coefficient is negative and statistically different from zero in the OLS and random effects specifications; using the coefficient estimate from the random effects specification in Panel B, a one standard deviation decrease in *SPREAD* (an increase in liquidity) increases *MVE* relative to *NAV* by 2.57 percentage points. However, this coefficient is imprecisely estimated in the fixed effects specifications, suggesting that most of our identification is coming from between-firm variation in liquidity.

[19] As an alternative to estimating separate coefficients for *BVA*, *D*, and *BVPE*, we combine these variables into a single measure of the incremental tax burden for a REIT by subtracting the tax basis proxy (*BVA*) from the gross value of properties (measured as the sum of *NAV*, *D*, and *BVPE*). For the six specifications presented in Table II, this restricted regression yields estimated values for τ ranging from 0.095 to 0.25, all of which are statistically different from zero at the 95 percent confidence level.

In Table III, we report results from regressions that use *BVCE* in place of *BVA* to measure tax basis. As previously noted, *BVCE* captures tax basis in all assets, not just tax basis in real estate properties. When using the variables as levels (Panel A), the estimated *BVCE* coefficients are positive and statistically different from zero when using ordinary least squares (0.15), random effects (0.093), and fixed effects (0.19).[20] When scaling the variables by *NAV* (Panel B), the estimated coefficients remain positive and statistically significant, and are equal to 0.091 for OLS, 0.095 for random effects, and 0.20 for firm fixed effects. In contrast to predictions, the estimated debt coefficient is positive and statistically significant at the 95 percent confidence level in the OLS and random effects specifications. Consistent with expectations, however, it is statistically insignificant in all other specifications.

The estimated tax rates from Tables II and III range from 9 to 27 percent, with OLS and random effects specifications yielding lower estimates than the firm fixed effects specifications. Most of the estimates (i.e., 16 out of 18) range from 9 to 20 percent. These estimates reflect the discounted value of future tax benefits from existing tax basis in properties. If we assume the implied undiscounted tax rate equals approximately 2.1 times the discounted rate as suggested by the example in Section II, then most of the estimated undiscounted tax rates range from 18 to 42 percent, with a midpoint of approximately 30 percent. By way of comparison, the top Federal tax rate on dividends for individual investors for most of the sample period is 39.6 percent.

The high fixed-effects estimates suggest it is unlikely that omitted, time-invariant firm characteristics create positive bias in the OLS or random effects estimates. Instead, if these omitted variables bias the OLS or random effects estimates, the bias appears to reduce estimated tax rates. Given the relatively short time dimension of our data, however, the fixed-effects estimates should be viewed with caution.

To the extent investors do, indeed, capitalize shareholder-level taxes into REIT share prices, REIT investment is on essentially equal footing with direct real estate investment, at least from a tax perspective. When investors directly purchase real estate properties through proprietorships or partnerships, they typically benefit from early depreciation deductions that they recapture as taxable gains (along with appreciation) when they sell the properties. In the absence of tax capitalization, however, REIT investors could consume depreciation tax shields without ever having to recapture the deductions as taxable gains by merely selling their shares on the secondary market before the REITs sells the underlying properties. However, the evidence in Tables II and III suggests that new REIT investors implicitly charge sellers for the tax depreciation deductions they have

[20] When restricting the estimated *NAV* coefficient to be constant across years, the estimated *NAV* coefficients are 0.79 (OLS), 0.84 (random effects), and 0.70 (firm fixed effects). In accordance with equation (6), the implied estimates of τ equal one minus the estimated *NAV* coefficients, or 0.21 (OLS), 0.16 (random effects), and 0.30 (firm fixed effects), all of which are statistically different from zero at the 95 percent confidence level. In addition, the estimated *BVCE* coefficient remains positive in all three specifications. Once again, *F*-tests reject this restriction at the 99 percent confidence level.

Table III

Regressions Measuring Tax Basis with Book Value of Common Equity

The table reports the results from ordinary least squares, random effects, and firm fixed effects regressions of the market value of equity on the firm's tax basis (as measured by the book value of common equity) and other covariates. Panel A reports results for specifications using levels of dollar values; Panel B reports results for specifications that scale the dollar-denominated variables by *NAV*. * denotes estimated coefficients that are statistically different from zero at the 90 percent confidence level; ** denotes estimated coefficients that are statistically different from zero at the 95 percent confidence level; and *** denotes estimated coefficients that are statistically different from zero at the 99 percent confidence level. All regressions use 389 observations and include a constant and year fixed effects; in Panel A, the regressions include interactions between the year effects and *NAV*. Standard errors are in parentheses; in the OLS specifications, the standard errors are adjusted for heteroskedasticity according to White (1980). In Panel A, dollar figures are in millions of dollars. The variable *MVE* is the market value of common equity (including the value of OP units in UPREITs), *NAV* is the net market value of assets, *BVCE* is the book value of common equity, which proxies for tax basis in assets, *D* is the book value of debt, *BVPE* is the book value of preferred equity, *SMALL* is a dummy variable equal to one if market capitalization is less than $400 million, *SPREAD* is the average bid–ask spread as a fraction of the midpoint of the bid and ask prices for the month of December, and UPREIT is a dummy variable equal to one if the REIT is an umbrella partnership. The *R*–squared is defined as the correlation squared between the predicted and actual values of the dependent variable, accounting for the reported variables, the year effects, and the year *NAV variables (but not the random or fixed effects).

Panel A: Dependent Variable: *MVE*

Variable	(1) Ordinary least squares	(2) Random effects	(3) Firm fixed effects
BVCE	0.15**	0.093**	0.19***
	(0.068)	(0.048)	(0.068)
D	0.18***	0.049**	– 0.036
	(0.046)	(0.022)	(0.030)
BVPE	0.19*	– 0.035*	– 0.076
	(0.11)	(0.076)	(0.086)
SMALL	– 92.9***	– 30.8	– 20.7
	(21.4)	(26.1)	(26.8)
SPREAD	– 4,380.0	– 6,240.0***	– 6,200.0***
	(3,270.0)	(2,310.0)	(2,320.0)
UPREIT	126.0***	187.0***	—
	(31.6)	(57.3)	
R-squared	0.96	0.96	0.95

Panel B: Dependent Variable: *MVE*/*NAV*

Variable	(1) Ordinary least squares	(2) Random effects	(3) Firm fixed effects
BVCE/*NAV*	0.091**	0.095**	0.20***
	(0.040)	(0.040)	(0.073)
D/*NAV*	0.0006	– 0.0032	– 0.013
	(0.027)	(0.025)	(0.033)
BVPE/*NAV*	0.086	0.037	– 0.050
	(0.082)	(0.075)	(0.086)
SMALL	– 0.11***	– 0.12***	– 0.097***
	(0.018)	(0.021)	(0.025)
SPREAD	– 11.35***	– 6.34***	0.88
	(2.45)	(2.02)	(2.30)
UPREIT	0.0040	0.043*	—
	(0.023)	(0.026)	
R-squared	0.62	0.61	0.53

consumed, as well as for any unpaid taxes on property appreciation, via lower purchase prices for the stock.

C. Controlling for the Potential Effects of Measurement Error

As previously discussed, any correlation between measurement error in *NAV* and *BVA*, *BVCE*, or *D* could bias our estimated tax rates. If this bias accounts for the positive *BVA* and *BVCE* coefficients in Tables II and III, or for the negative *D* coefficients in Table II, then we would expect the magnitude of the bias to decrease as we add other explanatory variables to the regression. For example, controlling for current and future cash flows, or Funds From Operations (*FFO*), may mitigate measurement error bias.[21] If *FFO* is correlated with the measurement error in *NAV*, and if the measurement error in *NAV* contributes to the positive estimated *BVA* coefficient and the negative estimated *D* coefficient, then controlling for *FFO* should reduce the magnitudes of the *BVA* and *D* coefficients.

To examine this possibility, we estimate equation (6) after adding current *FFO* and next period's *FFO*. In the random effects specification, the estimated coefficient for current *FFO* (which is observable to Green Street when estimating *NAV*) is -0.70 (t-statistic $= -1.9$), and the estimated coefficient for future *FFO* (which is not observable to Green Street when estimating *NAV*) is 2.33 (t-statistic $= 5.3$). Hence *FFO*, especially future *FFO*, provides incremental value-relevant information that is not captured by Green Street's estimate of *NAV*.[22] Nevertheless, including these two control variables does not reduce the magnitudes of the *BVA* and *D* coefficients. Instead, the magnitudes of the estimated *BVA* and *D* coefficients increase to 0.23 (t-statistic $= 7.2$) and -0.21 (t-statistic $= -5.6$), respectively. Qualitatively similar results occur when adding *FFO* to our other specifications. Thus, these results mitigate at least some of the concern that measurement error could drive our primary results.

In a final test, we more directly examine the potential effects of measurement error by testing whether the book value of common equity (*BVCE*) has predictive power for future profitability after controlling for *NAV*. If the predictive power of book value is related to taxes alone as we have assumed, then book value should predict the after-tax value of the firm (as measured by *MVE*), but not the pretax value of the firm. To conduct this robustness test, we use the book value of common equity (*BVCE*) instead of the book value of assets (*BVA*), so that all of the variables in the regression are net of debt (i.e., *NAV* is net of debt and earnings are net of interest payments).

[21] *FFO* is the most commonly used measure of cash flow in the real estate industry. Since *FFO* is unavailable for some REITs in our database and future *FFO* requires shortening the sample period, including these variables decreases sample size by 35 percent. The inferences we draw from adding *FFO* are not sensitive to using only a subsample of the observations in our main specification.

[22] In specifications that include current *FFO* but not future *FFO*, the estimated coefficient on current *FFO* is not statistically different from zero, suggesting that the effect of current *FFO* depends on including future *FFO* in the regression.

Table IV

Regressions of Leading FFO on Book Value of Common Equity and NAV

This table reports the results of regressing future cash flow on current book value of common equity and net asset value. The dependent variable is the future funds from operations in either the next year or next three years. All *FFO* numbers are discounted at 7 percent per year. The results are essentially the same if we use a higher discount rate of 10 percent or a lower discount rate of 3 percent. Standard errors are in parentheses and reflect the adjustment for heteroskedasticity from White (1980). The variable *FFO* is funds (i.e., cash flow) from operations, *NAV* is the net (of liabilities) market value of assets, *BVCE* is the book value of common equity, which proxies for the tax basis in inside assets. * denotes estimated coefficients that are statistically different from zero at the 90 percent confidence level; ** denotes estimated coefficients that are statistically different from zero at the 95 percent confidence level; and *** denotes estimated coefficients that are statistically different from zero at the 99 percent confidence level.

Dependent variable: Future *FFO* per share (dollars)		
Variable	(1) Next year's FFO per share	(2) Sum of FFO per share for next 3 years
NAV	0.090***	0.26***
	(0.0076)	(0.022)
BVCE	0.0035	0.012
	(0.0089)	(0.025)
No. of observations	294	159
R-squared	0.74	0.73

The pretax market value of equity for a REIT (*PMVE*) can be represented as the present discounted value of its future cash flows plus other factors or:

$$PMVE_{it} = \sum_{s=t}^{\infty} \rho^{-s} \pi_{is} + \mu_{is}, \tag{7}$$

where ρ is the discount factor (i.e., one plus the appropriate discount rate), π_{is} are the pretax cash flows that firm i earns in period s, and μ represents all other factors that may affect *PMVE*. If we had the infinite stream of future pretax REIT cash flows, as well as the appropriate discount rate, we could estimate the pretax value of the firm's equity. We could then regress *PMVE* on *NAV* and *BVCE*, and the estimated *BVCE* coefficient would reflect nontax valuation effects from book value that are not captured by *NAV*. While we do not have the full path of future cash flows, the same logic applies to a regression of future earnings on *NAV* and *BVCE* over a shorter horizon. After controlling for *NAV*, any relationship between *BVCE* and future earnings should reflect the inadequacies of *NAV* in predicting future earnings that are captured by book value.

As reported in Table IV, the estimated *NAV* coefficient is positive and significant at the 95 percent confidence level when we regress future cash flows on *NAV* and *BVCE*, whether we use the next year's *FFO* or the sum of *FFO* for the next three years, as a proxy for future cash flows. In contrast, the estimated *BVCE* coefficient is not statistically different from zero (with t-statistics less than one). These findings suggest that even if measurement error in *NAV* is material, it does not appear to be correlated with *BVCE*.

V. Conclusion

In this study, we exploit four characteristics of REITs to estimate the influence of shareholder-level taxes on share prices. First, a REIT's tax basis in its assets provides depreciation tax shields and reduces taxable gains on the sale of properties. Second, REITs do not pay corporate taxes, so any benefit they derive from tax basis reduces shareholder-level taxes only. Third, analysts regularly appraise the market value of REIT properties, and the tax basis REITs have in their properties invariably differs from the market value of the assets. Fourth, REITs are required to pay out most of their taxable income as dividends, limiting the extent to which these firms can use dividends for signaling purposes and eliminating the tax benefit associated with share repurchases as a substitute for dividends. Given this institutional setting, we design tests to examine the hypothesis that investors capitalize the shareholder-level tax benefits from tax basis into share prices, after controlling for the market value of the assets.

Our evidence indicates that each dollar of tax basis increases REIT share prices by 9 to 26 cents, conditional on the fair market value of properties, with most estimates ranging from 9 to 20 cents. Although the potential effects of omitted nontax factors remain a concern, these estimates are robust to a variety of specifications. Furthermore, after controlling for *NAV*, book value has incremental predictive power for the after-tax value of the firm (as measured by share prices) but not for the pretax value of the firm (as measured by future pretax cash flows), which provides some comfort that measurement error in *NAV* is not driving our findings.

By focusing on REITs, we have been able to control for many of the investment and dividend policy issues that complicate the analysis for other corporations. In particular, we find investors capitalize a substantial amount of dividend taxes into prices when dividend policy is largely nondiscretionary, there are no corporate taxes, and share repurchases do not offer a tax advantage relative to dividends. This result casts doubt on the tax irrelevance hypothesis that asset prices are determined by investors who are indifferent to taxes. While our study focuses on a single industry, we believe our findings provide a benchmark for future examinations of the share price effects of dividend taxes in more complex settings.

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