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DIVIDEND POLICY REVISITED: THE ROLE OF CASH FLOW UNCERTAINTY

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Dividend Policy Revisited: The Role of Cash Flow Uncertainty

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ABSTRACT:

In this study, we explore the role of expected cash flow volatility as a determinant of dividend policy. We first demonstrate that returns are increasing in dividend payout. But, we show that responses to changes in dividends are less sensitive to the magnitude of the change than to the sign of the change. We next develop a simple two period model which demonstrates that, given the existence of a large stock price penalty associated with dividend cuts, managers rationally pay out lower levels of dividends when future cash flows are less certain. Our final empirical results show that payout ratios are lower for those firms that are smaller, more levered and less diversified. This result is consistent with information-based explanations of dividend policy but not with agency cost theories.

1. Introduction

Dividend policy is at the very core of corporate finance. The fundamental value-relationship of corporate finance is couched in terms of dividends. Therefore it is not surprising that a recent survey on dividend policy (Allen and Michaely, 1994) (A&M) cites close to 100 articles. Despite this voluminous literature, a number of issues remain unresolved and clear guidelines for an "optimal payout policy" have not emerged.

In this research, we examine the link between cash flow volatility and dividend payout and evaluate two competing theories of dividend policy, the information-signaling theory and the agency cost or free-cash-flow theory. We find strong empirical support for both theories when we use methods similar to those employed previously. However, we also investigate the importance of a new potential determinant of dividend policy– the volatility of underlying cash flows.

More importantly, examining the link between cash flow volatility and dividend payout provides a novel method for distinguishing between the agency cost and signaling theories of dividends. According to the agency cost hypothesis, dividend payouts serve to reduce agency costs. By distributing free cash in the form of a dividend, management can divert fewer funds to projects that are in the best interests of management, but not in the interest of shareholders. Firms with high cash flow volatility are also those with the greatest potential agency costs. When cash flows are variable, it is difficult for investors to accurately attribute deviations in cash flows to the actions of corporate managers or to factors beyond management's control. Thus, the higher the variance in cash flows, thegreater the potential agency costs, and the greater reliance on dividend distributions.

Under this scenario, the value of dividend payout as a guarantee against non-value maximizing investments is greatest for those firms with greater cash flow uncertainty. Therefore, we would predict that firms with volatile cash flows would, on average, pay out a greater proportion of their cash flows in the form of a dividend. This also implies that volatile firms will have volatile payouts.

In contrast, the information content or signaling hypothesis predicts a relationship of the opposite sign. If, as we empirically demonstrate for this sample, there is a discrete stock price or shareholder wealth "penalty" associated with cutting dividends, then managers have incentives to avoid these penalties. One way to do so is to hold cash in reserve. This reserve may allow managers to maintain dividends at levels that can be sustained even if subsequent cash flows are lower than anticipated. This leads to the prediction that when future cash flows are more volatile, dividend payout ratios will be lower.

We exploit the power of a unique data base on an industry where the payment of dividends is paramount, specifically, the real estate investment trusts (REIT) industry. The unique characteristic of REITs is that they are exempt from federal income tax on net income, provided that they satisfy certain IRS requirements. The requirement most relevant for this study is the requirement to pay out at least 95% of its net income in the form of a dividend[1]. Thus, a REIT is the epitome of an income stock, and are arguably the most dividend-driven security in the market. Indeed, for our sample, the mean dividend yield exceeds 8% as comparted to the dividends on the Dow-Jones average over the same period of less than 4%.

Limiting our empirical examination to a single-industry provides an additional intrinsic advantage. Many prior empirical studies examine inter-industry data to investigate the determinants of dividend policy. With cross-industry data it is difficult to distinguish between industry effects on the one hand, and the factors that determine dividend policy on the other. By concentrating on a single industry, any industry effects are eliminated. In essence, by restricting attention to one industry, the necessity of controlling for cross-industry effects is made moot and the need for independent variables that are designed to "hold other things constant" is eliminated.

[1] Seemingly, this restrictio places severe constraints on a REIT's dividend policy. However, in practice, the managers of these firms have wide discretion in determining the amount of cash they distribute to their stockholders. See section 4.4 below.

We are aware of only one study that relates the volatility in earnings to dividend yield. Alli, Khan and Ramires (1993), using multiple regression techniques, are unable to find a relationship between the variance in earnings and dividend yields. We believe that their failure to find such a relationship is a direct consequence of their data set. Specifically, the use of cross-industry data increases the statistical noise and, hence, reduces the statistical power of their tests. While it is reasonable to expect that highly volatile firms within an industry have the potential for greater agency costs, it does not follow that this relationship holds across industries. For example, firms in a highly volatile industry may have developed elaborate monitoring mechanisms that reduce agency costs below those in less volatile industries. By combining observations from firms in very different industries, cross-industry variations confound the variation associated with the primary relationship examined.

We re-examine these relationships using a sample of 75 equity REITs over the 1985-92 period. We begin by examining the relationships between share prices and changes in dividends. Regardless of whether we measure the price impacts associated with changes in dividends over a three day or one year window, we find a significant fixed "penalty" associated with dividend cuts.

We then examine the relationship between payout rates and the volatility of underlying cash flows. However, rather than use an historical measure of volatility as an estimate of expected future volatility, we can exploit the homogeneity of our sample and of the assets owned by the firms in our sample. Specifically, consistent with recent empirical evidence (Geltner, 1989, Gyourko and Keim, 1992), we assume that the individual assets possessed by firms have similar systematic risk. Consequently, portfolio theory indicates that the volatility of cash flows to the entire REIT's asset base will decline as diversification increases. We use three proxies for this diversification: diversification across property types, diversification across regions and size. Finally, we include financial leverage as a determinant of the volatility of cash flows available to equity holders.

Our statistical results strongly confirm a negative relationship between cash flow volatility and dividend levels. Those REITs with higher expected cash flow volatility (greater leverage, smaller asset base or an asset base that is undiversified) offer lower dividend payout rates. The sign of this relationship suggests that, in this context, the information content or signaling effects dominate the agency cost effects.

In the next section, we review the alternative hypothesis concerning dividend policy. Section 3 contains a simple two period model that establishes the link between, and motivates our tests of, dividend payout policy and the uncertainty of future cash flows. In section 4, we outline our methodology, describe our data set and briefly review relevant regulations on REITs and dividend payout. In section 5, we evaluate the response of share values to changes in dividends. Our main empirical findings linking cash flow uncertainty and dividend payout ratios appear in section 6. Our findings are reviewed in a brief concluding section.

2. A Brief Review of Dividend Theory

Most empirical papers on dividend policy begin with the invocation of the Miller and Modigliani (M&M) dividend irrelevancy proposition, followed by the perfunctory caveat that the principle only holds in a perfect capital market. This admonition is then followed by a laundry list of real-world factors that vitiate the existence of a perfect market and the implications that follow from the relaxation of the particular perfect-market assumption. In general, these papers have identified three primary determinants of corporate dividend policy: taxes, asymmetric information and agency cost.

Much of the early work on dividend policy focused on the tax liability of dividend income. Elton and Gruber (1970) were perhaps the first to argue, and demonstrate empirically, that investors must be compensated for the tax disadvantage of dividends. Moreover, they argued that differential personal taxes would generate a clientele effect, in which individuals with high marginal tax rates will hold low-dividend yielding stocks, and tax-free institutions and low-taxed individuals will hold high-dividend yielding stocks. They present evidence consistent with these predictions. Specifically, they show that the ex-dividend effect, the drop in price between the cum-dividend stock price and the ex-dividend price, is greater for high-yielding stocks, implying that within this clientele there is no tax-induced penalty for dividend income[2]. They also show that the ex-dividend effect is significantly lower for low-dividend yielding stocks.

The tax-disadvantage of dividend income led researchers on a quest for the countervailing benefits to explain why corporations pay any dividends at all. The literature has identified two beneficial aspects of dividends that presumably counteract the tax penalty of dividend

[2] The higher the tax penalty, the lower the ex-dividend effect. If the tax penalty is 100%, there will be no ex-dividend effect; if the tax penalty is zero, the ex-dividend effect will be equal to the amount of the dividend.

income. The first is based on asymmetric information between managers and stockholders. The second is based on the agency costs arising out of the separation of ownership control in the large-scale, public corporation.

In a world in which corporate managers have superior information regarding the future value of the firm, dividends can serve as a useful mechanism for managers to signal their beliefs about future cash flows. To see this, consider the cash flow identity in any given period:

Dividends = Earnings + Net New Securities - Investment.

Earnings are determined by past investment, and investment is governed by the market value rule. Thus, dividends are seen as a tradeoff between paying out earnings, or more precisely, free cash flows, and the change in net new securities. If net cash flows are not sufficient to finance the optimal production/investment strategy and the desired level of dividends, the firm will simply issue new securities. If earnings exceed optimal investment and desired dividends, the firm will repurchase securities - net new shares for the period will be negative. If stockholders and managers have symmetric information regarding future earnings and investments, then this tradeoff does not affect the value of the firm's securities. Indeed, it is this logic that underpins the M&M Irrelevancy Proposition. However, if managers have superior information regarding the firm's earnings and investments, they can signal this information by its dividend policy. The higher expected profits (earnings less investment), the greater the cash available for dividends. Thus, managers signal expected earnings through their dividend policy. The signal is separating in that there is a cost to false signaling. Managers who incorrectly signal higher cash flows will be forced to either issue new shares, which is costly given transactions costs, or forgo the optimal investment strategy, which is also costly.

The agency theory of dividends easily can be seen by expanding the preceding equation:

Dividends = Earnings in the absence of agency costs + Net New Securities -
Investment - Agency Costs.

The addition of agency costs to the previous equation reflects that the fact that on-the-job consumption by managers, and monitoring and bonding costs, compete with dividends for the firm's cash flows: all else constant, the greater agency costs, the lower the dividend.

Since deadweight agency costs lower the value of the firm's securities, managers have an incentive to minimize them. Managers will use explicit and implicit contracts to reduce agency costs. For example, paying out dividends, without new financing, demonstrates that the firm is making money. It also demonstrates that the managers are not consuming all the profits of the firm. In the vernacular of the discipline, paying out dividends reduces agency costs by reducing the amount of "free cash flows" under the discretion of the firm's management. Moreover, a high dividend yield forces the managers to seek outside financing when earnings fall below expectations. This direct confrontation with the external capital market forces managers to become subjected to the discipline of market forces, which reduces agency costs further.

3. Cash Flow Volatility and Dividend Payout: A Model

In this section we develop a simple two period, three date model to illustrate the effect of cash flow uncertainty on dividend policy. The time line in Figure 1 below provides the sequence of events. At time zero the corporation is formed with no cash balances, C_0, and an income producing asset. During the first period cash flow, Y_1, is earned on the asset. At time, one the firm decides to distribute as dividends, D_1, and hold the balance of earnings as cash,

$$C_1 = Y_1 - D_1. \tag{1}$$

In period two Y_2 is earned and at the end of the period the firm distributes the cash available,

$$D_2 = C_1 + Y_2 \tag{2}$$

We assume that the return on the retained is less than the return on dividends paid cash to capture the agency costs of retained earnings. These costs can arise even if both stockholders and mangers invest cash in the same asset since interest earned inside the firm will be reduced by general and administrative expenses on the additional assets. Stockholders earn interest on distributed dividends at a rate greater than the net return on corporate cash. The difference between the returns is given by R. Earnings growth, $Y_2 - Y_1$, is assumed to be normally distributed with mean zero and standard deviation, σ_Y.

Figure 1

Time Line

$$
\begin{array}{ccccc}
C_0{=}0 & Y_1 & C_1, D_1 & Y_2 & D_2, P \\
| \text{\_\_\_\_\_\_\_\_\_\_\_\_} & & | \text{\_\_\_\_\_\_\_\_\_\_\_\_} & & | \\
0 & & 1 & & 2
\end{array}
$$

At time two the firm is sold to new investors for price, P, and the selling price is determined by the value function,

$$P=P(Y_2, D_2, I)$$

Where I is an indicator variable and

$$I = \begin{cases} 1 \text{ if } D_2<D_1 \\ 0 \text{ otherwise} \end{cases}$$

The objective is to choose the dividend, D_1, to maximize the expected value of distributions and sales proceeds for shareholders. That is,

$$Max\ L = E[D_1(1+R) + D_2 + P] \tag{3}$$

$$= E[\ R\ D_1 + Y_1 + Y_2 + P\ ]$$

The first order condition[3] is

$$\partial L/\partial D_1 = R - P_{D2} + P_I(\partial E(I)/\partial D_1) = 0 \tag{4}$$

where P_{D2}, P_I are partial derivatives of the value function with respect to D_2 and I.

But

$$E[I] = Pr[D_2<D_1]$$

Assume that changes in cash flow are normally distributed with mean, μ, and standard deviation, σ_Y, so that

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[3] The second order condition is a convexity condition. If the valuation function is linear, it is satisfied when $n'(\bullet)>0$. This holds if Pr[$D2<D1$] is less than one half.

$E\,Y_2 = Y_1 + \mu$

Then

$$E[I] = N\left(\frac{2D_1 - Y_1 - EY_2}{\sigma_Y}\right) \tag{5}$$

where $N(\bullet)$ is the cumulative normal density function.

Therefore

$$\frac{\partial L}{\partial D_1} = 0 = R + P_{D2} + P_I \frac{2}{\sigma_Y} n\left(\frac{(2D_1 - Y_1 - EY_2)}{\sigma_Y}\right) \tag{6}$$

where σ_Y is the standard deviation of earnings growth and $n(\bullet)$ is the normal density function.

Solving for the optimal dividend policy in period one, D_1^*, gives

$$D_1^* = Y_1 + \tfrac{1}{2}\left[\mu + \sigma_Y \underline{n}^{-1}\left(\tfrac{(P_{D_2} - R)}{P_I}\tfrac{\sigma_Y}{2}\right)\right] \tag{7}$$

where $\underline{n}^{-1}(\bullet)$ is the negative segment of the relation n^{-1}, that is the smallest value y such that $n(y) = x$. An interior solution to (7) exists if $R > P_{D2}$.

The optimal dividend in period one is increasing in current earnings and the expected growth of earnings but decreasing in both the volatility of earnings, σ_Y, and the dividend reduction penalty, P_I. Figures 2 and 3 illustrate for plausible values of the parameters. In Figure 2 the payout ratio falls quickly as the volatility of earnings increases. In Figure 3 the payout ratio declines as the penalty for a dividend cut increases but at a decreasing rate. Intuitively, shareholders value a dividend in period one more than retained earnings which increases the objective function, L. However, as the dividend, D_1, increases, the probability of a dividend reduction in time two increases. The optimal dividend balances these two effects.

4. Methods and Data

4.1 Previous tests of Dividend Theory

A major complication inherent in testing the three most frequently examined hypotheses concerning dividends - taxes, asymmetric information and agency costs - is that the three hypotheses do not yield unique implications. For example, many researchers have examined the relationship:

$$R_t - R^f_t = a + b\,(R^m_t - R^f_t) + c\,D_t \tag{8}$$

where R_t, R^f_t and R^m_t are the total returns to a stock, a riskless asset and some market proxy respectively and D_t is the dividend yield. The tax hypothesis implies that c will be positive. When a dividend is paid, the stock price falls by less than the amount of the dividend due to taxes incurred by the holder (Karpoff and Walkling (1988).

However, both the signaling theory and the agency cost theory also predict a positive relationship between dividend yield and stock returns. The signaling theory predicts a positive relationship since increases in dividends are interpreted as a signal from management that subsequent earnings will increase. Higher dividends also reduce free-cash available to management. Therefore increased dividends reduce agency costs per period, which in turn increases expected subsequent cash flows.

The lack of unique interpretations of a positive relationship between returns and dividend yields has led to many spirited debates in the finance literature. Perhaps the most notable example of such a debate was waged between Litzenberger and Ramaswamy (1979, 1980, 1982) who claimed that the tax penalty of dividends is responsible for the positive relationship, and Miller and Scholes (1978, 1982) who claimed that the positive relationship is due to signaling, or more precisely, changing expectations.

A further explanation for this positive relationship is advanced by A&M (1994), who argue that both higher dividend yields and higher observed returns are jointly caused by a third, underlying factor: risk. They argue that riskier equities command a higher required rate of return, and that managers of riskier firms offer higher dividend yields for signaling reasons.

4.2 Methods

In this study, we examine the relationships outlined above by estimating the following equations:

$$R_t - R^f_t = a + b\,(R^m_t - R^f_t) + c\,D_t + d\,\Delta D_t + e\,I_t \tag{9}$$

and based on equation (7) above

$$D_t = f + g\,E_t Y_{t+1} + h\,E_t\sigma_Y \tag{10}$$

where ΔD_t is the announced change in dividends in period t, Y_t is the cash flows available to shareholders during the period, I_t is an indicator variable of dividend reductions, and $E_t\sigma_Y$ is the anticipated volatility of cash flows available to shareholders. The tax hypothesis predicts that c will be positive, while the signaling theory predicts that d will be positive.

Our empirical contributions are centered around (10). The tax-hypothesis makes no clear prediction for the relationship between dividends and either the mean or variance of anticipated future cash flows. However, signaling theories suggest that g should be positive, since higher dividends would be used as one avenue to signal higher subsequent cash flows.

It is the sign of h, the relationship between expected cash flow volatility and dividends that is of primary importance to our study. Specifically, A&M (1994) argue that higher risk firms command higher returns and, as a signaling mechanism, pay out larger dividends. If this underlying logic is valid, then we would expect positive estimates for h. In contrast, our model outlined above suggests that, in an effort to mitigate the penalty imposed when dividends are cut, managers will actually pay out smaller dividends when cash flows are more risky. Thus, our analysis predicts a negative relationship between dividends and perceived risk.

4.3 Data

The data for this study are taken from the equity REIT database described in Capozza and Lee (1995). This database is a subset of the 209 REITs listed in the 1992 NAREIT (National Association of Real Estate Investment Firms) source book, which lists all publicly traded REITs as of December 31, 1991. This database focuses on equity REITs and excludes all mortgage, hotel, restaurant, and hospital REITs, REITs that do not trade on NYSE, AMEX, or NASDAQ, or for which property information is not available. These exclusions lead to a sample of 75 REITs, which are listed in Table 1. Given this list, Capozza and Lee construct one observation per firm for each of the years between 1985 and 1992. Of the 75 equity REITs, 32 appear in all eight years, with the remaining appearing for at least one year. This leads to a total of 416 observations.

Firm specific information was gathered from 10-K reports, annual reports to shareholders, and proxy statements augmented with stock price data from the CRSP daily return file. The database includes balance sheet, income statement, and property variables from the 10-K reports.

The proxy we use to measure focus (undiversification) in this study is a Herfindahl index based on product line, which is also provided in the database. For each observation, we construct two Herfindahl indices. The first, PropHerf is computed as $\sum_{k=1}^{4} S_k^2$ where S_k is the proportion of a firm's assets invested in each of four property types: office, warehouse, retail or apartment. Higher levels of concentration by property type lead to higher levels of the index: If the firm is highly focused along one dimension, the index is close to one; while the index approaches .25 if the firm's portfolio of properties is equally diversified across the four property types. We also compute RegHerf as $\sum_{r=1}^{8} S^2{}_r$ where S_r is the proportion of a firm's assets invested in each of eight real estate regions: New England, Middle Atlantic, Southeast, Midwest, Plains, Southwest, South Pacific, and North Pacific. As with the TypeHerf variable, this concentration variable can vary from one for a geographically concentrated REIT to .125 for a REIT with holdings equally diversified across the eight regions. The database also provides estimates of the market value of properties held and the net-asset-value (NAV) on a per share basis.

Table 2 contains mean, standard deviation and extreme values on variables culled from the database that will be used in this analysis. There is a large dispersion in the size of the firms considered here; book values of the property portfolios vary from \$2.1 million to about \$486 million, while book values of all assets vary up to \$604 million. Estimates of portfolio market values generally lie above reported book values, with a mean book-to-market ratio for properties of about 85%. There is considerable variation in the use of debt in the capital structure, with debt representing anywhere from 0 to 94.4% of the capital structure. Property type diversification also varies in the cross-section. The Herfindahl indices vary across most of their feasible ranges.

4.4 Dividends and REITs

REITs are, by law, exempt from taxation. However, to maintain their tax exempt status, REITs must meet a number of requirements. One such requirement is that a REIT must pay out at least 95% of net income to shareholders in dividends. Although the 95% rule may appear stringent, REIT managers retain much discretion over the use of funds. This discretion follows from the fact that the 95% rule is applied to earnings after the non-cash expense of depreciation has been deducted. Indeed, for the average REIT, a payout of 95% of net income represents less than half of the cash flows generated annually from operations

To illustrate the magnitude of managerial discretion, in Table 2 we report gross or property level cash flows and expenses as a proportion of the market value of total assets. For our sample, property assets, on average, provided net operating income (property level cash flows) of about 9% of assets. Of this 9%, 1% was consumed by overhead (general and administration, or G&A) expenses and 3% by interest costs. The remaining 5% was equally split between depreciation expense and reported net income. As a result, managers are required to pay a dividend that is at least 95% of the 2.5% net income yield. However, their corporate cash flows available for distribution are roughly 5% of assets or slightly more than twice the required payout.

Highly levered REITs, of course, may have little or no income, leaving managers with complete discretion over the use of funds. At the other extreme, even in a REIT without debt, managers still have significant discretion due to the 2.5% depreciation expense. Therefore, while the distribution requirement does reduce the discretion of managers, the limits are not particularly constraining.

In the last rows of Table 2, we provide evidence of significant cross-sectional variation in dividend policy. Dividends expressed as a percent of share price (dividend yield) varies from zero to roughly 44%. Perhaps more informatively, the inter-quartile range spans from 6.2% to 10.6%. Dividends expressed as a proportion of funds from operations (or cash available to shareholders calculated as property level cash flows less interest and G&A expenses) varies widely from its mean and median of 107% and 100%, respectively, with a standard deviation of .59. . Less than 3% of our observations involve zero dividends. The inter quartile range is bounded by 83% and 122%. These payout ratios are high because some REITs in the sample are finite life or liquidating firms that payout much more than current cash by returning invested capital when properties are sold.

5. Stock Values and Changes in Dividends

In this section, we re-investigate the link between changes in dividends and changes in share value. Specifically, our objectives are two fold. First, we wish to show that the previously documented link between changes in dividends and changes in share price[4] exists for our sample. Second, and more importantly, we investigate whether there exists a penalty associated with dividend reductions.

We investigate the relationship between dividends and share value over two distinct measurement horizons. First, we examine the relationship between total equity returns over a year and concurrent changes in both dividends and cash available to shareholders. We supplement these findings by using traditional event study methodology to examine abnormal returns accumulated over three days surrounding announcement of dividend changes.

5.1 Evidence from Annual Data:

We first examine the relationship between share value and dividends using annual measurements. By employing annual data, we include annual funds from operations (FFO, or corporate level cash flows available to shareholders) in the specification. Including changes in both dividends and FFO in the specification allows us to test for the irrelevance of dividends. If shareholders are indifferent between receiving dividend income or capital gains, then shareholders should care about cash flows generated over the year but be indifferent to the amount of this cash that is distributed to them. As a result, conditional on the inclusion of changes in FFO in the specification, the coefficient associated with changes in dividends should be zero.

In contrast, if shareholders face a greater rate of taxation on dividend versus capital gain income, or if capital gains provide the shareholder with a valuable option to recognize income at some future time or offset capital losses, then, again conditional on the inclusion of FFO, the coefficient associated with changes in dividends should be negative. However, for reasons reviewed above, both the signaling hypothesis and the free cash flow hypothesis predict a positive coefficient associated with changes in dividends.

[4]See Pettit (1972), Charest (1978) or Aharony and Swary (1980).

In the first column of Table 3, we report the most parsimonious specification of our model. The dependent variable is the total rate of return to shareholders over a fiscal year. The two dependent variables are the differences in dividends per share and FFO per share. Both differences are scaled by dividing by the share price as of the beginning of the fiscal year over which the total return is accumulated. For example, we measure the change in dividends as the difference between the dividends paid in the four quarters of one fiscal year from the dividends paid in the four quarters of the previous fiscal year. This dollar change in dividends is scaled by the closing stock price at the end of the first fiscal year (and beginning of the second fiscal year) to obtain the change in the dividend yield.

Obviously, the statistical power of this test can be enhanced if we can control for market-wide effects. However, due to limited data availability, calculation of REIT-specific betas is difficult. As a result, we include annual intercepts which represent average rates of returns for REITs with no changes in dividends or funds from operations[5].

The estimates indicate that the coefficient associated with changes in FFO are reliably greater than zero. The magnitude of the coefficient indicates that each one percent of share price increase in FFO per share is associated with a 2.8% increase in share price. Of greater relevance, however, is the coefficient associated with changes in dividends, which is positive and significant. A positive and significant coefficient associated with changes in dividends, even after controlling for changes in FFO, is consistent with both the signaling and agency theories, suggesting that any tax disadvantages to dividends are outweighed by these effects. Further, the magnitude of the dividend coefficient is economically meaningful. If FFO per share increases by 1%, but dividends are unaltered, then agents revise upwards their valuation of the present value of future dividends by 2.8%. If, instead, this increase in FFO is accompanied by an increase in dividends that is also 1% of share price, then the share value increases by an additional 1.6% for a total effect of 4.4%.

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[5]If expected or required rates of returns vary in the cross-section, but this variation is uncorrelated with the two independent variables, then both estimation and inference are valid using this simple correction. Although, obviously, statistical power may be adversely affected. Econometric concerns arise if the variation in required rates of return are correlated with either of the independent variables. However, we believe the impact of any such correlations would be small. First, recall that these variables are changes in dividends and FFOs and not levels. Therefore, arguments that riskier firms pay out higher *levels* of dividends or command higher FFO yields are irrelevant. Second, by limiting our sample to one industry, we believe that cross-sectional variations in required rates of return are small.

By estimating the previous functional form, we are implicitly assuming that the relationship between changes in share value and changes in dividends, conditional on changes in FFO, is continuous. However, we hypothesize that the valuation effects of dividend increases and declines may differ. We explore this possibility in the following three functional forms.

In the second column of Table 3, we impose the restriction that the slope linking changes in dividends to changes in share value is the same for dividend increases and decreases, but allow for a discontinuity in the function by including an indicator variable that equals one if there is a dividend decline and zero otherwise. Graphically, including this indicator variable allows the segment of the line to the left of zero to shift up or down by the amount of the coefficient associated with the indicator variable[6].

As in the first model, the coefficients associated with changes in FFO and dividends are both positive and significant, although the coefficient associated with changes in dividends is no longer significant at the 5% level. However, the coefficient associated with the dividend-decline indicator is significantly negative. This estimate suggests that there exists a 10% loss in share value "penalty" associated with any dividend cut, regardless of the magnitude of the dividend cut. This penalty is assessed in addition to the proportional valuation effects in the change in dividend. For example, if a trust cuts its dividend by 1% of the beginning of year share price, the total return to the stock over the year will be, on average, 11.8% [= -.11 + .88(-.01)] lower than a stock with no change in dividends.

In the next two columns of Table 3, we consider alternative function forms. In the third column, we create an indicator variable that equals one if there is no change in dividends. This has the effect of allowing the fitted value associated with no change in dividends to differ from the limit as the change in dividend approaches zero from the right. In the fourth column, we interact the dividend decline indicator with the change in dividend. By including this variable and the dividend decline indicator, we allow the intercept and the slope associated with dividend declines to vary from those associated with dividend increases.

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[6] We have estimated variants of this model where the indicator variable was defined using changes in dividends other than zero. However, the specification using zero provided the best fit and inferences remained unchanged for the alternative specifications.

In both of these alternative specifications, coefficients associated with changes in FFO and dividends remain positive and significant. Further, the bottom row contains F-statistics associated with the test of whether these models provide significantly greater explanatory than the model presented in the second column. In neither case can we reject the second model in favor of the next two[7]. Of primary importance, however, is the finding that, regardless of the specification employed, the estimate of the dividend decrease penalty remains negative and significant. Further, the magnitude of this penalty is economically meaningful and exceeds 10% in each specification.

5.2 Daily Data

In the right-most panel of Table 3, we re-examine the relationship between changes in dividends and changes in share price using a measurement horizon that is more familiar to finance researchers. Specifically, we measure the abnormal share price behavior in the three days surrounding the CRSP-reported dividend announcement date. We report results using abnormal returns calculated by subtracting the product of market returns and firm-specific estimated betas from raw returns. Results are unchanged if mean-adjusted abnormal returns are used.

The estimates reported in the right-most panel yield at least four interesting conclusions. First, estimates of coefficients from the three-day event horizon are roughly one-tenth their counterparts generated using an annual horizon. This contrast suggests that much of the share price reaction to changes in dividends occurs at times outside the three-day announcement period horizon. In well-functioning capital markets, changes in dividends are anticipated. Therefore it may not be surprising to find that roughly 90% of the valuation effects occur outside the three day window at announcement.

Despite smaller point estimates, associated t-statistics are dramatically larger, with many exceeding 10 in absolute value. There are three potential sources for the increase in the magnitude t-statistics. First, by associating an observation with each dividend, rather than each year, our sample increases four-fold, thus reducing standard errors by a factor of two. Second, since we use quarterly data, we cannot construct a suitable corresponding quarterly change-in-FFO variable. Since changes in dividends and changes in FFOs are

[7]Although not reported, each of the three models provide significantly greater explanitory power than the first model. If two linear models differ only by the inclusion of an additional independent variable, then the F-test associated with comparing the two models is statistically equivalent to the t-test of whether the additional variable is significant. As a result, model 2 is preferred to model 1 with an associated $F = -2.77^2 = 7.67$.

highly correlated, the standard errors in the annual specifications reflect this multicolinearity, while the standard errors in the quarterly specifications do not. Finally, since three day returns are less variable than annual returns, the standard error of the dependent variable is smaller in the quarterly specification[8].

Our third, and most pertinent, conclusion is that, as with the annual specifications, there is a negative and significant "penalty" associated with dividend cuts. In each of the four specifications, the coefficient associated with the reduction indicator equals about -1% with associated t-statistics that exceed 13 in absolute value. As we argued above, these coefficients capture only the unanticipated component of value revisions due to dividend cuts.

Finally, unlike its annual counterpart, the final specification suggests that the magnitude of the dividend omission is not pertinent. For dividend increases, share value increases by about half the increase in dividends (.547). However, for dividend cuts, the relevant coefficient linking valuation with the magnitude of the dividend change is essentially zero (.547 - .565). This suggests that for unanticipated dividend cuts, the magnitude of the cut is not relevant.

6. Cash Flow Volatility and Dividend Payout: Evidence

The empirical results in the previous section provide strong support for the existence of a "penalty" associated with dividend cuts. Trusts that reduce their dividends experience changes in value that are 10-15% lower than their contemporaries, even after controlling for changes in cash flows. This reduction is not fully anticipated before the announcement; dividend cuts are associated with a 1% value decline in the three days surrounding the announcement. In section 3, we presented a simple model that demonstrated that, conditional on the existence of such a discrete penalty, dividend payouts would be negatively related to the volatility of cash flows available to shareholders. In this section, we tie together these strands and empirically test for such a link.

To test our fundamental hypotheses, we require an estimate of management's prediction of future volatility of cash flows available for dispersal to shareholders. One strategy

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[8]It may appear paradoxical that standard errors are smaller, t-statistics are larger, yet R^2's are smaller. Although this result is consistent with omitting an important variable in the quarterly specifications (FFO), we believe that this is instead due to our use of annual intercepts. In the annual panel, these intercepts are highly significant but are insignificant in the quarterly, three-day-horizon specifications.

involves using a historical time-series of funds from operations and, using Box-Jenkins or GARCH methods, generating one-step-ahead forecasts of cash-flow volatility. Unfortunately, although we are blessed with numerous observations in the cross-section, we have an insufficient number of time-series observations per firm to conduct any meaningful time-series analysis.

Instead, our empirical strategy is based on proxies for cross-sectional differences in cash-flow volatility. These proxies are predicated on the dichotomy between operating risk and equity risk. The former risk is determined by the inherent riskiness of the portfolio of a firm's assets. Equity risk is determined by amplifying the operating risk by the financial leverage of the firm. We first discuss proxies for the operating risk, or risk of the portfolio of real estate assets, and then overlay the impact of financial leverage.

In developing proxies for the operating risk or the riskiness of the portfolio of assets held by each REIT, we begin by assuming that the cash-flow yield, or the ratio of cash generated by a property expressed as a percent of the property's beginning of period replacement value, R^P_t is comprised of systematic factors and a residual component:

$$R^P_t = \mathrm{f}(\mathbf{Z}_t) + e^P_t,$$

where $\mathbf{Z}_t$ is a vector of systematic factors and e^P_t is the residual component. The systematic portion, $\mathrm{f}(\mathbf{Z}_t)$ links the returns to properties to some aggregate variables. One possibility would be a single-factor model where the returns to all properties would be linearly related to changes in some stochastic metric like the NAREIT Index, an index of national property values or even a stock index.

Using standard portfolio theory techniques, we can calculate the volatility of a collection or portfolio of properties as the sum of the systematic risk and the unsystematic risk. In equity portfolio theory, investors are typically assumed to hold highly diversified portfolios and the magnitude of the unsystematic component is ignored or assumed away. However, such assumptions are not valid in the context of a REIT. Capital and managerial expertise constraints, combined with large transactions costs, inhibit the construction of "well diversified" portfolios.

Conceptually, property portfolios may be influenced by both systematic and unsystematic risk. However, in our analysis, we do not attempt to examine or evaluate differences in the systematic component of risk for at least two reasons. First, although numerous studies have demonstrated that the returns to equity REITs are correlated to one or more systematic factors[9], evidence that cash flows at the property level are correlated with systematic factors is meager. For example, Gyourko and Keim (1992) estimate single-factor betas for the returns to equity REITs in the range of .43 to .93, but they are unsuccessful in finding any systematic relationship between equity factors and contemporaneous returns to the Russell-NCREIF appraisal-based index of property values. Similarly, Geltner (1989) finds CAPM-type betas associated with equity REITs in excess of .6, but can find no evidence of systematic risk associated with either the Russell/NCREIF indices of property values.

Second, we recognize that one plausible explanation for the lack of such a relationship may be due to the delayed updating of the property value indices used in these studies. However, even when such delays or "smoothings" are explicitly taken into account, resulting measures of systematic risk either remain insignificant (Geltner (1989)) or are below 0.1 (Gyourko and Keim (1992)). As a result, we assume that even if underlying assets are subject to systematic factors, the cross-sectional variation of the systematic risk is small and is statistically overwhelmed by the cross-sectional variation of the unsystematic components of risk in these portfolios.

Predicated on this conjecture, we concentrate on the residual or unsystematic component of volatility. Using rudimentary portfolio theory, we can write $\mathrm{Var}(A_t)$, the residual variance of a portfolio comprised of $i = 1, \ldots, p$ assets at time t, as:

$$\mathrm{Var}(A) = \sum_i \sum_j w_i w_j \, \rho(\varepsilon_i . \varepsilon_j) \sigma_i \sigma_j \qquad (11)$$

where w_i is the ratio of the market value of asset i to the market value of the entire portfolio, and σ_i is the conditional standard deviation of ε_i.

Our empirical tests are predicated on three assumptions stemming from the above equation. Our first assumption is that σ_i can vary inter temporally, but is constant in the

[9]For single-factor studies, see Chan, Hendershott and Sanders (1990), Chen and Tsang (1988), and Patel and Olsen (1984). For multiple factor approaches, see Titman and Warga (1986) and Gyourko and Keim (1992).

cross-section. This assumption is not crucial for our analysis. However, we invoke it to ease the exposition and intuition underpinning the subsequent two assumptions.

We next assume that, in the cross-section, as the market value of the portfolio of assets increases, the contribution of a particular asset's own-volatility, is diminished (i.e., the average value of w_i^2 declines as the market value of the assets increases). Intuitively, we are simply positing that larger REIT portfolios are comprised of a larger number of discrete assets. While it is possible that larger REIT portfolios contain fewer distinct assets, our cursory analysis of REIT filings suggest that, with few exceptions, this is not the case.

Our final maintained assumption pertains to the correlation among assets. Given our assumption of equal standard deviations, the magnitude of the covariance contribution depends on the average correlation of returns to assets. We posit that these correlations depend on the (dis)similarity of the property types and geographic dispersion of the properties in the portfolio. Specifically, we assume that the correlation of returns to two assets is higher if the assets are of the same property type and / or the assets are in the same geographic region. As a result, we argue that the residual component of the portfolio variation is smaller when there is greater property type diversification and smaller when there is greater geographic dispersion. As mentioned above, we proxy for these dimensions of diversification using Herfindahl indices calculated across the four property types and across the eight geographic regions.

To motivate our final proxy for the volatility of cash flows available to shareholders, we rely on the standard corporate finance paradigm where the volatility of cash flows from operations are "grossed up" or multiplied by the financial leverage of a corporation to determine the volatility of cash flows available to shareholders. This yields the standard result that, holding the cash flows from operation constant, as the debt-to-equity or, equivalently, the debt-to-total-assets ratio increases, the volatility of cash flows to shareholders also increases. In our empirical tests, we use the ratio of debt to total assets to proxy for the contribution of leverage to cash flow volatility.

To summarize, we propose four proxies for the expected volatility of cash flows available to shareholders. Each proxy is measured as of the beginning of the fiscal year. Three of the proxies are posited to be related to the expected volatility of the cash flows of the portfolio of properties: the natural log of the market value of the property portfolio, and the Herfindahl measures of the geographic and property type concentrations of properties in the portfolio. The fourth measure, the debt-to-asset ratio, captures the multiplicative effect financial leverage has on the portfolio-level cash flows.

We perform a rudimentary test of whether our four proposed proxies are, in fact, related to the volatility of subsequent cash flows available to shareholders. Specifically, we construct the unsigned percent change in FFO yield as a noisy measure of cash flow volatility. We next regress this measure against our set of four proxies. Each of the four coefficient estimates associated with the proxies are of the correct sign. Realized volatility is higher when either of the Herfindahl concentration metrics are closer to one, when the value of the asset pool decreases, and when there is more leverage in the capital structure. However, only two of the proxies, leverage and size, are significant at traditional levels.

We predict that dividends are lower when the volatility of net cash flows increases in the cross-section. Consequently, we anticipate that dividends will be lower when the market value of assets is lower and when portfolios are more focused along either geographic or property-type dimensions.

In Table 4, we test these predictions empirically. The model presented in section 3 demonstrates that dividend payouts are related to both the mean and the variance of anticipated cash flows available to shareholders. To control for the mean effects, we propose a simple model of cash flow forecasting. In the first column of Table 4, we estimate a model based on the assumption of a random walk. Specifically, we assume that management's best guess of next year's cash flows as of the beginning of the fiscal year when, presumably, dividend policy is set, is the cash flows available to shareholders in the previous year. The dependent variable is the log of dividends paid per share paid over year t[10]. The independent variable is the log of the reported FFO for year t-1. The coefficient associated with the previous year's FFO, 0.598, suggests that REITs declare dividends for the coming fiscal year which are, on average, around 60% of the previous year's net cash flows.

A richer, yet simple, model of cash flow forecasting follows from the rational expectations paradigm. Specifically, since

[10]All analyses reported in this section were also estimated using levels, rather than natural logs. The results, significance and conclusions are unchanged.

$E_t Y_{t+1} = Y_t + E_t\{Y_{t+1} - Y_t\}$,

and

$Y_{t+1} = E_t Y_{t+1} + u_{t+1}$,

then

$E_t Y_{t+1} = Y_t + \{Y_{t+1} - Y_t\} - u_{t+1}$.

By appealing to rational expectations, we can use the actual change in cash flows ($Y_{t+1} - Y_t$) as a proxy for the expected change in cash flows ($\{Y_{t+1} - Y_t\} - u_{t+1}$). Since the expected change in cash flows is measured with error, we expect the coefficient associated with that component to be biased towards zero (Pagan (1984)).

Estimates of this richer specification appear in the second column of Table 4. As in the previous specification, the coefficient associated with the previous periods FFO is positive and significant. However, the coefficient is larger (.75) than in the previous specification. The proxy for the anticipated change in FFO is also positive and significant, but the magnitude of the coefficient (.33) is less than half the coefficient associated with lagged FFO. We believe that this smaller coefficient estimate reflects the standard errors-in-variables bias towards zero.

In the following columns, we add our proxies for anticipated volatility. In the third column, the log of the value of the real estate portfolio is included. As predicted, the coefficient estimate is significantly positive. This result is consistent with the joint hypothesis that (i) larger portfolios are subjected to smaller unsystematic risk, and (ii) firms with less volatile cash flows pay out larger dividends. The coefficient of .094 suggests that as the value of the real estate assets in the portfolio doubles in the cross-section, dividends are increased by roughly 10%, holding cash flows constant.

In the fourth column, we add financial leverage. The coefficient associated with the ratio of debt to total assets is significantly negative. As above, this estimate is consistent with the joint hypothesis that (i) the volatility of cash flows available to shareholders increases with financial leverage, and (ii) dividend payout rates vary with the perceived riskiness of these cash flows. The coefficient of -.257 indicates that, holding the mean of expected cash flows constant, increasing the debt-to-total asset ratio by 10% in the cross-section reduces dividends by about 2.5%.

Our measures of two dimensions of the diversification of the asset portfolio are examined in the fifth column. Of the two metrics, only the geographic dispersion measure is significant at traditional levels of significance. Perhaps surprisingly, there is no evidence that property-type focus affects the dividend payout decision. Since each of our proxies is predicated on a joint hypothesis, it is impossible to determine which of the joint hypotheses fails. It is feasible that either dividend rates are not related to expected future cash flow volatility, or that property-type concentration is not associated with anticipated future cash flow volatility. However, given that three alternative proxies are each significantly related to the dividend payout ratio, we believe that these findings suggest that it is the later link that is violated and that diversification across property types within a geographic region has little impact on portfolio volatility.

In the penultimate specification reported in Table 4, we include our four proxies for the expected volatility of future cash available to shareholders. Results are uniformly consistent with those generated from specifications that contain the proxies individually. Again, there is no evidence that property type diversification affects the dividend payout decision. However, the estimates of coefficients associated with the three proxies of anticipated cash flow volatility are each significant at conventional significance levels. Further, the signs of these three proxies are consistent with the underlying intuition. Holding anticipated cash flows constant, dividend payout rates are lower when financial leverage is higher, when the portfolio of underlying real estate assets is larger, and when the portfolio of real estate assets is more geographically dispersed[11].

In the final specification, we replace our set of four proxies with a single variable that is a linear combination of the four proxies. Above, we regressed an ex poste measure of realized volatility on our four proxies. Our single variable, which we call "fitted FFO volatility," is the fitted value from this regression. These fitted values are linear combinations of the four proxies, measured as of the beginning of a year, weighted by the coefficients from the above regression. Since these coefficients were estimated using our entire data set, these fitted values are not pure forecasts.

[11] This result is plausible if real estate fluctuations are local rather than national so that all properties in a region are affected by thesame economic forces. Given the severe regional recessions in Texas, the Northeast and California during the sample period, the result is sensible.

In the right-most column, we report estimates of this specification. The coefficient associated with fitted volatility is negative and significant, which is consistent with our joint hypotheses. Also note that the adjusted R2 is similar in magnitude to those reported in earlier specifications. Finally, although not reported, we estiamted a specification with fitted volatility and the four proxies. If one or more proxy were to enter this specification significantly, it would suggest that the proxy affected dividend policy directly as well as through its indirect link through volatility. However, no individual proxy is significant. This specification check suggests that our four proxies are related to dicvidend policy, but only through their association with predicted subsequent volatility.

6. Conclusions

In this study we provide new evidence on dividend policy that helps distinguish between two competing theories. We include measures of expected cash flow uncertainty in an empirical analysis of dividend policy and find that for all measures an increase in expected uncertainty reduces payout ratios. The results are not consistent with agency cost explanations which predict a positive relatonship between payout and uncertainty. The results are consistent with information-based theories of dividend policy. We propose that managers are aware of the large negative impact that dividend reductions have on stock prices. As a result, when managers anticipate uncertain future cash flows, they reduce the payout ratio to avoid the possibility of having to reduce dividiends in the future.

When compared to existing studies of cross-sectional variation in dividend payouts, our specifications, which concentrate on the role of expected cash flow volatility, provide an unusually high degree of explanatory power. For example, Jensen, Solberg and Zorn (1992) find that dividend yield is inversely related to inside ownership, but report R^2 values of around .20. Schooley and Barney (1994) consider non-linear relationships between inside ownership and dividends but report R^2 values of around .50. Chang and Lee (1986) report GLS models of dividend yields with R^2 values of around .36.

It may be argued that our approach of examining only a single industry may explain our uniformly higher degree of explanatory power. However, Hansen, Kumar and Shome (1994) also examine one industry (electric utilities) but concentrate on the role of inside ownership. Their models of dividend yields have adjusted R^2 values of only .25, however. As a result, we conclude that not only is anticipated cash flow volatility an important determinant of dividend policy, but that, arguably, this factor has greater statistical importance than previously considered factors.

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Table 1. The REIT Sample

The sample of REITs, drawn from the Equity REIT Database project, described in Capozza and Lee (1994). This database is constructed from the 1992 NAREIT (National Association of Real Estate Investment Trusts) source book, which lists all publicly traded REITs (209 REITs) as of December 31, 1991. The database excludes all mortgage, hotel, restaurant, and hospital REITs, REITs that do not trade on NYSE, AMEX, nor NASDAQ, or for which property information is not available. These exclusions lead to a sample of 75 REITs, which are listed here. Given this list, the researchers then attempted to construct one observation per REIT for each of the years between 1985 and 1992. Of the 75 equity REITs, 32 appear in all eight years and are annotated with a star (*), with the remaining appearing for at least one year.

*B R E Properties Inc
Berkshire Realty Co Inc
*Bradley Real Estate Trust
Burnham Pacific Properties Inc
*California Real Estate Invt Tr
Cedar Income Fund Ltd
Cedar Income Fund 2 Ltd
Chicago Dock And Canal Trust
*Clevetrust Realty Investors
*Continental Mortgage & Eqty Tr
Copley Property Inc
Cousins Properties Inc
Dial Reit Inc
Duke Realty Investments Inc
*E Q K Realty Investors 1
*Eastgroup Properties
*Federal Realty Investment Trust
*First Union Real Est Eq&Mg Invts
Grubb & Ellis Realty Inc Trust
*H R E Properties
*I C M Property Investors Inc
*I R T Property Co
Income Opportunity Realty Trust
Koger Equity Inc
Landsing Pacific Fund
Linpro Specified Pptys
*M G I Properties Inc
*M S A Realty Corp
*Meridian Point Realty Tr 83
*Meridian Point Realty Tr 84
Meridian Point Realty Trust IV
Meridian Point Realty Trust VI
Meridian Point Realty Trust VII
Meridian Point Realty Trust VIII
*Merry Land & Investment Inc
Monmouth Real Estate Invt Corp
*New Plan Rlty Trust
*Nooney Realty Trust Inc
*One Liberty Properties Inc
P S Business Parks Inc
Partners Preferred Yield Inc
Partners Preferred Yield II
Partners Preferred Yield III
*Pennsylvania Real Est Invt Tr
*Property Trust Amer
*Prudential Realty Trust
Public Storage Properties VI
Public Storage Properties VII
Public Storage Properties VIII
Public Storage Properties IX Inc
Public Storage Properties X Inc
Public Storage Properties XI Inc
Public Storage Properties XII
Public Storage Properties XIV
Public Storage Properties XV Inc
Public Storage Properties XVI
Public Storage Properties XVII
Public Storage Properties XVIII
Public Storage Properties XIX
Public Storage Properties XX
*Real Estate Investment Trust Ca
Realty South Investors Inc.
*Santa Anita Rlty Enterprises
Sizeler Property Investors Inc
*Trammell Crow Real Estate Invs
*Transcontinental Rlty Invstrs
*U S P Real Estate Investmt Trust
*United Dominion Realty Tr Inc
Vanguard Real Estate Fund I
Vanguard Real Estate Fund II
Vinland Property Trust
*Washington Real Est Invt Tr
*Weingarten Realty Investors
*Western Investment Real Est Tr
Wetterau Properties Inc

Table 2. Summary Statistics

This table reports means, standard deviations and extreme values for a number of summary statistics calculated across our sample of 416 observations for 75 firms. Total assets and property assets are book values. Total market assets are measured by estimated market value of properties plus the book value of other assets. The leverage ratio is defined as the book value of total liabilities / (book value of total liabilities + market value of the equity). The property type Herfindahl index is computed by summing the squared proportions of each of four asset classes (office, warehouse, retail and residential). The cash flow yield is the property level cash flows (rental income less property level expenses including insurance, property taxes, maintenance and advertising) divided by total market assets. Funds from operations, or corporate level cash flows, or cash available to shareholders are property level cash flows less interest and G&A expenses.

Variable	MEAN	MAX	MIN	STD. DEV.
Total Assets ($ Mil.)	126.8	603.8	2.1	110.2
Property Assets ($ Mil.)	94.7	485.7	2.1	85.3
Book to Market Ratio Of Property (%)	85.2	201.0	14.0	33.0
Book to Market Ratio Of Total Assets (%)	87.0	166.0	20.0	26.0
Leverage Ratio (%)	36.8	94.4	0.0	25.0
Property Type Herfindahl Index. (%)	65.3	100	25	23.5
Cash Flow Yield (%)	8.9	58.0	0.0	5.1
G&A expenses / Total Assets (%)	1.1	7.5	0	1.1
Interest Expense / Total Assets (%)	3.0	10.8	0	2.3
Depreciation Expense / Total Assets (%)	2.5	6.3	0	1.1
Dividend Yield (% of share price)	8.4	34	0	4.1
Dividend per share / Funds from Operations	1.1	5.4	0	.59

Table 3: The Effects of Changes in Dividends on Stock Returns

Estimates of regressions of total returns on changes in dividends. In the first four columns, the dependent variable is the toal return (capital gains plus dividends) to an REIT over a fiscal year. To control for market-wide or industry-wide fluctuations, a series of annual intercepts are estimated but not reported. Changes in Cash Available for Shareholders is the FFO (funds from operation or corporate level cash flows) per share in the observation year less the same number in prior year, with the difference divided by the share price as of the beginning of the observation year. Changes in Dividends is also computed by taking annual differences of per share dividends paid and deflating by the share price as of the beginning of the observation year.The Reduction Indicator equals 1 if dividends were lower in the observation year than in the previous year, and zero otherwise. The No Change Indicator equals 1 if dividends were no different in the observation year than in the previous year, and zero otherwise.

	Dependent Variable: Annual Stock Returns				Dependent Variable: Three Day Abnormal Return			
	1	2	3	4	1	2	3	4
Change in Cash Available for Shareholders	2.83 (5.23)	2.44 (4.42)	2.32 (4.14)	2.43 (4.23)				
Change in Dividends	1.61 (4.33)	0.88 (1.94)	0.76 (1.66)	1.15 (1.82)	.124 (9.99)	.092 (7.34)	.092 (7.34)	.547 (19.44)
Reduction Indicator		-0.11 (-2.77)	-0.13 (-3.03)	-0.14 (-3.14)		-.009 (-13.54)	-.009 (-13.55)	-.010 (-15.28)
No Change Indicator			-0.05 (-1.22)	-0.04 (-1.02)			-.001 (-4.08)	-.001 (-4.12)
Reduction Indicator * Change in Dividends Paid				-0.83 (-0.89)				-.565 (-18.02)
Adjusted R^2	40.6%	42.3%	42.4%	42.4%	1.0%	2.0%	2.0%	4.0%
F-test versus Model II	n/a	n/a	1.49	1.14	n/a	n/a	16.65	168.16

Table 4: Dividends and Proxies for Cash Flow Riskiness

Estimates of regressions of dividends on cash flows available to shareholders and proxies for the riskiness of cash flows. For each of the 225 usable obeservations, constructed using REIT data from 1985-92, the dependent variable is the natural log of dividends per share paid out over a given calender year. To control for market-wide or industry-wide fluctuations, a series of annual intercepts are estimated but not reported. The natural log of FFO (funds from operation or corporate level cash flows) per share over the previous year and the natural log in the observation year less the same number in prior year are included to accounted for projected cash flows. The leverage ratio is the book value of total liabilities divided by the market value of assets. Property type Herfindahl is computed as the sum of squared proportions of a firm's real estate assets invested in each of four real estate types: office, warehouse, retail or apartment. Regional Herfindahl is computed as the sum of squared proportions of a firm's real estate assets invested in each of nine real estate regions. The final row provides F-statistics for the null hypothesis that the riskiness proxy coefficients are jointly insignificant and are constructed by contrasting squared errors to those associated with the second model. F-statistics that are significant at the 10%, 5% and 1% are designated with *, ** and *** respectively.

Dependent Variable: ln(dividends paid per share)

	1	2	3	4	5	6	7
lagged *ln*(FFO per share)	.60 (14.8)	.75 (17.6)	.70 (16.2)	.74 (17.6)	.75 (17.6)	.67 (15.8)	.64 (14.4)
Change *ln*(FFO per share)		.33 (5.7)	.33 (5.8)	.33 (5.5)	.34 (5.7)	.32 (5.7)	.32 (5.7)
ln(market value of assets)			.09 (3.4)			.13 (4.7)	
Leverage Ratio				-.26 (-2.4)		-.39 (-3.6)	
Regional Herfindahl					-.19 (-2.0)	-.20 (-2.2)	
Property Type Herfindahl					-.01 (-0.0)	-.02 (-0.2)	
Fitted FFO volatility							-1.3 (-5.6)
Adjusted R^2	51.4%	61.4%	63.2%	62.2%	61.8%	65.8%	66.1%
F-test versus Model II	n/a	n/a	11.6^{***}	5.6***	1.9	7.0***	30.6****

Figure 2.

Effect of Earnings Volatility on the Payout Ratio

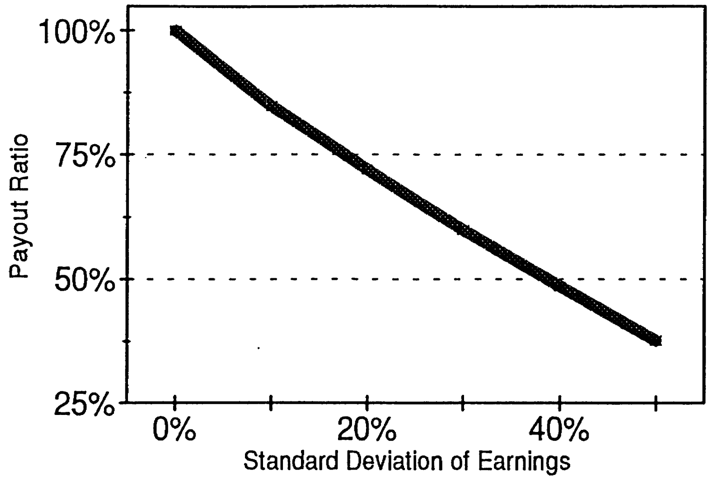

Figure 3.

Effect of a Dividend-Cut Penalty on the Payout Ratio