Do REITs Use Dividends to Signal Large Future Earnings Increases?

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Abstract

Finance theory suggests that an increase in dividend payout serves as an unambiguous signal to market that the firm anticipates higher future earnings. Yet, because it is often unclear just what an increase in dividend payout signals and how it does so, testing the theory using a sample of ordinary firms proves difficult in general. In this paper, we focus on the application of dividend signaling theory to the case of Real Estate Investment Trusts (REITs). REIT managers have valuable information about the firm's re-leasing spread profit, and will, in the presence of asymmetric information, choose to convey this insider's information to outside investors in periods of when the market lease rate is high or is expected to increase through dividend changes. Consistent with our theoretical predictions, we find substantial evidence of a positive relation between dividend changes and future earnings changes for REITs with high investment spending in periods when current lease rates are expected to increase in the future. Further, we find very little evidence of dividend signaling in all other cases, even when we do a detailed analysis of REITs with low investment spending in periods when current lease rates are expected to increase in the future. The evidence clearly supports the dividend signaling hypothesis, thus contributing to our understanding of whether changes in dividends have information content.

Keywords: Dividend; Real Estate; REIT; Earnings Information Asymmetry

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1 Introduction

Finance theory suggests that an increase in dividend payout serves as an unambiguous signal to market that the firm anticipates higher future earnings. Yet, because it is often unclear just what an increase in dividend payout signals and how it does so, testing the theory using a sample of ordinary firms proves difficult in general. Firms are generally very heterogeneous with regard to future growth prospects, and it is often difficult to correct for this heterogeneity when doing inferences for longitudinal trends. Therefore, parameter estimates can be inconsistent and the standard errors can be wrong.

In this study, we focus on the application of dividend signaling theory to the case of Real Estate Investment Trusts (REITs). REITs provide an interesting setting to examine the proposition that dividends signal large future earnings increases because they operate in a unique environment: one in which information is known to the REIT (and to lessors of real estate in general) that can improve earnings forecasts considerably and includes details of current and recent re-leasing spread profit. (The latter refers to the amount by which current lease rates on new leases exceed the lease rates in the portfolio.)

For a signaling equilibrium to occur, with dividends serving as the signaling device, it is necessary for firms with higher expected future profitability to be aware that their future earnings will increase, and for firms with lower expected profitability not to be able to imitate the signal. For a REIT, those with high (low) quality assets should generally be able to capture a large (small) percentage of higher lease rates in periods of high current lease rates, and thus there should be a clear difference in the signaling levels between the two REIT types in periods of high or increasing market lease rates. The latter is consistent with investment theory (see Titman, Tompaidis, and Tsyplakov (2004)).

To put the point in a slightly different way, some problems have simple solutions, other do not. Drawing on a sample of REITs with "high" and "low" quality assets in periods of "good" and "bad" states of the world (based on "increasing" and "decreasing" market lease rates) allows us to test the well-known phenomena of dividend signaling in a way that overcomes firm heterogeneity. Our approach is to condition regressions of future earnings changes on REIT dividend changes on "good" and "bad" states of the world (based on increasing and decreasing market lease rates) and on periods of "high" versus "low" investment spending. We believe that REITs change their dividends mainly in response to higher re-leasing spreads in periods when current lease rates are high or expected to increase in the future but only if they have high-quality assets, and that shareholders interpret the dividend payout to imply that the REIT belongs to this particular asset class. We also believe that a "high level of investment" at the same time plays a crucial role in the certification of this signal. These facts may explain the poor results obtained by previous studies of whether REIT dividend changes contain information about future earnings and profitability.

We document the following results. First, we find compelling evidence for dividend signaling. We estimate that for REITs with high investment spending in periods when current lease rates are expected to increase in the future, a standard deviation change in increase in ordinary dividends signals a +21.57 percent change in the standard deviation of future earnings-to-book ratio. In term of discretionary dividends (actual dividends minus REIT required minimum payout), a standard deviation change in positive change in discretionary dividends signals a +33.35 percent change in the standard deviation of future earnings-to-book ratio. In term of dividend surprises (actual dividends minus expected dividends based on counterfactual REOC sample with propensity score matching), a standard deviation change in positive dividend surprise signals a +36.84 percent change in the standard deviation of future earnings-to-book ratio.

Second, we find very little evidence of dividend signaling in all other cases, even when we do a detailed analysis of REITs with low investment spending in periods when current lease rates are expected to increase in the future. Generally, these results are consistent with our theoretical predictions (i.e., that there is ambiguity about REIT dividend signals per se, and that only signals that are informative about are future profitability occur for REITs with high-quality assets in periods when current lease rates are high or expected to increase in the future).

The article proceeds as follows. In section 2, we discuss both the theoretical and empirical literature and highlight the institutional setting of the REIT market, which has some important implications for the specification of our empirical tests and for when REIT dividend decisions are likely to reveal information about future earnings to the market. In section 3, we describe the REIT dividend and earnings data we collected and report some descriptive statistics. Empirical results are presented in sections 4 to 7. These sections are organized in a step-by-step format. Sections 4 to 7 give a definitive answer to the question whether REIT dividend changes have information content. Section 8 provides further analyses. Section 9 concludes.

2 Related Literature and Contributions

Since the theoretical work by Miller and Modigliani (1961) and Black (1976), a variety of hypotheses have been advanced to explain why dividends convey useful information for investors. According to signaling theory, in the presence of information asymmetry, dividends are important signals for firms to contract and convey insider's information to outside investors. The idea is that dividends should reliably be related to future firm performance, even if dividends are not intended per se to serve as a signaling device (as in, for example, Miller and Rock (1983).[1]

The theory thus predicts that dividend changes should forecast future earnings changes, future earnings, and future abnormal earnings.[2] This prediction has the advantage of being relatively easy to test econometrically. Yet despite a large literature devoted to the analysis of dividend signaling, there is still no clear understanding of the relation between dividend changes and future earnings changes. Some studies find a positive relation between dividend changes and future earnings changes (e.g., Aharony and Dotan (1994), Bernheim and Wantz

[1] According to the agency theories, dividend can resolve agency conflicts (Easterbrook (1984), Jensen (1986)). Jensen (1986) argues that dividends can reduce agency problem of free cash flow, while Easterbrook (1984) argues that larger dividends of high leverage firms create more value by subjecting managers to external financing and hence more frequent monitoring by outsiders.

[2] See, e.g., Andres and Hofbaur, 2015; Baker et al, 2016; Fuller Floyd et al, 2015; Leary and Michaely, 2011; Turner et al, 2013; Bhattacharya and Jacobsen, 2016.

(1995), Brook, Charlton and Hendershott (1998), Dyl and Weigand (1998), Healy and Palepu (1988), Kao and Wu (1994), and Nissim and Ziv (2001)), and some find no relation between dividend changes and future earnings changes (e.g., Watts (1973), Miller (1987), Benartzi, Michaely and Thaler (1997), and DeAngelo, DeAngelo, and Skinner (1996), and Michaely, and Swaminathan (2002)). Other studies suggest that market responses to dividend changes differ according to changing firm circumstances and parameter being signaled [Lang and Litzenberger (1989), La Porta, Lopez-De-Silanes, Shleifer, and Vishny (2000)]. Fuller and Goldstein (2011) find that dividends matter more to shareholders in declining markets due to reasons which cannot be explained by information signaling or agency.

This brings us to the question why the results are what they are. One issue is heterogeneity. Heterogeneity can affect the observed earnings-dividends relation and the inference of the information content of dividend hypothesis. To overcome this problem, we adopt the approach in this paper of analyzing the relation between REIT dividend changes and future earnings changes. Tests using a sample REITs (as explained in the introduction) can get to the issue of whether firms use dividends to signal future profitability in a way other studies cannot.

We are not, however, the first to draw attention to REIT dividend policy. In fact, the existing literature on REIT dividend policy (and not just REIT dividend signaling per se) is also quite large. Here we shall review three such studies which relate to different aspects of REIT dividend policy: Hardin and Hill (2010), Gentry, Kemsley, and Mayer (2003), and Boudry (2011). All three papers point out interesting aspects of REIT dividend policy.

The focus of Hardin and Hill (2010) is on the federal rules that require REITs to pay out 90 percent of their taxable income to shareholders as dividends. Hardin and Hill (2010) argue that these federal rules make REIT dividends quite sticky. Their analysis suggests that REIT dividends complement cash flows for lender monitoring by serving as a proxy for minimal expected firm cash flow available to service debt.

Gentry, Kemsley, and Mayer (2003) use REITs to examine the impact of dividend taxes on firm valuation. They argue that REIT dividend policy is less discretionary than that of other corporations. This aspect of REIT dividend policy (along with the fact that REITs do no pay corporate taxes) allows Gentry, Kemsley, and Mayer (2003) largely to sidestep dividend-signaling issues in examining the impact of dividend taxes on firm valuation. Gentry, Kemsley, and Mayer (2003) regress REIT market value of equity on REIT net asset value (NAV) and book value of assets (BVA) as a measure of tax bias. The estimates from Gentry, Kemsley, and Mayer (2003) suggest that investors capitalize a substantial amount of dividend taxes into REIT prices.

Boudry (2011) decomposes REIT dividends into a discretionary and nondiscretionary component. Boudry (2011) finds that 1) REIT discretionary dividends tend to be large on average making up between 18% and 35% of a REIT's total dividend and 2) REIT discretionary dividends tend to display considerable variation through time and across firms. Boudry (2011) also reports results of regressions of REIT discretionary dividends on excess funds from operations (FFO) and REIT nondiscretionary dividends. The estimates indicate that the main determinant of REIT discretionary dividends appears to be dividend smoothing and that the amount of REIT discretionary dividends tends to be inversely related to nondiscretionary dividends.

These studies tend to overlook that REIT managers have valuable information about the firm’s re-leasing spread profit, and will, in the presence of asymmetric information, choose to convey this insider’s information to outside investors in periods of when the market lease rate is high or is expected to increase through dividend changes. This insight is the real contribution of this paper.

3 Data

Our basic data source for this analysis is Compustat and SNL databases. The Compustat database consists of financial statement data for most publicly held companies in the U.S. We focus on a sample of equity REITs because our nonpublic information hypothesis pertains only to equity REITs that own and invest directly in real estate, not to mortgage REITs that own and invest in property mortgages. To be included in the sample, the REIT had to meet the following criteria: a) the REIT had to paid dividends in a given fiscal year; and b) the Compustat files had to contain information on the REIT's earnings and other variables around the dividend payment year. The sample period is from 2000 through 2013. We also exclude observations where the REITs report negative book equity.[3]

We combine this data with statistics on market lease rates, which are based on accounting data from the National Council of Real Estate Investment Fiduciaries (NCREIF). An advantage of the NCREIF data is that it contains information on institutional-quality properties. Another advantage is that the database has been carried on for many years and ultimately across all property types. NCREIF uses this database to compute annual and quarterly returns on institutional-quality properties by property type. We use this data to identify market lease rates for apartment buildings, office buildings, industrial properties, and retail shopping centers. We then merge this data with our Compustat database by REIT property type. To merge this data, we sort REITs into four major property types: 1) Residential REITs. These are equity REITs that own and operate multi-family rental apartment buildings. 2) Office REITs. These are equity REITs that invest in office buildings and receive rental income from tenants who have usually signed long-term leases. 3) Industrial REITs. These are equity REITs that focus on the ownership and leasing of industrial properties (such as warehouses, distribution centers, manufacturing center, flex/office buildings, and high-tech space). 4) Retail REITs. These are equity REITs that own and manage retail properties (including large regional malls, grocery-anchored shopping centers, and power centers) and rent space in those properties to tenants. Property type information is from S&P Global Market Intelligence (formerly SNL Financial).

Panel A of Table 1 reports the means and standard deviations of the relevant variables in

[3] In the regression analysis, we normalize the key variables such as dividend changes by book equity. As such, we exclude 27 firm-year observations where book equity is negative. Moreover, firms with negative book equity are likely to be distressed and hence they are excluded from our analysis of dividend signaling.

the Compustat database. The average (annual) earnings (as a percentage of book value) across the sample is 0.0029, with a standard deviation of 0.0869. We measure earnings by taking revenues and subtracting the cost of doing business, such as depreciation, interest, taxes and other expenses, but without factoring in income or losses from extraordinary items (Compustat item #). This measure of earnings is intended to give a picture of how a REIT would be performing under normal circumstances. Because the REIT industry is so capital intensive, depreciation charges are high and the latter reduces net income on the income statement (which explains why the earnings numbers in Table 1 are so low).

The average of (annual) total dividends per share across the sample is 1.1427 with a standard deviation of 0.7540 (see Appendix Table A1). The annual dividend is defined as ordinary dividend from Form 1099-DIV plus capital gains and losses from capital gains distributions, plus any payment from the REIT's paid-in-capital or shareholders' equity dividend paid in the fiscal year.

Panel A of Table 1 reports the number of increases and decreases in annual ordinary dividends over the 14 years of the sample. Some interesting observations are worth noting. We observe that there are more REIT ordinary dividend decreases than increases. For example, from 2000 to 2013 there are 389 decreases in REIT ordinary dividends versus 372 increases. The results (especially in terms of frequency of dividend cuts versus increases) are quite different than those found in most studies. Previous studies have usually found dividend increases to much more likely than dividend decreases. Nissim and Ziv (2000) found dividend increases to be 14.6 times more likely than dividend cuts. Similarly, Grullon, Michaely, Benartzi, and Thaler (2005) found that dividend increases are 16.7 times more likely than dividend decreases. One important difference between our paper and most of the literature is the sample studied. Both Nissim and Ziv (2000) and Grullon, Michaely, Benartzi, and Thaler (2005), for instance, focus on firms that are traded in the NYSE or the NYSE AMEX Equities, formerly known as the AMEX, over the time period 1963 through 1997. Our data, however, include the period 2000 to 2013. This data sample includes a period of continued rapid expansion in credit to the commercial real estate sector (which could explain the dividend increases), followed by a collapse of the commercial real estate mortgage market and a reversal of commercial real estate rents and prices (which could explain the dividend decreases).

Panel B of Table 1 reflects the distribution of REIT dividend change announcements by periods when market lease rates are high or expected to increase and when the REIT was investing heavily. In our sample of 359 cases of REIT ordinary dividend increases, 151 (or 42 percent) REIT ordinary dividend increases occurred in periods when the market lease rate was high or expected to increase and when the REIT was investing heavily. In 112 of the 359 (or 31 percent) REIT ordinary dividend increases, market lease rates were high or increasing but the REIT was not investing heavily. Of the 96 REIT dividend increases that occurred when market lease rates were low or expected to decrease, 56 (or 58 percent) involved heavy investment spending. The data used to estimate firm investment spending are from Compustat. We measure net investment (I_t less depreciation) as the change from quarter $t-x$ to quarter t in a REIT's total asset. Our nonpublic information hypothesis has different implications for equity REITs with high investment spending in high-quality assets in periods when current lease rates are expected to increase in the future versus equity REITs with low investment spending in high-quality assets in periods when current lease rates are expected to increase in the future. The high investment spending in this case serves a certification function that provides a signal to investors that the REIT is confident of higher re-leasing spreads in the future. Our nonpublic information hypothesis also predicts that capital markets will react unfavorably to announced dividend increases by equity REITs in periods of decreasing market lease rates, especially if the REIT exhibits high levels of investment spending. The relative magnitude of investment spending is measured as a share of total assets. Every REIT was then assigned a median expenditure of its property sector. Then REITs are categorized into "high" or "low" investment spending groups based on whether their investment expenditure was greater or less than the median "assigned" expenditure in the sample.

[insert Table 1 here]

4 A "First Look" at REIT Dividend Changes and Future Profitability

We begin our analysis by estimating the following equation for REIT dividend changes and future profitability:

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D_{it-1}^{+} + b_2 \Delta D_{it-1}^{-} + b_3 ROE_{it-1}$$
$$+ b_4 (E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \quad (1)$$

where E_{it} denotes earnings for firm i in year t, $\Delta D_{it}^{+} = \Delta D_{it}$ if $\Delta D_{it} > 0$ and $\Delta D_{it}^{+} = 0$ otherwise, $\Delta D_{it}^{-} = \Delta D_{it}$ if $\Delta D_{it} < 0$ and $\Delta D_{it}^{-} = 0$ otherwise, and $ROE_{it} = E_{it}/B_{it}$. We define the annual dividend change, $\Delta D_{it} = (D_{it} - D_{it-1})/B_{it-1}$, where D_{it} is the total dividend for the REIT i in fiscal year t, and B_{it-1} and B_{it-2} are the lagged variables of book value of common equity.[4] In the standard dividend signaling model, positive coefficients for ΔD_{it}^{+} and ΔD_{it}^{-} would indicate that dividend decisions are made to signal future profitability, and this is the case here as well. Signaling theory suggests a positive relationship between REIT profitability and dividends, since profitable REITs (i.e., those REITs with high-quality assets) are able to pay dividends. Paying dividends on the one hand can be considered as a signal of higher expected re-leasing spreads in periods of high or increasing market lease rates. Cutting dividends on the other hand can be considered as a signal of lower expected re-leasing spreads in periods of low or decreasing market lease rates. However, unlike most signaling models where paying higher dividends and cutting dividends convey the same information, ceteris paribus, about future earnings and that investors revise their beliefs about firm profitability accordingly, we allow for different coefficients for ΔD_{it}^{+} and ΔD_{it}^{-}.

[4] We employ annual cash dividend instead of the annualized rate of quarterly dividend changes as in by Grullon, Michaely, Benartzi, and Thaler (2005), because REITs are subject to the regulatory requirement of 90 percent payout ratio on an annual basis, not a quarterly basis.

Note that equation (1) is equivalent to the model in Nissim and Ziv (2001), and Grullon, Michaely, Benartzi, and Thaler (2005). The model tests whether REIT dividend changes signal future profitability controlling for ROE_{it} as a predictor of earnings changes. Nissim and Ziv (2001) link ROE_{it} negatively to an expected change in earnings, on the theory that ROE_{it} mean reverts at a slow rate. Another important factor when it comes to predicting $(E_{it} - E_{it-1})/B_{it-1}$ is autocorrelation (i.e., the fact that the data are correlated with themselves, and thus the error terms are correlated). Accordingly, we control for autocorrelation in the error process by including a lagged version of the dependent variable as an additional explanatory variable.

We also control for heterogeneity. In particular, to examine whether it might be the case that the signaling effects estimated here are biased towards zero in any state of world in which market rental rates are low or are expected to decrease, the sample is disaggregated into two groups based on whether the dividend change occurred either in a period of high or increasing market rental rates, or in a period of low or decreasing market rental rates. We expect that if there is any state of world in which a REIT might have "valuable" information it is a period of high or increasing market rental rates.

Next, to control for firm heterogeneity we split the REITs in the sample into two groups based upon their property-level investment activity in each period. We classify REITs with property-level investments above/below the median property-type investment level for a given year as large/small in that year.[5] Theory links periods of high or increasing market rental rates to periods of high investment spending in order to capture higher lease rates in the future. Yet investment policy is quite heterogeneous across REITs. Not all REITs may behave optimally all the time or use optimally all the information available to them over time. REITs typically must screen a relatively large number of potential deals available and invest in only a small fraction of the deals that come to their attention. Their screening criteria can often reflect a

[5] For each year, we compute the median property-type investment level for different property types of REITs that are characterized by their investments: (i) Regional Mall, Retail, and Shopping Center; (ii) Industrial, Manufactured Home, and Self-Storage; (iii) Diversified; (iv) Health Care, Hotel, and Specialty; (v) Office; and (vi) Multi-family.

tendency to limit investments following, for example, the acquisition of a large portfolio of properties or in the presence of financial market imperfections. There is also an evaluation step involving an assessment of the potential return and risk of a particular deal. While high or increasing market rental rates can increase the likelihood that a deal is accepted, in the same vein a high perceived risk that rents could fall in the future increases the likelihood of the deal being rejected. REITs may also face different degrees of information and agency problems.

We investigate whether a dividend change signal is likely to be a more credible, positive signal to the market in periods of high or increasing market rental rates for REITs with high investment spending than for REITs with low investment spending, and empirically examine how higher and lower investment spending enhances the dividend change signal in periods of low or decreasing market rental rates. We effectively obtain estimates of equation (1) in each case using multiple years of data for a cross-section of REITs with different state- and firm-specific features.

Table 2 reports our initial results from estimating equation (1) for the four different specifications. The model is estimated by using annual data for REITs from 2000 to 2013. shown above. A positive correlation between REIT dividend changes and future profitability should be expected for REITs that are the most sanguine about future profitability (i.e., REITs with high investment spending) in periods of increasing market lease rates. The results show that there is indeed a positive relationship between dividend changes and future profitability for REITs with high investment spending in periods of increasing market lease rates (see column A). The coefficient estimate of dividend increase, $\hat{b}_1$, equals 0.677 and is statistically significant at 5 percent. See Case 1. In the context of economic significance, a standard deviation change in increase in ordinary dividends signals a +21.57 percent change in the standard deviation of future earnings-to-book ratio.[6] The result is consistent with our

[6] The economic significance is computed as the coefficient of positive dividend surprise of 0.677 (in Case (1) in Table 2), multiplied by the standard deviation of positive dividend surprise of 0.0238 (reported in Case (1) in Panel B of Table 1). Then the economic magnitude of +21.57% is interpreted as percentage of the standard deviation of future earnings-to-book ratio (which is 0.0747 in Panel B of Table 1). The same method of calculation applies to other results of economic significance reported in this paper.

conjecture that only REITs with high asset growth and high rent growth use an increase in dividends as a costly signal of higher earnings growth in the next period.

Case 2 of Table 2 shows the results of estimating the model for REITs with high asset growth but negative rent growth. Here we get an insignificant coefficient of 0.269 on dividend increases. Of course, we did not expect to find otherwise. For one thing, these REITs all potentially lack positive information about higher re-leasing spreads. Since market lease rates are declining, we may assume re-leasing spreads are declining as well. The negative drift of the market lease rate is similar to a downward-sloping term structure of lease rates. However, a downward-sloping term makes investment costs more expensive, so there is a fall in profits. As profits fall, there should be a pronounced decline in investment spending as well. Such behavior would reflect good market timing. In contrast, bad market timers who are increasing both dividends and investment at time when re-leasing spreads are falling ought to show no response (which is an apt description of the REITs in this case who are trying to signal higher future profitability). For REITs decreasing dividends and increasing investment at times when re-leasing spreads are falling, however, there is a different story. Here we obtain a significant coefficient of −0.397 on dividend decreases. In this respect, REITs that decrease dividend payments (increase their plowback rates) and increase their investments as re-leasing spreads fall appear to be signaling that they have sufficient internal funds to take advantage of lower asset prices, opening up the possibility of greater future earnings.

Case 3 of Table 2 presents the results of estimating the model for REITs with low investment spending in periods of increasing market lease rates. We consider these firms to be financially constrained. In these regressions, neither the term for ΔD_{it}^{+} nor the term for ΔD_{it}^{-} is significant at conventional levels. In addition, the coefficient for ΔD_{it}^{+} is (about) one-sixth as large in these regressions as in the regressions for REITs with high investment spending in periods of increasing market lease rates, implying that firms classified as less financially constrained actually exhibit greater future profitability. Less constrained firms are more likely to adjust investment in response to increases in market lease rates. Thus, they have higher investment-rental-cash-flow sensitivity.

Case 4 of Table 2 presents the results for REITs with low asset growth and negative rent growth. The results suggest that the relation between dividend changes and earnings changes is not symmetric for dividend increases and decreases. The coefficient $\widehat{b_2}$ on ΔD_{it}^{-} is, as expected by the signaling literature, positive and significantly different from zero. It seems evident that the lack of investment spending in this case sends a signal of weakness and/or constraint on the part of the firm, ultimately leading to lower future earnings. In the case of REITs with dividend increases, the coefficient $\widehat{b_1}$ on ΔD_{it}^{+} is negative and insignificant (holding all other variables constant, including lagged earnings levels and a lagged version of the dependent variable). We give the following argument for why such a negative coefficient might be feasible in this case: First, we are dealing only with firms that have cut back on their investment spending in periods of declining market lease rates. Second, investment spending has stalled for these firms because of declining market lease rates. Third, for these firms, a dividend increase is viewed as indicating a lack of profitable investment opportunities, hence the negative relation between dividend increases and future earnings.

[insert Table 2 here]

5 A "Second Look" at REIT Dividend Changes and Future Profitability

In the previous section, the dividend signaling hypothesis was tested by conducting tests of the association between REIT dividend changes and the change in future earnings without distinguishing between the results of discretionary and nondiscretionary dividend changes. In this section, the tests that we develop here are based on discretionary dividend changes only. REITs can make both discretionary and nondiscretionary dividend changes. Dividend changes that are nondiscretionary from the standpoint of a REIT are those that arise when the REIT is required to raise its dividend to satisfy an IRS ruling that it pay out an amount equal to at least

90 percent of its taxable income in the form of dividends to shareholders. The ruling is in place to ensure that REIT shareholders can enjoy many of the benefits associated with direct real estate investment including being a truly passive investment. In contrast, discretionary REIT dividend changes arise when the REIT has decided to make a change but is not required to do so in order to satisfy the 90 percent dividend payout requirement.

The theory asserts that discretionary REIT dividend changes can serve as signals regarding future profitability, but this is not the case for nondiscretionary REIT dividend changes. The signal emitting from a nondiscretionary REIT dividend change is more likely to be interpreted as a signal about the change rather than about future profitability. In light of these issues, distinguishing between discretionary and nondiscretionary dividend changes can help (in theory) make a difference empirically in identifying the relationship between REIT profitability and dividends.

We define the nondiscretionary component of the REIT dividend payment, ND_{it}, as

$$ND_{it} = minimum\ dividend_{it} - D_{it-1} \qquad (2)$$

and the discretionary component of the REIT dividend payment, DD_{it}, as

$$DD_{it} = D_{it} - minimum\ dividend_{it} \qquad (3)$$

where $minimum\ dividend_{it} = \gamma TI_{it}$, TI_{it} is REIT taxable income, and $\gamma = 0.90$ is what REITs in the US are required by law to pay out of their taxable income to avoid paying corporate income taxes.[7] The variable D_{it} is REIT total cash distribution, which includes total ordinary dividend (OI_{it}), total capital gain distribution (CG_{it}), and return of capital (ROC_{it}), as reported on Form 1099-DIV, i.e., $D_{it} = OI_{it} + CG_{it} + ROC_{it}$. The nondiscretionary component of the REIT dividend change is the difference between the dividend the REIT is required by tax law to pay out to shareholders each year and the level of dividends, D_{it-1}, for REIT i in year $t-1$. The discretionary component of the REIT dividend (DD_{it}) is the difference between the actual level of dividends, D_{it}, for REIT i in year t and the dividend the REIT is required to pay out in order to maintain its trust status.

[7] For years prior to 2001, the required payout rate is 95%. As such, we set $\gamma = 0.95$ for observations before year 2001.

Taxable income, for the purposes of our tests, in each year is estimated as follows. For those REITs that pay a return of capital dividend, taxable income can be, by definition, inferred by finding the sum of the amount of ordinary taxable dividends, OI_{it}, plus total capital gain dividends, CG_{it}. For all other REITs, we experimented with two alternative methods to estimate taxable income. The first was a regression-based approach, and here, we used data on REIT taxable income and generally accepted accounting principles (GAAP) income obtained from S&P Global Market Intelligence for a sample of 20 REITs over the 2000-2013 time period to estimate $TI_{it} = \psi_1 I_{it} + \psi_0$, where I_{it} is conventional accounting (GAAP) income. The estimated taxable income equation, $TI_{it} = \hat{\psi}_1 I_{it} + \hat{\psi}_0$, was then used to estimate the missing taxable income for those REITs without a declared return of capital dividend. The second approach was to use the sum of the amount of ordinary taxable income plus total capital gains dividends to approximate taxable income. We choose between the two options based on in-sample mean squared error. The second option is in a class of its own, so it is selected automatically to estimate taxable income for REITs with and without a declared return of capital dividend.[8]

To test whether the discretionary component of the REIT dividend change signals future profitability, we estimate the following equation:

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D^{*,+}_{it-1} + b_2 \Delta D^{*,-}_{it-1} + b_3 ROE_{it-1}$$
$$+ b_4 (E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \quad (4)$$

where $\Delta D^{*,+}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} > 0$ and $\Delta D^{*,+}_{it} = 0$ otherwise, and $\Delta D^{*,-}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} < 0$ and $\Delta D^{*,-}_{it} = 0$ otherwise.[9]

We continue to control for possible heterogeneity in the data by estimating equation (4) in the same way we did for equation (1). We cannot think of any obvious reason why REIT managers would not act strategically, at least when it comes to signaling their information to shareholders by undertaking costly dividend payments in periods of high or increasing market

[8] When this assumption is made, the approach to estimate REIT taxable income is consistent with Boudry's (2011) approach. The approach implies that $DD_{it} = D_{it} - minimum\ dividend_{it} = OI_{it} + CG_{it} + ROC_{it} - \gamma TI_{it} = (1-\gamma)(OI_{it} + CG_{it}) + ROC_{it}$.
[9] In our analysis, we excluded observations of REITs with negative book equity and negative taxable income.

lease rates. Hence, we believe that estimating the model separately across different leasing rate environments, conditional on the information conveyed by the firm's investment activity, is worthwhile.

Table 3 reports the results from estimating equation (5) shown above. The model is estimated separately across the four different specifications. The most important finding is that there is a positive and statistically significant relation between REIT dividend changes and future profitability for REITs with high investment spending in periods of increasing market lease rates (i.e., REITs that are the most sanguine about future profitability). See Case 1. The estimated coefficient of the discretionary dividend increase, $\widehat{b_1}$, equals 5.190, and is statistically significant at 1 percent. In term of economic significance, a standard deviation change in increase in ordinary dividends signals a positive change in the future earnings-to-book ratio of 0.0249; this is equivalent to +33.35 percent change in the standard deviation of future earnings-to-book ratio.

We obtain much less convincing evidence for discretionary dividend changes in periods of decreasing market lease rates but high asset growth. There is a negative relation between discretionary dividend increases and future profitability in this case, but the coefficient is not significant. See Case 2. The only explanatory variable for which there is a positive and significant effect on future profitability in this case is the discretionary dividend decrease.

In the low asset growth and increasing market lease rate case, the estimated coefficient of the discretionary dividend increase, $\widehat{b_1}$, is negative, but the coefficient is not significant. See Case 3. This result is interesting because it is indeed possible that discretionary dividend increases in periods of increasing market lease rates but low asset growth send mixed signals to potential investors concerning the firm's prospects. We obtain a positive impact of discretionary dividend decreases on future profitability, but the coefficient is not significant.

In the regression for the low asset growth and decreasing lease rate case presented in Case 4 of Table 3, the estimated coefficient of the discretionary dividend increase, $\widehat{b_1}$, is positive, but the coefficient is not significant. There is a positive relation between discretionary dividend decreases and future profitability for REITs, but the effect is insignificant.

[insert Table 3 here]

6 A "Third Look" at REIT Dividend Changes and Future Profitability

Another concern with using equation (1) or (5) is the issue of some ambiguity in the measurement of future profitability. Since future profitability is a function of the money that the firm would have earned on the extra dividend had it retained it (or the money that the REIT does indeed earn should it decide to cut its dividends), it seems important to consider how sensitive the results are to alternative definitions of future profitability. To address this issue, one must take a stand on what a REIT would earn on the extra dividend had it retained it (or the money that the REIT does indeed earn should it decide to cut its dividend). Fortunately, with all the data available in the case of REITs, foregone earnings for REITs are relatively easy to measure.

The strategy employed is to control directly for REIT foregone earnings in estimating equation (5). To implement this approach, we measure, FE_{it}, for each REIT in the sample:

$$FE_{it} = \rho_{it}\Delta D_{it} \tag{5}$$

where ρ_{it} equals the estimated (going-in) cap rate in the private equity real estate market. If these foregone earnings are then added to the explanatory variables of equation (4) (and ROE_{it-1} is dropped), the following equation is obtained:

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1\Delta D^{*,+}_{it-1} + b_2\Delta D^{*,-}_{it-1} + b_3 FE_{it-1}/B_{it-2} + b_4\,(E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \tag{6}$$

The sign of b_3 depends on the size of ρ_{it}. While a higher (lower) value of ρ_{it} raises the marginal cost of an increased dividend payment in terms of forgone current earnings, a higher (lower) value of ρ_{it} earned by capital in use for income generation purposes will also raise (lower) future profitability.

We obtain values of ρ_{it} by calculating the REIT's net operating income (NOI) at the property level and dividing by its capitalized real estate value. Our method for measuring NOI at the property level begins with total rental revenues. We add other property revenue and subtract operating expense (excluding general and administrative (G&A) expenses for the REIT). We also adjust for any capital expenditure reserve:

Rental revenues
+ Other property revenue
- Operating expense (excluding G&A expenses)
<u>- Cap-ex reserve</u>
= Net operating income (NOI) (7)

The calculation of the capitalized real estate value begins with a measure of the net asset value (NAV) for each REIT. We estimate NAV as share price times total outstanding shares. We then deduct the value of other assets, including cash and cash equivalents, land held for investment and/or sale, investment in unconsolidated properties, and properties under development, and add total liabilities and preferred stock.

NAV
- Cash and cash equivalents
- Land held for investment and/or sale
- Investment in unconsolidated properties
- Properties under development
<u>+ Total liabilities and preferred stock</u>
= Capitalized real estate value (V) (8)

We denote this capitalized real estate value by the term V.

To obtain ρ_{it}, we compute

$$\rho_{it} = NOI_{it}/V_{it} \tag{9}$$

The value of ρ_{it} can be interpreted as the implied capitalization rate, also known as the implied cap rate. It is a simple way to measure the potential return on investment for a property that is foregone (earned) when the REIT increases (or decreases) its dividend.

Practitioners will often compare a REIT's implied cap rate to a private real estate deal and essentially see how much one is paying for the convenience of going through a REIT.

For each REIT, stock prices and total outstanding shares are obtained from the Center for Research in Security Prices (CRSP) database. All other financial data are obtained from S&P Global Market Intelligence (formerly SNL Financial). S&P Global Market Intelligence reports analysts' estimates of expected total rental revenues minus operating expenses and cap-ex reserves for the current fiscal year (up to 12 months ahead) as well as for the next fiscal year. To measure net operating income at the property level across all firms in the sample, we concentrate on analysts' estimates of expected net operating income for the current fiscal year. S&P Global Market Intelligence also reports balance-sheet information for REITs. This information allows us to build measures of the capitalized value of real estate at the REIT level. As this information has been used by financial analysts and investment banks for various purposes (including granting loans), the data are carefully controlled and very reliable. The sample should not be a concern for our work, because the data in S&P Global Market Intelligence represent virtually all publicly-traded REITs.

The results of estimating equation (5) adjusting REIT earnings for FE_{it} are shown in Table 4. The model is estimated separately across the four different specifications. The first point to notice is that there is a positive and statistically significant relation between REIT dividend changes and future profitability for REITs with high investment spending in periods of increasing market lease rates. In term of economic significance, a standard deviation change in increase in ordinary dividends signals a positive change in the future earnings-to-book ratio of 0.0207; this is equivalent to +27.77 percent change in the standard deviation of future earnings-to-book ratio. See Case 1.

The second point is that, while there is a negative relation between discretionary dividend increases and future profitability for REITs with high investment spending in periods of decreasing market lease rates, the coefficient is not significant. See Case 2.

For REITs with low investment spending in periods of increasing market lease rates, the evidence seems to point to a negative and insignificant relation between discretionary dividend increases and future profitability. For instance, in Case 3 the coefficient on the REIT dividend increase is -1.415 and insignificant.

The last point is REIT dividend increases appear to have a positive and statistically insignificant effect on future profitability for REITs with low investment spending in periods of decreasing market lease rates. However, the evidence does suggest that there is a positive and significant relation between discretionary dividend decreases and future profitability for REITs with low investment spending in periods of decreasing market lease rates. See Case 4.

With respect to the coefficient estimate of FE_{it-1}/B_{it-1}, in no case is the estimate significantly different from zero at the 1 percent level. The coefficient estimate of FE_{it-1}/B_{it-1} for REITs with high investment spending in periods of increasing market lease rates is positive but only significantly different from zero at the 10 percent level. When we move to the cases in periods of decreasing market lease rates, however, the coefficient estimates of FE_{it-1}/B_{it-1} are negative but not significant. The coefficient estimate of FE_{it-1}/B_{it-1} for REITs with high investment spending in periods of increasing market lease rates is positive but small, and not significantly different from zero.

[insert Table 4 here]

7 A "Counterfactual Look" at REIT Dividend Changes and Future Profitability

Here the emphasis is on deviations from expected dividends as a determinant of future earnings. Employing an expectational model of REIT dividends enhances the power of our tests because any market reaction to a REIT dividend change should be based on deviations from expectations, rather than deviations from the dividend the REIT is required by tax law to pay out to shareholders each year.

We take two approaches to measuring REIT expected dividends. Our first approach is to assume that expectations formed in the REIT market are the same as those formed in the real estate operating company (REOC) market and impose such expectations on REITs. Our second approach is to very similar to the first, except that we first use propensity scoring to match each REIT in our sample with a similar REOC(s).

We then look at whether there is any correlation between deviations from REIT expected dividends and future earnings. To measure the deviation from REIT expected dividends, we perform the following decomposition:

$$\begin{aligned} D_{it} - minimum\ dividend_{it} \\ &= (D_{it} - D_{it}^{e}) \\ &+ (D_{it}^{e} - minimum\ dividend_{it}) \end{aligned} \tag{10}$$

where the first term on the right hand side, $D_{it} - D_{it}^{e}$, is the deviation of the actual dividend, D_{it}, from expected, D_{it}^{e}. The second term on the right hand side, $D_{it}^{e} - minimum\ dividend_{it}$, is the deviation of the expected dividend, D_{it}^{e}, from the minimum dividend payment that the REIT must make to avoid paying corporate taxes.[10] In this expression, if financial market participants form expectations before REIT dividends are announced on the basis of available earnings information, and if that information should be incorporated into the term D_{it}^{e}, then only changes in the unexpected component $D_{it} - D_{it}^{e}$ should serve as a signaling device of REIT future profitability.

To test this hypothesis, the model estimated is:

$$\begin{aligned} (E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D_{it-1}^{u,+} + b_2 \Delta D_{it-1}^{u,-} + b_3 \Delta D_{it-1}^{n} + b_4\, FE_{it-1}/B_{it-2} \\ + b_5\, (E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \end{aligned} \tag{11}$$

where $\Delta D_{it}^{u,+} = \Delta(D_{it} - D_{it}^{e})$ if $\Delta(D_{it} - D_{it}^{e}) > 0$ and $\Delta D_{it}^{u,+} = 0$ otherwise, and $\Delta D_{it}^{u,-} = \Delta(D_{it} - D_{it}^{e})$ if $\Delta(D_{it} - D_{it}^{e}) < 0$ and $\Delta D_{it}^{u,-} = 0$ otherwise. $\Delta D_{it}^{u} = \Delta(D_{it} - D_{it}^{e})$ and $\Delta D_{it}^{e} = \Delta(D_{it}^{e} - minimum\ dividend_{it})$. Here equation (11) assumes, as is common in the

[10] To investors, REOCs are very similar to REITs, except that REOCs are not required to pay any specific level of income as dividends to shareholders each year. In addition, there is no minimum restriction on the number of owners or limits on ownership for REITs. REOCs are also more flexible than REITs in terms of what types of types of real estate investment they can make. REOCs do, however, have to pay standard corporate taxes REITs avoid. Thus, in this instance the term D_{it}^{e} can be regarded not only as the level of payment aligning managers' interests with those of investors in an ordinary corporation, but also the payment the REIT would have made if it did not have a bunch of regulatory hurdles to jump through each year in its bid to qualify as a trust.

dividend signaling literature, that unexpected changes in REIT dividends rather than levels have information content about future earnings. The possible values of D_{it}^{e} are defined in the next two subsections.

7.1 Estimates Based on Unmatched Analysis

To carry out this analysis, we obtained dividend and earnings data from S&P Global Market Intelligence for a sample of REOCs over the 2000-2013 time period. We assume dividend expectations for both REOCs and REITs are formed using a partial adjustment model along the lines of Lintner's (1956) target adjustment model. The model is estimated for all dividend-paying REOCs in our sample. The objective of the model is to illustrate that current dividends are based on current earnings. Lintner's (1956) model holds that the desired level of dividends is related to current earnings multiplied by the firm's target payout ratio. The Lintner (1956) model further assumes that, in making dividend decisions, the firm adjusts its dividends only partially to its desired level of dividends with a time lag.

With respect to the parameters of the model, we assume a constant target payout ratio and a constant speed of adjustment of the change in cash dividends in period t from the previous dividend at period $t-1$. The estimated model is then applied to the REIT sample to obtain an estimate in each year of REIT expected dividends.

Based on this estimate, equation (11) can be directly estimated under the assumption that dividend expectations formed in the REIT market are the same as those formed in the REOC market.[11] We estimate (11) separately across the four different specifications as we are interested in changes in the unexpected REIT dividends should serve as a signaling device of future profitability in periods of when the market lease rate is high or is expected to increase through dividend changes.

Table 5 presents the results from estimating equation (11). We find that there is a positive and significant relation between positive change in dividend surprises ($\Delta D_{it}^{u,+}$ in equation (11))

[11] In this case, D_{it}^{e} equation (11) is the expected REIT dividend based on the Lintner (1956) model, which is estimated from the REOC sample.

and future profitability for REITs with high investment spending in periods of increasing market lease rates. The foregone earnings variable has a positive and significant effect on future profitability. The coefficient estimate of past earnings is positive and significant at the 10 percent level. In all other cases, positive dividend surprises have a positive but insignificant effect on future profitability.

[insert Table 5 here]

7.2 Estimates Based on Matched Analysis

To perform this analysis, we use our sample of dividend-paying REOCs and REITs. The analysis involves two major steps. The first step is estimating propensity scores comparing REOCs to REITs.[12] Using a logit model with a 0-1 variable for being a REOC as the dependent variable, we match REOCs to REITs based on an earnings-to-book ratio and the logarithm of market size.[13] The selection criterion is based on the difference between the propensity scores for the REOCs and the REITs. Next, a REIT is matched with a REOC whose estimated propensity score is closest to (statistically equals to) the REIT's propensity score. Due to small sample size of firms available in the REOC industry, we perform the propensity score matching with replacement in order to reduce bias in estimate.

To gauge the REIT's expected dividend payout, we then use the observed dividend payout ratio based on the matched REOC. This matching algorithm should produce, in principle, robust and unbiased estimates of REIT expected dividends. The approach also has the advantage that it nicely approximates the experiment of interest, using how dividend expectations are formed for comparable REOCs to estimate expected dividends for REITs.[14]

Having estimated REIT expected dividends in this fashion, we then estimate (11)

[12] Our analysis is related to the literature of matching methods which estimate counterfactual outcomes by using similar subjects in another group (Roberts and Whited, 2013).
[13] We perform propensity score matching to ensure that the REIT and the REOC firms share similar observable pre-treatment firm characteristics prior to the treatment (see Rosenbaum and Rubin 1983).
[14] In this case, D_{it}^{e} in equation (11) is computed as REIT's EBITDA per share multiplied by the REOC's payout ratio (total dividends-to-EBITDA ratio) from the matched REOC sample based on propensity score.

separately across the four different specifications. Table 6 reports our results for the different specifications. The estimates appear very similar to those in Table 5 and suggest the same positive relation between positive change in dividend surprises and future profitability for REITs with high investment spending in periods of increasing market lease rates. In term of economic significance, Case 1, for example, shows that a standard deviation change in increase in dividend surprises (measured as the deviation of the actual dividend from the counterfactual dividend) signals a positive change in the future earnings-to-book ratio of 0.0275; this is equivalent to +36.84 percent change in the standard deviation of future earnings-to-book ratio. The results in Table 6 also suggest qualitatively the same general conclusions with respect to dividend signaling in all other cases, even for REITs with low investment spending in periods when current lease rates are expected to increase in the future.

[insert Table 6 here]

8 Further Analysis and Robustness Check

In this penultimate section, we provide further analysis of the relation between changes in REIT dividends and future earnings change. First, we examine the extent to which large dividend changes may influence the autocorrelation coefficients. Second, we examine the signaling power of specially designated dividends.

8.1 Non-Linearities in the Autocorrelation

We use the methodology proposed by Grullon, Michaely, Benartzi, and Thaler (2005) to tackle the possibility of nonlinearities in the relation between future earnings changes and lagged earnings levels and changes.[15] The two models estimated are

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D^{*,+}_{it-1} + b_2 \Delta D^{*,-}_{it-1}$$

$$+ b_3\, FE_{it-1}/B_{it-2} + \lambda_1 CE_0 + \lambda_2 NCED_0 \times CE_0$$

[15] Grullon, et al. (2005) argue that the appropriate functional form between dividend changes and future earnings is nonlinear. They base their argument on the results of Fama and French (2000), who empirically show that the mean reversion process of earnings is highly nonlinear. Grullon, et al. (2005) find no evidence supporting the idea that dividend increases (decreases) signal better (worse) prospects for firm profitability.

$$+\lambda_3 NCED_0 \times CE_0^2 + \lambda_4 PCED_0 \times CE_0^2 + \varepsilon_{it} \quad (6')$$

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D_{it-1}^{u,+} + b_2 \Delta D_{it-1}^{u,-} + b_3 \Delta D_{it-1}^{e}$$

$$+b_4\, FE_{it-1}/B_{it-2} + \lambda_1 CE_0 + \lambda_2 NCED_0 \times CE_0$$

$$+\lambda_3 NCED_0 \times CE_0^2 + \lambda_4 PCED_0 \times CE_0^2 + \varepsilon_{it} \quad (11')$$

where CE_0 is equal to $(E_{it-1} - E_{it-2})/B_{it-2}$, $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise, and $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. The values λ_2, λ_3, and λ_4 measure nonlinearity in the autocorrelation of changes in REIT profitability. Equations (6') and (11') are similar to that estimated by Grullon, Michaely, Benartzi, and Thaler (2005), allowing for the potential nonlinearity in the autocorrelation of changes in profitability.[16]

Table 7 reports the results of estimating (6') and (11'). The results are generally consistent with those presented above. After controlling for non-linearities in the autocorrelation, we find similar results and the same conclusion that there is a positive and significant relation between positive dividend surprises (estimated by either positive discretionary dividend changes or positive changes in unexpected REIT dividends) and future profitability for REITs with high investment spending in periods of increasing market lease rates.

The results in Table 7 imply, among other things, that our main results continue to hold even after we control for the autocorrelation in earnings. The results suggest that some nonlinearity in the autocorrelation of changes in REIT profitability is likely to be present in our data, as can be seen from the positive and significant estimates of λ_1, λ_2 and λ_4 for REITs with high investment spending in periods of increasing market lease rates and the positive and

[16] Equation (6') is estimated using positive and negative changes in discretionary dividends, which are defined in equation (6). Equation (11') is estimated based on propensity score analysis of REOC matched sample (see Section 7.2). As a robustness check, we also estimate dividend surprises using Lintner's (1956) model from REOC sample (as discussed in Section 7.1) and find the same conclusion that there remains a positive and significant relation between positive dividend surprises and future profitability in Case 1 after controlling for non-linearity of earnings.

significant estimates of λ_1, λ_2, and λ_3 for REITs with low investment spending in periods of decreasing market lease rates, both in panels A and B of Table 7.

[insert Table 7 here]

8.2 The Signaling Power of Specially Designated Dividends

Here we provide a direct test of the signaling power of the different types of REIT dividends. REITs typically make three types of dividend distributions. First, they make ordinary income distributions from rental income generated by real estate properties. These distributions are taxed to shareholders as ordinary income. Second, they make capital gains distributions to shareholders when capital assets are sold. These distributions are taxed to shareholders as capital gains (either long-term or short-term). Third, they make distributions from depreciation tax shields and other expenses. These distributions are considered a nontaxable return of capital. Because our signaling hypothesis is that REIT dividend increases (decreases) convey information about future earnings and, more specifically, about higher (lower) market re-leasing spreads, ordinary dividends, as opposed to capital gains and return of capital dividends, should be the means by which REIT managers convey this information about the firm.

The model estimated is

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta OI_{it-1}^{+} + b_2 \Delta OI_{it-1}^{-} + b_3 \Delta CG_{it-1} + b_4 \Delta ROC_{it-1}$$
$$+ b_5\, FE_{it-1}/B_{it-2} + \lambda_1 CE_0 + \lambda_2 NCED_0 \times CE_0$$
$$+ \lambda_3 NCED_0 \times CE_0^2 + \lambda_4 PCED_0 \times CE_0^2 + \varepsilon_{it} \qquad (12)$$

where change in total ordinary dividend, $\Delta OI_{it}^{+} = \Delta OI_{it}$ if $\Delta OI_{it} > 0$ and $\Delta OI_{it}^{+} = 0$ otherwise, and $\Delta OI_{it}^{-} = \Delta OI_{it}$ if $\Delta OI_{it} < 0$ and $\Delta OI_{it}^{-} = 0$ otherwise. ΔCG_{it} is change in total capital gain distribution and ΔROC_{it} is change in return of capital. Other variables are defined earlier. The data needed to analyze this question are taken from FORM-1099 DIV for each REIT and for the sample period 2000 to 2013.

The results of estimating equation (12) separately across the four different specifications are given in Table 8. The main result of Table 8 is that there appears to be a large and statistically significant relationship between REIT ordinary dividend changes and the change in future earnings for REITs with high investment spending in periods of increasing market lease rates. Interestingly, the magnitude of the estimated effect suggests that a standard deviation change in increase in ordinary dividends signals a +26.67 percent change in the standard deviation of future earnings-to-book ratio. Notice also that there appears to be no relation between REIT ordinary dividend changes and the change in future earnings for the other three cases.

Two other results in Table 8 deserve mention. First, in Case 1, the other taxable measure of dividend changes, changes in capital gain dividends, does not matter for REITs with high investment spending in periods of increasing market lease rates. The estimate in this case is positive but not significantly different from zero. It appears that in periods of increasing market lease rates REITs with high investment spending generally signal their private information through ordinary dividend increases, not through changes in capital gain dividends. The case involving REITs with low investment spending in periods of increasing market lease rates represents a puzzle. The results in Case 3 suggest that there is a negative and significant relationship between REIT capital gain dividend changes and the change in future earnings for REITs with low investment spending in periods of increasing market lease rates. We find this result surprising, but these REITs could be better off investing heavily in their properties to capture the higher lease rates in the future rather than by selling properties. Another curious finding is the positive and significant relationship between REIT capital gain dividend changes and the change in future earnings for REITs with high investment spending in periods of decreasing market lease rates (see Case 2). But by and large, this result would make sense if these REITs were providing extra returns to their shareholders by selling properties to raise the cash required to buy distressed proprieties that were vulnerable to a liquidity crunch. Second, return of capital distributions matter in periods of increasing market lease rates. The results suggest that there is a large and statistically significant relationship between REIT return of capital dividend changes and the change in future earnings for REITs with either high or low investment spending in such periods (see Case 1 and Case 3).

[insert Table 8 here]

9 Conclusion

This paper has presented empirical evidence on the relationship between REIT dividend changes and future profitability. The evidence, for the most part, seems to be consistent with signaling theory – namely, that a REIT's announcement of a dividend increase is interpreted as a signal by outsiders that the REIT anticipates permanently higher levels of cash flows in the future. We believe that comparing the link between REIT dividend changes and future profitability in periods of high or increasing market lease rates represents the conceptually correct way of testing signaling theory from a REIT standpoint, especially for REITs with high asset growth in these periods.

Because we were interested in this paper in measuring the relative information content of REIT dividend changes, we needed to use a measure of a change in dividend which reflected unexpected dividend changes. One model of expected REIT dividend changes that has been used in the literature is to measure changes in discretionary REIT dividend payouts. Another model is to assume that expectations formed in the REIT market are the same as those formed in the REOC market and impose such expectations on REITs. Still another model is to compute the announced change in specifically designated dividends, like ordinary income distributions from rental income generated by real estate properties, capital gains distributions to shareholders, nontaxable return of capital distributions. The results are generally not sensitive to the way we measure expected REIT dividend changes.

We find a significant positive relation between dividend changes and future earnings changes for REITs with high investment spending in periods when current lease rates are expected to increase in the future. Further, we find no relation between dividend changes and future earnings changes in all other cases, even when we do a detailed analysis of REITs with low investment spending in periods when current lease rates are expected to increase in the future. Collectively, our results suggest that REIT dividend changes reveal valuable information about the REIT's re-leasing spread profit and therefore about future earnings in periods of when the market lease rate is high or is expected to increase.

References

Aharony, J., and Swary, I., 1980. Quarterly dividends and earnings announcements and stockholders' returns: An Empirical Analysis. *Journal of Finance*, 35(1), 1-12.

Allen, F., Bernardo, A.E. and Welch, I., 2000. A theory of dividends based on tax clienteles. *Journal of Finance*, 55(6), 2499-2536.

Andres, C., Hofbaur, U., Do what you did four quarters ago: Trends and implications of quarterly dividends. *Journal of Corporate Finance*, 43, 139-158.

Asem, E., Lethbridge, A.B. and Kaul, A., 2014. Dividend changes and future earnings: A conditional analysis. Working paper, University of Alberta.

Atanasov, V. and Black, B., 2016. Shock-based causal inference in corporate finance and accounting research. *Critical Finance Review*, 5(2), 207-304.

Baker, M., Mendel, B. and Wurgler, J., 2016. Dividends as reference points: A behavioral signaling approach. *Review of Financial Studies*, 29(3), pp.697-738.

Beaver, W., Kettler, P. and Scholes, M., 1970. The association between market determined and accounting determined risk measures. *Accounting Review*, 45(4), 654-682.

Benartzi, S., Michaely, R. and Thaler, R., 1997. Do changes in dividends signal the future or the past?. *Journal of Finance*, 52(3), 1007-1034.

Bernheim, B.D. and Wantz, A., 1992. A tax-based test of the dividend signaling hypothesis (No. w4244). National Bureau of Economic Research.

Bhattacharya, U. and E. Jacobsen, S., 2015. The share repurchase announcement puzzle: Theory and evidence. *Review of Finance*, 20(2), 725-758.

Bird, A., Karolyi, S.A. and Ruchti, T.G., 2016. Understanding the 'Numbers Game'. Available at SSRN: https://ssrn.com/abstract=2748220.

Boudry, W.I., 2011. An examination of REIT dividend payout policy. *Real Estate Economics*, 39(4), 601-634.

Brav, A., Graham, J.R., Harvey, C.R. and Michaely, R., 2005. Payout policy in the 21st century. *Journal of Financial Economics*, 77(3), 483-527.

Brook, Y., Charlton Jr, W.T. and Hendershott, R.J., 1998. Do firms use dividends to signal large future cash flow increases? *Financial Management*, 27(3), 46-57.

Bruggeman, W.B. and Fisher, J.D., 1993. *Real Estate Finance and Investments*. Ninth Edition, Irwin: Homewood, Illinois.

Case, B., Hardin, W.G. and Wu, Z., 2012. REIT dividend policies and dividend announcement effects during the 2008–2009 liquidity crisis. *Real Estate Economics*, 40(3), 387-421.

Conroy, R.M., Eades, K.M. and Harris, R.S., 2000. A test of the relative pricing effects of dividends and earnings: Evidence from simultaneous announcements in Japan. *Journal of Finance*, 55(3), 1199-1227.

DeAngelo, H., DeAngelo, L. and Skinner, D.J., 1996. Reversal of fortune dividend signaling and the disappearance of sustained earnings growth. *Journal of Financial Economics*, 40(3), 341-371.

Devos, E., Spieler, A. and Tsang, D., 2014. Elective stock dividends and REITs: evidence from the financial crisis. *Real Estate Economics*, 42(1), 33-70.

Downs, D.H. and Güner, Z.N., 2000. Investment analysis, price formation and neglected firms: Does real estate make a difference? *Real Estate Economics*, 28(4), 549-579.

Dyl, E.A. and Weigand, R.A., 1998. The information content of dividend initiations: Additional evidence. *Financial Management*, 27(3), 27-35.

Easterbrook, Frank, 1984, Two agency cost explanations of dividends, *American Economic Review*, 74, 650-659.

von Eije, H., Goyal, A. and Muckley, C.B., 2014. Does the information content of payout initiations and omissions influence firm risks? *Journal of Econometrics*, 183(2), 222-229.

Fama, E.F. and French, K.R., 2000. Forecasting profitability and earnings. *Journal of Business*, 73(2), 161-175.

Floyd, E., Li, N. and Skinner, D.J., 2015. Payout policy through the financial crisis: The growth of repurchases and the resilience of dividends. *Journal of Financial Economics*, 118(2), 299-316.

Fuller, K.P. and Goldstein, M.A., 2011. Do dividends matter more in declining markets? *Journal of Corporate Finance*, 17(3), 457-473.

Gentry, W.M., Kemsley, D. and Mayer, C.J., 2003. Dividend taxes and share prices: evidence from real estate investment trusts. *Journal of Finance*, 58(1), 261-282.

Grinstein, Y. and Michaely, R., 2005. Institutional holdings and payout policy. *Journal of Finance*, 60(3), 1389-1426.

Grullon, G., Michaely, R., Benartzi, S. and Thaler, R.H., 2005. Dividend changes do not signal changes in future profitability. *Journal of Business*, 78(5), 1659-1682.

Grullon, G., Michaely, R. and Swaminathan, B., 2002. Are dividend changes a sign of firm maturity? *Journal of Business*, 75(3), 387-424.

Hanlon, M., Myers, J. and Shevlin, T., 2006. The Information Content of Dividends: Do

Dividends Provide Information about Future Earnings?. Working paper, UNC Kenan-Flagler Business School, Academic Areas, Accounting.

Hardin, W., and Hill, M. 2008. REIT dividend determinants: Excess dividends and capital markets. *Real Estate Economics*, 36(2), 349-369.

Healy, P.M. and Palepu, K.G., 1988. Earnings information conveyed by dividend initiations and omissions. *Journal of financial Economics*, 21(2), 149-175.

Jensen, Michael, 1986, Agency cost of free cash flow, corporate finance, and takeovers, *American Economic Review*, 76(2), 323-329.

Kale, J.R., Kini, O. and Payne, J.D., 2012. The dividend initiation decision of newly public firms: Some evidence on signaling with dividends. *Journal of Financial and Quantitative Analysis*, 47(02), 365-396.

Kallberg, J.G., Liu, C.H. and Srinivasan, A., 2003. Dividend pricing models and REITs. *Real Estate Economics*, 31(3), 435-450.

Kao, C. and Wu, C., 1994. Tests of dividend signaling using the Marsh-Merton model: A generalized friction approach. 67(1), *Journal of Business*, 45-68.

Lang, L.H. and Litzenberger, R.H., 1989. Dividend announcements: Cash flow signalling vs. free cash flow hypothesis? *Journal of Financial Economics*, 24(1), 181-191.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W., 2000. Agency problems and dividend policies around the world. *Journal of Finance*, *55*(1), 1-33.

Leary, M.T. and Michaely, R., 2011. Determinants of dividend smoothing: Empirical evidence. *Review of Financial Studies*, 24(10), 3197-3249.

Lintner, J., 1956. Distribution of incomes of corporations among dividends, retained earnings, and taxes. *American Economic Review*, 46(2), 97-113.

Michaely, R. and Roberts, M.R., 2012. Corporate dividend policies: Lessons from private firms. *Review of Financial Studies*, 25(3), 711-746.

Miller, Merton, 1987, The information content of dividends, in J. Bossons, R. Dornbush, and S. Fischer, Eds.: *Macroeconomics: Essays in Honor of Franco Modigliani* (MIT press: Cambridge, Mass.), 37-61.

Miller, M.H. and Modigliani, F., 1961. Dividend policy, growth, and the valuation of shares. *Journal of Business*, *34*(4), 411-433.

Miller, M.H. and Rock, K., 1985. Dividend policy under asymmetric information. *Journal of Finance*, 40(4), 1031-1051.

Nissim, D. and Ziv, A., 2001. Dividend changes and future profitability. *Journal of Finance*, 56(6), 2111-2133.

Rosenbaum, P. and Rubin, D. 1983, The central role of the propensity score in observational studies for causal effects, *Biometrika*, 70, 41-55.

Sun, L., Titman, S.D. and Twite, G.J., 2015. REIT and commercial real estate returns: A postmortem of the financial crisis. *Real Estate Economics*, 43(1), 8-36.

Titman, S., Tompaidis, S. and Tsyplakov, S., 2004. Market imperfections, investment flexibility, and default spreads. *Journal of Finance*, 59(1), 165-205.

Turner, J.D., Ye, Q. and Zhan, W., 2013. Why do firms pay dividends?: Evidence from an early and unregulated capital market. *Review of Finance*, 17(5), 1787-1826.

Wang, K., Erickson, J. and Gau, G.W., 1993. Dividend policies and dividend announcement effects for real estate investment trusts. *Real Estate Economics*, 21(2), 185-201.

Watts, R., 1973. The information content of dividends. *Journal of Business*, 46(2), 191-211.

Table 1. Summary Statistics

The table reports the dividend and earnings characteristics for our REIT sample from 2000 to 2013. Return on earnings is measured by earnings relative to book value of common equity. Dividend change is the annual change in total ordinary divided. Foregone earnings FE_{it} (defined in equation (5)) is $\rho_{it}\Delta D_{it}$ where ρ_{it} equals the estimated (going-in) cap rate in the private equity real estate market. ROE is defined as net income divided by book equity. Panel A reports the statistics for the full sample. Panel B reports the statistics sub-sampled by asset growth and rent growth.

Panel A. Summary Statistics - All Cases

Variable	N	Mean	Median	Std. Dev	Min	Max
Earnings-to-Book (t+1)	799	0.0029	0.0034	0.0869	-0.3290	0.3824
Positive Change in Ordinary Dividends	799	0.0110	0.0000	0.0234	0.0000	0.1527
Negative Change in Ordinary Dividends	799	-0.0132	0.0000	0.0275	-0.1784	0.0000
Number of Positive Change	372					
Number of Negative Change	389					
ROE	759	0.0918	0.0805	0.1182	-0.3089	0.8706
Foregone Earnings	722	0.0158	0.0106	0.0210	-0.0322	0.1540

Panel B. Summary Statistics - by Different Cases of Asset Growth vs. Lease Growth

Case #1 - High Asset Growth and Positive Rent Growth				**Case #2 - High Asset Growth and Negative Rent Growth**			
Variable	N	Mean	Std. Dev	Variable	N	Mean	Std. Dev
Earnings-to-Book (t+1)	266	0.0164	0.0747	Earnings-to-Book (t+1)	133	0.0083	0.0740
Positive Change in Ordinary Dividends	266	0.0126	0.0238	Positive Change in Ordinary Dividends	133	0.0122	0.0275
Negative Change in Ordinary Dividends	266	-0.0102	0.0248	Negative Change in Ordinary Dividends	133	-0.0153	0.0323
Number of Positive Change	151			Number of Positive Change	56		
Number of Negative Change	107			Number of Negative Change	75		
Case #3 - Low Asset Growth and Positive Rent Growth				**Case #4 - Low Asset Growth and Negative Rent Growth**			
Variable	N	Mean	Std. Dev	Variable	N	Mean	Std. Dev
Earnings-to-Book (t+1)	257	-0.0057	0.0975	Earnings-to-Book (t+1)	115	-0.0132	0.0966
Positive Change in Ordinary Dividends	257	0.0100	0.0218	Positive Change in Ordinary Dividends	115	0.0077	0.0171
Negative Change in Ordinary Dividends	257	-0.0124	0.0280	Negative Change in Ordinary Dividends	115	-0.0194	0.0266
Number of Positive Change	112			Number of Positive Change	40		
Number of Negative Change	122			Number of Negative Change	70		

Table 2. A "First Look" at REIT Dividend Changes and Future Profitability

This table reports estimates of equation (3) of Nissim and Zvi (2001, p.2120) future earnings changes to dividend increases and decreases,

$$(E_t - E_{t-1})/B_{t-1} = b_0 + b_1 \Delta D^{+}_{it-1} + b_2 \Delta D^{-}_{it-1} + b_3 ROE_{t-1} + b_4 (E_{t-1} - E_{t-2})/B_{t-2} + \varepsilon_t \quad (3)$$

where E_{it} denotes earnings in for firm i in year t, B is the book value of common equity, and $ROE_{it} = E_{it}/B_{it}$. D is the annual total ordinary dividend, ΔD is the dividend change measured by the difference between the current and previous fiscal year, scaled by the book value of common equity in previous fiscal year, ΔD^{+}_{it} equals dividend change if dividend change is positive and zero otherwise, ΔD^{-}_{it} equals dividend change if dividend change is negative and zero otherwise. Case 1 reports estimates of sub-sample of firms with high asset growth and positive rent growth. Case 2 reports estimates of sub-sample of firms with high asset growth and negative rent growth. Case 3 reports estimates of sub-sample of firms with low asset growth and positive rent growth. Case 4 reports estimates of sub-sample of firms with low asset and negative rent growth. A firm's asset growth as percentage change in total assets. We measure rent growth as annual change in market lease rates between the 4th quarter of the current year and the 4th quarter of the previous year. Market lease rates are estimated using property value trends from the NCREIF database as net operating income (NOI) for properties that are in the NCREIF index at the beginning and end of the respective quarter. We estimate regressions by a pooled regression with clustered standard errors. To reduce the effect of outliers, all the variables have been winsorized at the 1percent and the 99percent of empirical distributions of our main variables. ***, **, * represent the statistical significance at the 1percent, 5percent, and 10percent level, respectively.

Case #1 - High Asset Growth and Positive Rent Growth		**Case #2 - High Asset Growth and Negative Rent Growth**	
Positive Change in Ordinary Dividends	0.677**	Positive Change in Ordinary Dividends	0.269
	(0.29)		(0.37)
Negative Change in Ordinary Dividends	-0.016	Negative Change in Ordinary Dividends	-0.397**
	(0.17)		(0.20)
ROE	0.187**	ROE	-0.180***
	(0.09)		(0.05)
Past Earnings	-0.063	Past Earnings	-0.151
	(0.09)		(0.10)
Constant	-0.009	Constant	0.017*
	(0.01)		(0.01)
R-squared	0.13	R-squared	0.08
N	249	N	130
Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Ordinary Dividends	0.096	Positive Change in Ordinary Dividends	-0.42
	(0.38)		(0.32)
Negative Change in Ordinary Dividends	0.168	Negative Change in Ordinary Dividends	1.041**
	(0.51)		(0.45)
ROE	-0.086	ROE	0.023
	(0.09)		(0.19)
Past Earnings	-0.324**	Past Earnings	-0.21
	(0.13)		(0.19)
Constant	0.003	Constant	0.003
	(0.01)		(0.02)
R-squared	0.1	R-squared	0.07
N	247	N	109

Table 3. A "Second Look" at REIT Dividend Changes and Future Profitability

This table reports estimates of future earnings changes to unexpected dividend increases and decreases. Discretionary dividend measured by actual dividend of a REIT minus the expected value of the dividend of a REIT based on minimum dividend (see also equation (4)). This table reports estimates of future earnings changes to increases and decreases in discretionary dividends,

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D^{*,+}_{it-1} + b_2 \Delta D^{*,-}_{it-1} + b_3 ROE_{it-1} + b_4\,(E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \qquad (4)$$

where $\Delta D^{*,+}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} > 0$ and $\Delta D^{*,+}_{it} = 0$ otherwise, and $\Delta D^{*,-}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} < 0$ and $\Delta D^{*,-}_{it} = 0$ otherwise. E_{it} denotes earnings in for firm *i* in year *t*, B is the book value of common equity, and $ROE_{it} = E_{it}/B_{it}$. Case 1 reports estimates of sub-sample of firms with high asset growth and positive rent growth. Case 2 reports estimates of sub-sample of firms with high asset growth and negative rent growth. Case 3 reports estimates of sub-sample of firms with low asset growth and positive rent growth. Case 4 reports estimates of sub-sample of firms with low asset and negative rent growth. A firm's asset growth as percentage change in total assets. We measure rent growth as annual change in market lease rates between the 4th quarter of the current year and the 4th quarter of the previous year. Market lease rates are estimated using property value trends from the NCREIF database as net operating income (NOI) for properties that are in the NCREIF index at the beginning and end of the respective quarter. We estimate regressions by a pooled regression with clustered standard errors. To reduce the effect of outliers, all the variables have been winsorized at the 1percent and the 99percent of empirical distributions of our main variables. ***, **, * represent the statistical significance at the 1percent, 5percent, and 10percent level, respectively.

Case #1 - High Asset Growth and Positive Rent Growth		**Case #2 - High Asset Growth and Negative Rent Growth**	
Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	5.190**	Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	-0.08
	(2.05)		(1.89)
Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	-0.057	Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	0.447*
	(0.26)		(0.25)
ROE	0.11	ROE	-0.144***
	(0.10)		(0.05)
Past Earnings	-0.105	Past Earnings	-0.111
	(0.10)		(0.10)
Constant	-0.003	Constant	0.026***
	(0.01)		(0.01)
R-squared	0.2	R-squared	0.06
N	249	N	130
Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	-0.795	Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	3.192
	(2.19)		(5.05)
Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	0.265	Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	1.346
	(0.45)		(0.99)
ROE	-0.079	ROE	-0.013
	(0.09)		(0.22)
Past Earnings	-0.312**	Past Earnings	-0.212
	(0.12)		(0.21)
Constant	0.005	Constant	-0.016
	(0.01)		(0.02)
R-squared	0.11	R-squared	0.04
N	247	N	109

Table 4. A "Third Look" at REIT Dividend Changes and Future Profitability

This table reports estimates of future earnings changes to unexpected dividend increases and decreases. Discretionary dividend measured by actual dividend of a REIT minus the expected value of the dividend of a REIT based on minimum dividend (see also equation (6)). This table reports estimates of future earnings changes to increases and decreases in discretionary dividends,

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D^{*,+}_{it-1} + b_2 \Delta D^{*,-}_{it-1} + b_3 FE_{it-1}/B_{it-2} + b_4 (E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \tag{6}$$

where $\Delta D^{*,+}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} > 0$ and $\Delta D^{*,+}_{it} = 0$ otherwise, and $\Delta D^{*,-}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} < 0$ and $\Delta D^{*,-}_{it} = 0$ otherwise. E_{it} denotes earnings in for firm i in year t, and B is the book value of common equity. Foregone earnings FE_{it} (defined in equation (5)) is $\rho_{it} \Delta D_{it}$ where ρ_{it} equals the estimated (going-in) cap rate in the private equity real estate market. ROE is defined as net income divided by book equity. Case 1 reports estimates of sub-sample of firms with high asset growth and positive rent growth. Case 2 reports estimates of sub-sample of firms with high asset growth and negative rent growth. Case 3 reports estimates of sub-sample of firms with low asset growth and positive rent growth. Case 4 reports estimates of sub-sample of firms with low asset and negative rent growth. A firm's asset growth as percentage change in total assets. We measure rent growth as annual change in market lease rates between the 4th quarter of the current year and the 4th quarter of the previous year. Market lease rates are estimated using property value trends from the NCREIF database as net operating income (NOI) for properties that are in the NCREIF index at the beginning and end of the respective quarter. We estimate regressions by a pooled regression with clustered standard errors. To reduce the effect of outliers, all the variables have been winsorized at the 1percent and the 99percent of empirical distributions of our main variables. ***, **, * represent the statistical significance at the 1percent, 5percent, and 10percent level, respectively.

Case #1 - High Asset Growth and Positive Rent Growth		**Case #2 - High Asset Growth and Negative Rent Growth**	
Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	4.322***	Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	-0.648
	(1.58)		(2.01)
Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	0.142	Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	0.286
	(0.24)		(0.26)
Foregone Earnings	-0.16	Foregone Earnings	-0.149
	(0.10)		(0.10)
Past Earnings	0.952**	Past Earnings	-0.877**
	-0.379		-0.362
Constant	-0.004	Constant	0.025***
	(0.01)		(0.01)
R-squared	0.23	R-squared	0.09
N	240	N	122
Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	-1.415	Positive Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	2.88
	(2.43)		(5.13)
Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	0.389	Negative Change in Discretionary Dividends, $D_{it} - minimum\ dividend_{it}$	1.984**
	(0.36)		(0.98)
Foregone Earnings	-0.363***	Foregone Earnings	-0.214
	(0.11)		(0.19)
Past Earnings	0.201	Past Earnings	-0.051
	-0.73		-1.085
Constant	-0.006	Constant	-0.012
	(0.01)		(0.02)
R-squared	0.11	R-squared	0.06
N	231	N	104

Table 5. A "Counterfactual Look" at REIT Dividend Changes and Future Profitability (REOC Sample with Target Payout Model)

This table reports estimates of future earnings changes to unexpected dividend increases and decreases estimated by REOC counterfactual analysis with Target Payout Model. For each REIT, we decompose the dividends for each REIT into two components (see equation (10)):

$$D_{it} - minimum\ dividend_{it} = (D_{it} - D_{it}^{e}) + (D_{it}^{e} - minimum\ dividend_{it}) \qquad (10)$$

where $D_{it} - D_{it}^{e}$, is the deviation of the actual dividend, D_{it}, from expected dividend, D_{it}^{e}. D_{it}^{e} is the expected REIT dividend based on the Lintner (1956) model estimated from the REOC sample. $D_{it}^{e} - minimum\ dividend_{it}$, is the deviation of the expected dividend, D_{it}^{e}, from the minimum dividend payment that the REIT must make to avoid paying corporate taxes. To examine the estimates of future earnings changes to unexpected dividend increases and decreases (defined above), the model estimated is:

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1 \Delta D_{it-1}^{u,+} + b_2 \Delta D_{it-1}^{u,-} + b_3 \Delta D_{it-1}^{n} + b_4\, FE_{it-1}/B_{it-2} + b_5\,(E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \qquad (11)$$

where $\Delta D_{it}^{u,+} = \Delta(D_{it} - D_{it}^{e})$ if $\Delta(D_{it} - D_{it}^{e}) > 0$ and $\Delta D_{it}^{u,+} = 0$ otherwise, and $\Delta D_{it}^{u,-} = \Delta(D_{it} - D_{it}^{e})$ if $\Delta(D_{it} - D_{it}^{e}) < 0$ and $\Delta D_{it}^{u,-} = 0$ otherwise. $\Delta D_{it}^{n} = \Delta(D_{it}^{e} - minimum\ dividend_{it})$. E_{it} denotes earnings in for firm i in year t, and B is the book value of common equity. Foregone earnings FE_{it} (defined in equation (5)) is $\rho_{it}\Delta D_{it}$ where ρ_{it} equals the estimated (going-in) cap rate in the private equity real estate market. ROE is defined as net income divided by book equity. Case 1 reports estimates of sub-sample of firms with high asset growth and positive rent growth. Case 2 reports estimates of sub-sample of firms with high asset growth and negative rent growth. Case 3 reports estimates of sub-sample of firms with low asset growth and positive rent growth. Case 4 reports estimates of sub-sample of firms with low asset and negative rent growth. A firm's asset growth as percentage change in total assets. We measure rent growth as annual change in market lease rates between the 4th quarter of the current year and the 4th quarter of the previous year. Market lease rates are estimated using property value trends from the NCREIF database as net operating income (NOI) for properties that are in the NCREIF index at the beginning and end of the respective quarter. We estimate regressions by a pooled regression with clustered standard errors. To reduce the effect of outliers, all the variables have been winsorized at the 1percent and the 99percent of empirical distributions of our main variables. ***, **, * represent the statistical significance at the 1percent, 5percent, and 10percent level, respectively.

Case #1 - High Asset Growth and Positive Rent Growth		**Case #2 - High Asset Growth and Negative Rent Growth**	
Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	1.083***	Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	0.887
	(0.25)		(0.57)
Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.359**	Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.312
	(0.16)		(0.32)
Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.341**	Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.446
	(0.16)		(0.40)
Foregone Earnings	1.252***	Foregone Earnings	-0.952**
	(0.42)		(0.38)
Past Earnings	-0.170**	Past Earnings	-0.168*
	(0.08)		(0.10)
Constant	-0.006	Constant	0.016**
	(0.01)		(0.01)
R-squared	0.24	R-squared	0.11
N	240	N	122

Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	0.566	Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	0.756
	(0.42)		(1.37)
Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.516	Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.349
	(0.34)		(1.02)
Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.51	Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	-0.045
	(0.41)		(1.18)
Foregone Earnings	0.054	Foregone Earnings	-0.126
	(0.72)		(1.07)
Past Earnings	-0.357***	Past Earnings	-0.163
	(0.13)		(0.19)
Constant	-0.005	Constant	-0.014
	(0.01)		(0.02)
R-squared	0.12	R-squared	0.11
N	231	N	104

Table 6. A "Counterfactual Look" at REIT Dividend Changes and Future Profitability (REOC Sample with Propensity Score Matching)

This table reports estimates of future earnings changes to unexpected dividend increases and decreases estimated by REOC counterfactual analysis with Propensity Score Matching. For each REIT, we decompose the dividends for each REIT into two components (see equation (10)):

$$D_{it} - minimum\ dividend_{it} = (D_{it} - D_{it}^e) + (D_{it}^e - minimum\ dividend_{it}) \qquad (10)$$

where $D_{it} - D_{it}^e$, is the deviation of the actual dividend, D_{it}, from expected dividend, D_{it}^e. D_{it}^e is expected REIT dividend, computed as REIT's EBITDA per share multiplied by the REOC's payout ratio (total dividends-to-EBITDA ratio) from the matched REOC sample. The matched REOC sample is obtained by propensity score matching and the propensity score is estimated using EBITDA-to-book ratio and the logarithm of market size. $D_{it}^e - minimum\ dividend_{it}$, is the deviation of the expected dividend, D_{it}^e, from the minimum dividend payment that the REIT must make to avoid paying corporate taxes. To examine the estimates of future earnings changes to unexpected dividend increases and decreases (defined above), the model estimated is:

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1\Delta D_{it-1}^{u,+} + b_2\Delta D_{it-1}^{u,-} + b_2\Delta D_{it-1}^{n} + b_3\, FE_{it-1}/B_{it-2} + b_4\,(E_{it-1} - E_{it-2})/B_{it-2} + \varepsilon_{it} \qquad (11)$$

where $\Delta D_{it}^{u,+} = \Delta(D_{it} - D_{it}^e)$ if $\Delta(D_{it} - D_{it}^e) > 0$ and $\Delta D_{it}^{u,+} = 0$ otherwise, and $\Delta D_{it}^{u,-} = \Delta(D_{it} - D_{it}^e)$ if $\Delta(D_{it} - D_{it}^e) < 0$ and $\Delta D_{it}^{u,-} = 0$ otherwise. $\Delta D_{it}^{n} = \Delta(D_{it}^e - minimum\ dividend_{it})$. E_{it} denotes earnings in for firm i in year t, and B is the book value of common equity. Foregone earnings FE_{it} (defined in equation (5)) is $\rho_{it}\Delta D_{it}$ where ρ_{it} equals the estimated (going-in) cap rate in the private equity real estate market. ROE is defined as net income divided by book equity. Case 1 reports estimates of sub-sample of firms with high asset growth and positive rent growth. Case 2 reports estimates of sub-sample of firms with high asset growth and negative rent growth. Case 3 reports estimates of sub-sample of firms with low asset growth and positive rent growth. Case 4 reports estimates of sub-sample of firms with low asset and negative rent growth. A firm's asset growth as percentage change in total assets. We measure rent growth as annual change in market lease rates between the 4th quarter of the current year and the 4th quarter of the previous year. Market lease rates are estimated using property value trends from the NCREIF database as net operating income (NOI) for properties that are in the NCREIF index at the beginning and end of the respective quarter. We estimate regressions by a pooled regression with clustered standard errors. To reduce the effect of outliers, all the variables have been winsorized at the 1percent and the 99percent of empirical distributions of our main variables. ***, **, * represent the statistical significance at the 1percent, 5percent, and 10percent level, respectively.

Case #1 - High Asset Growth and Positive Rent Growth		**Case #2 - High Asset Growth and Negative Rent Growth**	
Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	1.426***	Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	1.013*
	(0.42)		(0.55)
Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.335	Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.089
	(0.30)		(0.24)
Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.196	Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.468*
	(0.29)		(0.27)
Foregone Earnings	1.337***	Foregone Earnings	-0.991**
	(0.37)		(0.42)
Past Earnings	-0.094	Past Earnings	-0.158
	(0.08)		(0.10)
Constant	-0.009*	Constant	0.014*
	(0.01)		(0.01)
R-squared	0.23	R-squared	0.12
N	240	N	122
Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	0.121	Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	2.031
	(0.69)		(1.45)
Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.692**	Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	2.464*
	(0.34)		(1.30)
Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.403	Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	1.908
	(0.46)		(1.41)
Foregone Earnings	0.11	Foregone Earnings	0.059
	(0.72)		(1.05)
Past Earnings	-0.346***	Past Earnings	-0.188
	(0.12)		(0.19)
Constant	0	Constant	-0.002
	(0.01)		(0.02)
R-squared	0.13	R-squared	0.1
N	231	N	104

Table 7. Further Analyses: Nonlinearity of Earnings

This table reports estimates of future earnings changes to dividend increases and decreases (or unexpected dividend increases and decreases) with nonlinearities of autocorrelation in the relation between future earnings changes and lagged earnings levels and changes. Panel A reports the results based on positive and negative changes in discretionary dividends; discretionary dividends are measured by actual dividend of a REIT minus the expected value of the dividend of a REIT based on minimum dividend (see equation (4)). The model estimated is:

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1\Delta D^{*,+}_{it-1} + b_2\Delta D^{*,-}_{it-1} + b_3\, FE_{it-1}/B_{it-2} + \lambda_1 CE_0 + \lambda_2 NCED_0 \times CE_0 + \lambda_3 NCED_0 \times CE_0^2 + \lambda_4 PCED_0 \times CE_0^2 + \varepsilon_{it} \qquad (6')$$

where $\Delta D^{*,+}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} > 0$ and $\Delta D^{*,+}_{it} = 0$ otherwise, and $\Delta D^{*,-}_{it} = \Delta DD_{it}$ if $\Delta DD_{it} < 0$ and $\Delta D^{*,-}_{it} = 0$ otherwise. E_{it} denotes earnings in for firm i in year t, and B is the book value of common equity. Foregone earnings FE_{it} (defined in equation (5)) is $\rho_{it}\Delta D_{it}$ where ρ_{it} equals the estimated (going-in) cap rate in the private equity real estate market. CE_0 is equal to $(E_{it-1} - E_{it-2})/B_{it-2}$, $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise, and $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. The values λ_2, λ_3, and λ_4 measure nonlinearity in the autocorrelation of changes in REIT profitability. Panel B reports the results based on unexpected dividend increases and decreases estimated by REOC counterfactual analysis with propensity score matching (see Section 7.2 for details). The model estimated is:

$$(E_{it} - E_{it-1})/B_{it-1} = b_0 + b_1\Delta D^{u,+}_{it-1} + b_2\Delta D^{u,-}_{it-1} + b_3\Delta D^{e}_{it-1} + b_4\, FE_{it-1}/B_{it-2} + \lambda_1 CE_0 + \lambda_2 NCED_0 \times CE_0 + \lambda_3 NCED_0 \times CE_0^2 + \lambda_4 PCED_0 \times CE_0^2 + \varepsilon_{it} \qquad (11')$$

where $\Delta D^{u,+}_{it} = \Delta(D_{it} - D^{e}_{it})$ if $\Delta(D_{it} - D^{e}_{it}) > 0$ and $\Delta D^{u,+}_{it} = 0$ otherwise, and $\Delta D^{u,-}_{it} = \Delta(D_{it} - D^{e}_{it})$ if $\Delta(D_{it} - D^{e}_{it}) < 0$ and $\Delta D^{u,-}_{it} = 0$ otherwise. $\Delta D^{n}_{it} = \Delta(D^{e}_{it} - minimum\ dividend_{it})$. Case 1 reports estimates of sub-sample of firms with high asset growth and positive rent growth. Case 2 reports estimates of sub-sample of firms with high asset growth and negative rent growth. Case 3 reports estimates of sub-sample of firms with low asset growth and positive rent growth. Case 4 reports estimates of sub-sample of firms with low asset and negative rent growth. A firm's asset growth as percentage change in total assets. We measure rent growth as annual change in market lease rates between the 4th quarter of the current year and the 4th quarter of the previous year. Market lease rates are estimated using property value trends from the NCREIF database as net operating income (NOI) for properties that are in the NCREIF index at the beginning and end of the respective quarter. We estimate regressions by a pooled regression with clustered standard errors. To reduce the effect of outliers, all the variables have been winsorized at the 1percent and the 99percent of empirical distributions of our main variables. ***, **, * represent the statistical significance at the 1percent, 5percent, and 10percent level, respectively.

Panel A. Discretionary Dividends and Nonlinearity

Case #1 - High Asset Growth and Positive Rent Growth		**Case #2 - High Asset Growth and Negative Rent Growth**	
Positive Change in Discretionary Dividends,	4.175***	Positive Change in Discretionary Dividends,	-0.945
$D_{it} - minimum\ dividend_{it}$	(1.50)	$D_{it} - minimum\ dividend_{it}$	(1.82)
Negative Change in Discretionary Dividends,	0.196	Negative Change in Discretionary Dividends,	0.388
$D_{it} - minimum\ dividend_{it}$	(0.25)	$D_{it} - minimum\ dividend_{it}$	(0.29)
Foregone Earnings	0.696	Foregone Earnings	-0.909**
	(0.45)		(0.37)
Past Earnings, CE_0	-0.658***	Past Earnings, CE_0	0.175
	(0.222)		(0.493)
$NCED_0 \times CE_0$	1.064**	$NCED_0 \times CE_0$	-0.375
	(0.43)		(0.63)
$NCED_0 \times CE_0^2$	2.313**	$NCED_0 \times CE_0^2$	0.533
	(1.14)		(1.66)
$PCED_0 \times CE_0^2$	1.762*	$PCED_0 \times CE_0^2$	-0.937
	(0.98)		(1.79)
Constant	0.012	Constant	0.019**
	(0.01)		(0.01)
R-squared	0.26	R-squared	0.08
N	240	N	122
Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Discretionary Dividends,	-1.043	Positive Change in Discretionary Dividends,	2.781
$D_{it} - minimum\ dividend_{it}$	(2.53)	$D_{it} - minimum\ dividend_{it}$	(4.96)
Negative Change in Discretionary Dividends,	0.387	Negative Change in Discretionary Dividends,	2.236*
$D_{it} - minimum\ dividend_{it}$	(0.35)	$D_{it} - minimum\ dividend_{it}$	(1.19)
Foregone Earnings	0.227	Foregone Earnings	-0.091
	(0.74)		(1.25)
Past Earnings, CE_0	-0.125	Past Earnings, CE_0	-2.230**
	(0.418)		(1.067)
$NCED_0 \times CE_0$	0.092	$NCED_0 \times CE_0$	2.699*
	(0.65)		(1.48)
$NCED_0 \times CE_0^2$	1.348	$NCED_0 \times CE_0^2$	2.904
	(2.20)		(2.46)
$PCED_0 \times CE_0^2$	-1.138	$PCED_0 \times CE_0^2$	13.388**
	(1.24)		(6.41)
Constant	-0.005	Constant	0.009
	(0.01)		(0.02)
R-squared	0.11	R-squared	0.15
N	231	N	104

Panel B. Dividend Surprises and Nonlinearity

Case #1 - High Asset Growth and Positive Rent Growth		Case #2 - High Asset Growth and Negative Rent Growth	
Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	1.474***	Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	1.023*
	(0.47)		(0.57)
Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.203	Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.174
	(0.28)		(0.25)
Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.174	Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.542*
	(0.26)		(0.29)
Foregone Earnings	1.022**	Foregone Earnings	-1.014**
	(0.41)		(0.43)
Past Earnings, CE_0	-0.682***	Past Earnings, CE_0	0.087
	(0.23)		(0.42)
$NCED_0 \times CE_0$	0.969**	$NCED_0 \times CE_0$	-0.317
	(0.42)		(0.57)
$NCED_0 \times CE_0^2$	1.291	$NCED_0 \times CE_0^2$	0.26
	(0.99)		(1.83)
$PCED_0 \times CE_0^2$	1.990*	$PCED_0 \times CE_0^2$	-0.671
	(1.01)		(1.56)
Constant	0.005	Constant	0.01
	(0.01)		(0.01)
R-squared	0.26	R-squared	0.11
N	240	N	122
Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	0.255	Positive Change in Dividend Surprise, $\Delta D_{it}^{u,+}$	2.228
	(0.77)		(1.56)
Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	0.688**	Negative Change in Dividend Surprise, $\Delta D_{it}^{u,-}$	2.800*
	(0.35)		(1.44)
Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	0.458	Change in deviation of the expected dividend from the minimum dividend, ΔD_{it}^{n}	2.356
	(0.45)		(1.59)
Foregone Earnings	0.121	Foregone Earnings	-0.184
	(0.74)		(1.26)
Past Earnings, CE_0	-0.059	Past Earnings, CE_0	-1.891*
	(0.44)		(0.95)
$NCED_0 \times CE_0$	0.02	$NCED_0 \times CE_0$	2.155
	(0.64)		(1.30)
$NCED_0 \times CE_0^2$	1.346	$NCED_0 \times CE_0^2$	2.272
	(2.29)		(2.32)
$PCED_0 \times CE_0^2$	-1.227	$PCED_0 \times CE_0^2$	12.071**
	(1.36)		(5.85)
Constant	-0.001	Constant	0.013
	(0.02)		(0.02)
R-squared	0.13	R-squared	0.18
N	231	N	104

Table 8. Nonlinearity of Earnings and Specially Designated Dividends

This table reports estimates of future earnings changes to different payout components, including total ordinary dividend, taxable income (many missing observations), total capital gain distribution, and return of capital. The model estimated is

$$(E_{it}-E_{it-1})/B_{it-1} = b_0 + b_1\Delta OI^{+}_{it-1} + b_2\Delta OI^{-}_{it-1} + b_3\Delta CG_{it-1} + b_4\Delta ROC_{it-1} + b_5\, FE_{it-1}/B_{it-2} + \lambda_1 CE_0 + \lambda_2 NCED_0 \times CE_0 + \lambda_3 NCED_0 \times CE_0^2 + \lambda_4 PCED_0 \times CE_0^2 + \varepsilon_{it} \qquad (12)$$

where change in total ordinary dividend, $\Delta OI^{+}_{it} = \Delta OI_{it}$ if $\Delta OI_{it} > 0$ and $\Delta OI^{+}_{it} = 0$ otherwise, and $\Delta OI^{-}_{it} = \Delta OI_{it}$ if $\Delta OI_{it} < 0$ and $\Delta OI^{-}_{it} = 0$ otherwise. ΔCG_{it} is change in total capital gain distribution and ΔROC_{it} is change in return of capital. E_{it} denotes earnings in for firm *i* in year *t*, and B is the book value of common equity. Foregone earnings FE_{it} (defined in equation (5)) is $\rho_{it}\Delta D_{it}$ where ρ_{it} equals the estimated (going-in) cap rate in the private equity real estate market. CE_0 is equal to $(E_{it-1} - E_{it-2})/B_{it-2}$, $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise, and $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. The values λ_2, λ_3, and λ_4 measure nonlinearity in the autocorrelation of changes in REIT profitability. Case 1 reports estimates of sub-sample of firms with high asset growth and positive rent growth. Case 2 reports estimates of sub-sample of firms with high asset growth and negative rent growth. Case 3 reports estimates of sub-sample of firms with low asset growth and positive rent growth. Case 4 reports estimates of sub-sample of firms with low asset and negative rent growth. A firm's asset growth as percentage change in total assets. We measure rent growth as annual change in market lease rates between the 4th quarter of the current year and the 4th quarter of the previous year. Market lease rates are estimated using property value trends from the NCREIF database as net operating income (NOI) for properties that are in the NCREIF index at the beginning and end of the respective quarter. We estimate regressions by a pooled regression with clustered standard errors. To reduce the effect of outliers, all the variables have been winsorized at the 1percent and the 99percent of empirical distributions of our main variables. ***, **, * represent the statistical significance at the 1percent, 5percent, and 10percent level, respectively.

Case #1 - High Asset Growth and Positive Rent Growth		**Case #2 - High Asset Growth and Negative Rent Growth**	
Positive Change in Ordinary Dividends	0.837***	Positive Change in Dividend surprise,	0.22
	(0.25)		(0.34)
Negative Change in Ordinary Dividends	-0.137	Negative Change in Dividend surprise,	-0.276
	(0.22)		(0.25)
Change in Total Capital Gain	0.459	Change in Total Capital Gain	1.652***
	(1.03)		(0.57)
Change in Return of Capital	0.780***	Change in Return of Capital	0.391
	(0.20)		(0.32)
Foregone Earnings	1.049**	Foregone Earnings	-1.239***
	(0.45)		(0.38)
Past Earnings, CE_0	-0.805***	Past Earnings, CE_0	0.009
	(0.25)		(0.39)
$NCED_0 \times CE_0$	1.133**	$NCED_0 \times CE_0$	-0.188
	(0.48)		(0.53)
$NCED_0 \times CE_0^2$	1.973	$NCED_0 \times CE_0^2$	0.644
	(1.23)		(1.59)
$PCED_0 \times CE_0^2$	2.168*	$PCED_0 \times CE_0^2$	-0.442
	(1.18)		(1.51)
Constant	0.009	Constant	0.018*
	(0.01)		(0.01)
R-squared	0.27	R-squared	0.11
N	240	N	122
Case #3 - Low Asset Growth and Positive Rent Growth		**Case #4 - Low Asset Growth and Negative Rent Growth**	
Positive Change in Ordinary Dividends	0.127	Positive Change in Dividend surprise,	-0.592
	(0.56)		(0.49)
Negative Change in Ordinary Dividends	0.351	Negative Change in Dividend surprise,	1.023***
	(0.48)		(0.38)
Change in Total Capital Gain	-2.187**	Change in Total Capital Gain	1.089
	(1.10)		(1.57)
Change in Return of Capital	0.736**	Change in Return of Capital	2.049
	(0.36)		(1.26)
Foregone Earnings	0	Foregone Earnings	-0.138
	(0.65)		(1.43)
Past Earnings, CE_0	0.02	Past Earnings, CE_0	-1.753*
	(0.41)		(1.00)
$NCED_0 \times CE_0$	-0.136	$NCED_0 \times CE_0$	1.96
	(0.63)		(1.31)
$NCED_0 \times CE_0^2$	1.025	$NCED_0 \times CE_0^2$	2.12
	(2.14)		(2.25)
$PCED_0 \times CE_0^2$	-1.246	$PCED_0 \times CE_0^2$	10.888*
	(1.28)		(5.89)
Constant	-0.003	Constant	0.022
	(0.01)		(0.02)
R-squared	0.18	R-squared	0.18
N	231	N	104

Appendix

Table A1. Summary Statistics of Dividend Surprises

The table reports the taxable income and different measures of dividend change for our REIT sample from 2000 to 2013. In Panel A, Taxable Income (obtained from Form 1099-DIV) is computed as the sum of ordinary dividend and total capital gain. Dividends are measured as: (i) total ordinary dividends, (ii) discretionary dividend (= 0.1*(ordinary dividend + total capital gain) + return of capital), (iii) total dividends (= ordinary dividend + total capital gain + return of capital). In Panel B, discretionary dividend is measured by actual dividend of a REIT minus the expected value of the dividend of a REIT based on minimum dividend (see also equation (3)). In Panels C and D, positive dividend surprise is measured by actual dividend of a REIT minus the expected value of the dividend based on expected dividends obtained from REOC counterfactual analysis (see also equation (10)). For the REOC counterfactual analysis (with Lintner's model or propensity score matching), $(D_{it} - D_{it}^e)$ and $(D_{it}^e - minimum\ dividend_{it})$ are defined in equation (10). As shown in equation (10), the dividends for each REIT are decomposed into two components: $D_{it} - D_{it}^e$, is the deviation of the actual dividend, D_{it}, from the counterfactual dividend, D_{it}^e; $D_{it}^e - minimum\ dividend_{it}$, is the deviation of the counterfactual dividend, D_{it}^e, from the minimum dividend payment that the REIT must make to avoid paying corporate taxes.

Panel A. Level of Taxable Income and Dividends	Obs	Mean	Median	Std. Dev.	Min	Max
Taxable Income (1099 Form) = (ordinary dividend + total capital gain)	803	1.1093	1.2510	1.45062	0.0000	10.7463
Discretionary Dividends	803	0.1444	0.1342	0.1130	0.0009	1.4853
Total Ordinary Dividends	803	1.0876	0.9984	0.7765	0.0000	4.4000
Total Dividends	803	1.1427	1.0677	0.7540	0.0070	4.4000
Dividend Surprise based on REOC Analysis with Lintner's Model: $(D_{it} - D_{it}^e)$	799	0.2274	0.2162	0.4610	-3.2281	2.3838
Deviation of the expected dividend (Lintner^' s Model)from the minimum dividend: $(D_{it}^e - minimum\ dividend_{it})$	799	-0.0827	-0.0888	0.4180	-2.1408	3.2400
Dividend Surprise based on REOC Analysis with Propensity Score Matching: $(D_{it} - D_{it}^e)$	1336	1.1452		0.8583	-8.0135	5.4859
Deviation of the expected dividend (Propensity Score)from the minimum dividend: $(D_{it}^e - minimum\ dividend_{it})$	1336	-0.9558		0.7966	-4.7326	8.3067

Panel B. Change in Discretionary Dividends (Tables 3, 4, and 7)	Obs	Mean	Median	Std. Dev	Min	Max
Positive Change in Discretionary Dividend	799	0.0016	0.0000	0.0048	0.0000	0.0372
Negative Change in Discretionary Dividend	799	-0.0070	-0.0001	0.0211	-0.1406	0.0000
number of positive change	376					
number of negative change	415					

Panel C. Change in Dividend Surprises, based on REOC Analysis with Lintner's Model (Table 5)	Obs	Mean	Median	Std. Dev	Min	Max
Positive Change in Dividend surprise	799	-0.0235	0.0000	0.0716	-0.3333	0.1641
Negative Change in Dividend surprise	799	0.0117	-0.0077	0.0255	0.0000	0.1641
Deviation of the expected dividend from the minimum dividend	799	-0.0351	0.0067	0.0604	-0.3333	0.0000
number of positive change	320					
number of negative change	479					

Panel D. Change in Dividend Surprises, based on REOC Analysis with Propensity Score Matching (Tables 6 and 7))	Obs	Mean	Median	Std. Dev	Min	Max
Positive Change in Dividend surprise	796	0.0088	0.0000	0.0193	0.0000	0.1259
Negative Change in Dividend surprise	796	-0.0165	-0.0022	0.0310	-0.1784	0.0000
Deviation of the expected dividend from the minimum dividend	796	0.0025	0.0005	0.0376	-0.1582	0.1605
number of positive change	349					
number of negative change	439					