Do Dividends Convey Information About Future Earnings?[*]

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Abstract

In contrast to the literature's current consensus, we show that dividends contain highly persistent information about future earnings levels. Using an "event window" approach that compares earnings after dividend changes to those before, we find dividend changes predict unexpected future earnings for horizons up to three years. The attenuation in earnings information noted by prior studies disappears after controlling for (i) endogenous investment and asset write-downs accompanying dividend changes and (ii) the non-linear relation between dividend changes and market reactions. Our results suggest the market reaction to dividend change announcements reflects, at least in part, new information about future earnings.

1. Introduction

Dividend changes clearly convey value-relevant information to investors; many studies document substantial market reactions to their announcement.[1] But what information do they convey? Miller and Modigliani (1961) suggest that market prices may respond to dividend announcements because investors infer managers' private information about future earnings. This seems consistent with how managers think about dividend policy. For example, Brav et al. (2005) report that in their survey of CFOs "almost every executive volunteered that [payout] conveys managements' confidence in the future."[2] Yet, in their extensive reviews of the literature, DeAngelo et al. (2009) conclude that "Researchers have struggled to find evidence that dividend increases are reliable signals of future earnings increases" (p. 185) and Kalay and Lemmon (2011) state "In short, there is little evidence that changes in dividends predict future changes in earnings" (p. 43). In this paper, we make several important corrections in the measurement of the information content of dividends and show that in fact dividend changes do contain information about future earnings.

In particular, we ask two related questions: Do dividend changes contain new information about future earnings? And if so, how persistent is this information? In contrast to the current consensus, we provide robust evidence that dividends contain highly persistent information about the future level of earnings. A few key elements of our empirical design drive the difference between our conclusions and those of prior studies.

First, we use an "event window" approach to cleanly delineate past and future earnings reports, relative to the time of the dividend announcement. Second, we use alternate definitions of earnings to account for the fact that dividend changes are often associated with changes in

[1] See, for example, Pettit (1972); Aharony and Swary (1980), among others.
[2] Eighty percent of respondents indicated dividends convey information about "our company" to investors, and two-thirds believe dividend changes convey information about sustainable changes in earnings.

investment spending in the same direction, as well as large, but short-lived, asset write-downs, both of which create a wedge between accounting net earnings and true economic profitability. Third, we control for the impact of large outliers and the non-linear relation between the size of the dividend change and the market reaction.

Our "event window" approach compares earnings announced after the dividend change to earnings in the comparable period before the dividend change. This contrasts with the "fiscal year" approach used in prior studies, which groups dividends and earnings into fiscal years and compares earnings in the fiscal year containing the dividend change to earnings in the following fiscal year (as well as, in some cases, comparing earnings in fiscal year t+1 to those in t+2). When we apply our "event window" approach, we find dividend changes predict future earnings changes for at least three years after the dividend change. These results are robust to several proxies for expected earnings, including linear and non-linear functions of past earnings levels, earnings changes, and stock returns (Grullon et al., 2005), a matched sample of non-changers (Benartzi et al., 1997), and analyst earnings forecasts. Importantly, our evidence from analyst revisions after dividend changes suggests analysts do seem to infer earnings information from dividend announcements. When we apply the fiscal year approach to our same sample and set of controls for expected earnings, we find no evidence of dividend information content. Because any earnings yet to be announced at the time of the dividend change are at least partly unknown to investors, we argue that inference about information content should use an empirical measure of "future" that includes all unannounced earnings realizations.[3]

While the predictability we document persists for at least three years after the dividend change, the magnitude of the relation between dividend changes and future earnings is strongest

[3] We are not the first to use quarterly data to examine the information content of dividends. However, prior studies using this approach find at best earnings information that dissipates after the first one to three quarters after the dividend change (e.g., Aharony and Dotan, 1994; Carroll, 1995; Lie, 2005a).

in the first year following the dividend change and attenuates by about 30% at longer horizons. The attenuation can explain why the "fiscal year" and "event window" methodologies yield different conclusions. Under the fiscal year approach, earnings announced after the dividend declaration, but before the end of the fiscal year, serve as the baseline for comparison with future years. Because these earnings tend to exhibit the greatest dividend information content, fiscal year studies have implicitly required dividend increasing (decreasing) firms to have persistently higher (lower) earnings *growth* to detect information content. However, both informal descriptions of the information content hypothesis (e.g. Linnter, 1956; Miller and Modigliani, 1961) as well as more formal signaling models (Bhattacharya, 1979; Miller and Rock, 1985) envision the dividend decision as conveying information about the expected *level* of future earnings.[4] We argue that this is better captured by a comparison of post-dividend announcement earnings to pre-dividend earnings.

The attenuation is somewhat surprising if managers and investors view dividend increases as a "permanent" commitment to maintain the new dividend level (Lintner, 1956; Brav et al., 2005). We identify two key factors that account for this apparent attenuation. The first is that income before extraordinary items, the accounting variable traditionally used to measure changes in earnings, incorporates endogenous investment and asset write-down responses to the changes in profitability surrounding dividend changes. When we use earnings measures that are less affected by investment and write-downs, namely gross profit or operating cash flow (Novy-Marx, 2013; Peters and Taylor, 2017), we find the attenuation in information content for both

[4] For example, in Bhattacharya (1979) and John and Williams (1985), the dividend acts as a signal of the mean of the future profits from a current investment; in Miller and Rock (1985), the expected value of the next year's earnings shock is a linear function of the current year's, which is fully revealed by the dividend.

dividend increases and cuts completely disappears.[5] We examine individual line items to show that investments that are expensed immediately (e.g., R&D) and asset write-downs both contribute to the attenuation in information content observed using net income. Firms increase (scale back) investment, some of which is expensed, following dividend increases (cuts). We show the attenuating effect on earnings grows with the horizon. At the same time, write-downs spike (decline) following dividend cuts (increases), but this effect is only short lived. Focusing on gross profits thus gives a clearer picture of changes in economic profitability.

Finally, we show the presence of a small number of very large dividend increases that differ from the vast majority of dividend changes affects the measured persistence. As prior studies have documented, the market reaction to dividend announcements is a non-linear function of the dividend change (Baker et al., 2015). In particular, while the announcement return increases with the size of a dividend increase, this relation flattens out for the small number of very large increases in our sample. This suggests that investors may infer less information about future earnings from these outliers. Indeed, we find that very large increases are more often made by firms with more volatile payout policies and that the dividend changes themselves are significantly less persistent than more moderate increases.

We adjust our measure of dividend news in two ways to allow for a non-linear relation between dividend news and the size of the dividend change. First, we percentile rank the dividend changes. Second, we use a predicted market return, based on the empirical relation between announcement returns and the sign and magnitude of the dividend change. After accounting for the impact of outliers in this way, we find even more persistent information content at all horizons using both net income and gross profit to measure unexpected earnings.

[5] Novy-Marx (2013) argues that gross profit, not net income, is "the cleanest accounting measure of true economic profitability."

In particular, using gross profit we now find substantial growth in information content across the horizon for both dividend increases and decreases.

Finally, we compare the earnings information content of dividends to that of share repurchases. Survey and empirical evidence suggests that managers view repurchases as a more flexible alternative to dividends and are therefore more likely to use repurchases to pay out temporary increases in cash flow, while only increasing dividends in response to more permanent increases (Brav et al., 2005). Consistent with this intuition, we find that announcements of share repurchase programs are significantly positively related to unexpected earnings in the year after the announcement, but are unrelated to earnings beyond one year in the future. By contrast, when we include both dividend changes and share repurchases in the same regression, we find that dividend changes are positively related to unexpected earnings throughout the three year horizon.

We make several contributions. First, we show that once we clearly delineate between past and future earnings utilizing an "event window" approach, there is strong evidence that dividend increases predict unexpected earnings well into the future. These findings contrast with the current consensus that there is little empirical support for the information content hypothesis for dividends (see, for example, reviews by Allen and Michaely (2003), DeAngelo et al. (2009) and Kalay and Lemmon (2011)). While other factors may also be relevant, our findings are consistent with the market reaction to dividend change announcements reflecting information about future earnings that investors infer from the change in dividends, consistent with survey evidence (Lintner, 1956; Brav et al., 2005) and the conjecture of early theorists (Miller and Modigliani, 1961).

Second, we explain the attenuation in information content noted in earlier studies as a function of the accounting system's tendency to incorporate investment and asset write-downs in

earnings. While many studies demonstrate that firms adjust their operations in response to negative news, such as the news that precipitates a dividend decrease, we are the first to show this confounds attempts to estimate the persistence of earnings information content using net income. We argue other studies seeking to understand the horizon of economic income associated with disclosure should consider using gross profit to reduce some of the noise in earnings (Basu, 1997; Novy-Marx, 2013; Peters and Taylor, 2017).

Third, while both empirical and survey results suggest firms that increase their dividend implicitly commit to maintain the new level, we show this assumption is less descriptive of extremely large increases. Moreover, the market discounts large changes (Baker et al., 2015), suggesting investors seem to understand the degree of commitment to the new dividend varies with the magnitude of the change. We demonstrate that using a measure of dividend news consistent with market reactions, rather than a linear function of the percentage change, increases the measured persistence of dividend information content.

2. Related literature and hypothesis development

Miller and Modigliani (1961) argue that investors react to dividend changes because they infer some of managers' information about future earnings expectations from the change in payout commitments.[6] This idea has been formalized in a number of dividend signaling models (e.g., Bhattacharya, 1979; Miller and Rock, 1985; John and Williams, 1985). Dividend signaling models, or the information content hypothesis more generally, have several testable implications.

[6] We note that other (non-mutually exclusive) explanations have been offered for the price reaction to dividend changes. Following Easterbrook (1984) and Jensen (1986), higher dividends may reduce the free cash flow subject to managerial discretion, thereby increasing the fraction of future earnings captured by investors. Alternatively, Grullon et al. (2002) suggest that dividend increases reflect a reduction in risk, and therefore a lower discount rate, as firms mature. Given our focus on the earnings information content of dividends, we refer the reader to excellent reviews by Allen and Michaely (2003), DeAngelo et al. (2009), and Kalay and Lemmon (2011) for fuller treatments of these alternate views.

First, if dividend decisions are a function of managers' private information about current and future earnings, dividend increases (decreases) should be followed by higher (lower) unexpected earnings realizations. Second, if investors recognize the earnings news reflected in dividend announcements, dividend changes should be greeted by price changes in the same direction. Related, investors should update their expectations about future earnings following announced dividend changes.

A lengthy literature tests whether dividends contain information about unexpected future earnings changes. While a few studies support the information content view of dividends (Ofer and Siegel, 1987; Aharony and Dotan, 1994; Yoon and Starks, 1995; Nissim and Ziv, 2001), most large sample empirical studies argue dividend changes contain little or no information about future earnings (Watts, 1973; Gonedes, 1978; Penman, 1983; Lang and Litzenberg, 1989; DeAngelo et al., 1996; Benartzi et al., 1997; Grullon et al., 2002; Grullon et al., 2005).[7] Recent review papers (Allen and Michaely, 2003; DeAngelo et al., 2009; Kalay and Lemmon, 2011) characterize this latter view as the current consensus.

One research design choice has a dramatic influence on whether a study confirms or rejects the information content hypothesis, namely whether the study computes earnings changes using an event window approach or over fiscal years. In the event window methodology, earnings announced after the dividend declaration are compared to earnings in the comparable period just prior to the dividend declaration. In the fiscal year methodology, dividend changes are aggregated over a fiscal year. These studies then compute earnings changes by comparing earnings in the fiscal year following the dividend declaration to earnings in the year in which the firm declared the dividend change. Almost all of the studies employing the "fiscal year"

[7] We exclude studies from our review that use a small subset of dividend paying stocks, such as Brickley (1983), which studies earnings changes for thirty-five firms that change their dividend. We also exclude studies examining dividend omissions and dividend initiations.

approach do not support the information content hypothesis.[8] Perhaps the most comprehensive of these studies is Benartzi et al. (1997), who show that dividend changes are highly correlated with earnings in the current or past fiscal years. However, dividend increases are uncorrelated with earnings growth in the subsequent fiscal years, while dividend cuts are actually followed by earnings increases.[9]

One study with results that support the information content hypothesis and have not been challenged is Aharony and Dotan (1994), which uses an event window methodology and shows only short-lived information content. Such short-term information content is hard to reconcile with the perceived long-term commitment of a dividend change (Lintner, 1956; Brav et al., 2005). We offer methodological refinements, which we argue allow us to better capture how market participants would update their expectations of future earnings in response to the dividend change. These refinements affect inference, as we find evidence of long-horizon information content. Aharony and Dotan (1994) use a regression approach and show positive information content for only two quarters after the dividend change and negative information content in the fourth quarter. We expand on their methodology in two ways: first, we compute changes in unexpected earnings using pre-dividend earnings and return information, whereas at longer horizons Aharony and Dotan (1994) do not. Second, we include extensive controls for pre-dividend declaration earnings and returns, which allows us to isolate the unexpected information content in the dividend change. Third, while Aharony and Dotan examine only the

[8] Specifically, seven studies find no information content (Watts, 1973; Gonedes, 1978; Penman, 1983; DeAngelo et al., 1996; Benartzi et al., 1997; Grullon et al., 2002; Grullon et al., 2005), while only Nissim and Ziv (2001) find supportive evidence. Several of these studies consider dividend changes in the first quarter of the subsequent fiscal year as part of the prior fiscal year's earnings.

[9] While Nissim and Ziv (2001) challenge these results, Grullon et al. (2005) show Nissim and Ziv's findings are highly sensitive to the manner of controlling for mean reversion.

first year after the dividend change, we focus on the long-term persistence of the earnings information and uncover the sources of the perceived attenuation of the information content.

Although our methodology is somewhat different, there is a prior literature examining the association between analysts' forecast revisions and dividend changes.[10] In contrast to studies examining information content using actual earnings changes, where the fiscal year approach is the norm, the studies investigating analyst revisions all use an event window methodology. Three of the four studies find statistically significant evidence that analysts revise their forecasts in the same direction as dividend changes (Ofer and Siegel, 1987; Dennis et al., 1994; Yoon and Starks, 1995), while one does not (Lang and Litzenberg, 1989). However, all these studies use summary files, which offer only approximate information about the timing of forecast revisions. As a result, these studies cannot rule out the possibility that the revision was driven by (i) a concurrent earnings release, or (ii) information released before the dividend declaration (Allen and Michaely, 2003; DeAngelo et al., 2009). By using the I/B/E/S detail file, we are able to ensure that we compare only forecasts made after the previous earnings release but before the dividend change to forecasts made between the dividend change and the next earnings release. Further, we remove the impact of biases associated with slow updating, by including controls for lagged returns and lagged forecast errors (Lys and Sohn, 1990; Abarbanell and Bernard, 1992).

3. Sample selection and descriptive statistics

We obtain data on dividend declarations from the CRSP events database. We first select all ordinary quarterly dividend declarations (distribution code 1232) over the period 1972 – 2015

[10] Ofer and Siegel (1987) is the only study of which we are aware to test for dividend information content by predicting errors in the pre-dividend consensus.

for which the firm made a previous quarterly dividend declaration in the past 180 days.[11] This allows us to compute the percentage dividend change. We limit the sample to: (i) firms listed on the NYSE, AMEX, or Nasdaq exchanges, (ii) ordinary common stocks (i.e., those with share code 10 or 11), and (iii) non-financial firms (we exclude firms with a four digit SIC beginning with six). We also exclude: (i) dividend declarations for which the firm declared a distribution other than a quarterly dividend between the declaration dates of the current and prior quarterly dividend to focus our analysis on the information content of quarterly dividends (Benartzi et al., 1997; Nissim and Ziv, 2001), and (ii) firms that split their shares between the month of the prior dividend declaration and the month of the current dividend declaration, as splits are correlated with dividend changes and also convey information about future earnings (Nayak and Prabhala, 2001; Ikenberry and Ramnath, 2002). We require data on CRSP to compute past returns. We require earnings data from the CRSP/Compustat Merged database for the eight quarters before the dividend declaration to construct controls for expected earnings changes (Fama and French, 2000). Tests of one (two, three) year ahead earnings information content of dividends require earnings realizations for four (eight, twelve) consecutive quarters after the dividend declaration. We also require non-missing earnings announcement dates before and after the declaration to identify the earnings information available to market participants. We winsorize all non-return continuous variables at the top and bottom one percent to mitigate the influence of outliers, except the percentage dividend change for which we set all dividend increases larger than 200% to 200%.[12]

[11] The first year earnings announcements were available on Compustat is 1972.

[12] Several dividend increase observations are extremely large in percentage terms. To mitigate their influence we winsorize the percentage dividend change at +200%. We do not winsorize dividend decreases because they are bounded at -100% and dividend decrease observations comprise just over 1% of the sample. We winsorize all variables involving earnings at the top and bottom one percent for two reasons: (i) the distribution of changes in earnings values is highly kurtotic and skewed so extreme values account for much of the variance in earnings

Table 1 presents descriptive statistics for our sample. 85% of dividend declarations maintain the prior dividend level, while 14% (1%) increase (decrease) the dividend. Although dividend decreases are less frequent, they tend to be larger. The average decrease reduces the dividend by 49.2% while the average increase raises the dividend by 18.8%. The average decrease has an announcement window return of -3.3%, compared to 0.9% for the average increase, suggesting a greater reaction to dividend decreases. The positive association between the dividend change and announcement returns suggests that investors update their valuation of the firm in response to the dividend change. Declarations that change the dividend tend to be preceded by returns of the same sign as the dividend change, suggesting at least some of the information affecting the decision to change the dividend was released to the market before the dividend declaration.

Examining earnings realizations, we find firms that decrease the dividend have lower earnings the year after the dividend decrease than before. We also find firms that decrease the dividend have lower earnings after the dividend declaration than firms that do not change the dividend or increase it. We find firms that increase the dividend have higher earnings the year after the dividend declaration than before and greater earnings growth than firms that do not change the dividend. The goal of our first set of empirical tests is to identify the portion of the post-dividend declaration earnings change that is unexpected at the time of the dividend change, and is thus forecasted by the dividend change.

4. Do dividend changes predict future earnings changes?

changes (Gerakos and Gramecy, 2014), and (ii) large changes in accounting income have little relation with economic income (Freemen and Tse, 1992).

In this section, we test whether dividend changes have information content about future earnings by regressing future earnings changes on the dividend change (our variable of interest) and controls for expected changes in earnings. The central difference between our methodology and the prior literature is that we compute future earnings changes comparing earnings realized after the dividend change to earnings realized before the dividend change ("event window approach"). Most prior studies predict earnings changes between fiscal years t+1 and t, using dividend changes within year t (Watts, 1973; Gonedes, 1979; Benartzi et al., 1997; Nissim and Ziv, 2001; Grullon et al., 2005). The fiscal year approach includes both pre- and post-dividend change earnings from year t. As a result, current year earnings will include some realizations unknown to investors at the time of the dividend change. Modeling earnings expectations at all horizons using pre-dividend information allows us to sketch out the relation between dividend changes and future unexpected earnings at various horizons. Because market participants will update expectations of any earnings realizations which have not been reported, the fiscal year approach could falsely reject the hypothesis that dividends have information content about future earnings.

We present two main findings: first, we show using an event window approach that dividends have information content about future earnings up to at least three years into the future. Second, we show the fiscal year approach rejects earnings information content of dividends because it does not classify all earnings realized after the dividend change as future earnings.

4.1. Event window tests for the information content of dividends

In our main empirical specification, we regress earnings changes on the percentage dividend change (ΔDIV) and a series of control variables.

$$\Delta E_{it+n} = \beta_0 + \beta_1 \Delta DIV_{it} + \Sigma \beta_j Controls + \varepsilon \quad (1)$$

ΔE is the change in earnings using income before extraordinary items (*IBQ*) from the CRSP/Compustat Merged quarterly file. All earnings changes are computed as the difference between the sums of the four quarterly earnings announced before the dividend change and four consecutive quarterly earnings after the dividend change. We compute earnings changes over the one, two and three years after the dividend change to provide evidence on the persistence of the dividend information content. The first (second, third) year's earnings changes begin with the first (fifth, ninth) quarter after the dividend change. We scale by the market value of equity one year before the dividend announcement, similar to Benartzi et al. (1997). Refer to Figure 1, Panel A for a more detailed description of the earnings change calculations and a visual depiction of the timing of earnings realizations relative to dividend changes. If a dividend declaration occurs the day of an earnings announcement, we classify the earnings announced at the time of the dividend change as the prior quarter's earnings. We cluster all standard errors by the year of the dividend declaration unless otherwise noted.

In all specifications, we include controls for earnings changes that would have been expected in the absence of the dividend change. Specifically, we include as independent variables the four past quarterly earnings changes, four past earnings levels, non-linear functions of past annual earnings changes and levels (Fama and French, 2000; Grullon et al., 2005),[13] as well as five variables capturing returns over the 240 trading days before the dividend

[13] The past earnings level (earnings change) is the sum of the four quarterly earnings levels (earnings changes) before the dividend announcement. Specifically, we include a total of six variables, three each for the earnings change and level: (i) an interaction between the variable and an indicator equal to one if the variable is negative, (ii) an interaction between a positive indicator and the variable squared, and (iii) an interaction between a negative indicator and the variable squared. We exclude the main effect because it will be multi-collinear with our four quarterly earnings change and levels variables. In unreported analysis, results are similar when including non-linear controls for each quarterly change and level.

announcement because returns impound information about future earnings (Ball and Brown, 1968).

We present the results from estimating equation (1) using the event window approach in Table 2, Panel A. The dependent variable in column (1) is the change in earnings the first year after the dividend change ($\Delta E_{(y+1)}$). We find a highly significant coefficient on the dividend change (β=0.025; t=5.1). The coefficient magnitude suggests the average dividend change of 20% corresponds to an increase in expected earnings equal to 0.5% of the market value of equity of the firm over the one year period after the dividend change. Because the average dividend paying firm in our sample trades at a forward earnings to price ratio of 9.4%, our regression estimates suggest dividend changes have economically meaningful information about future earnings.

In column (2), we estimate equation (1) using the second year after the dividend change as the dependent variable ($\Delta E_{(y+2)}$), to provide evidence on the persistence of the future earnings forecasted by the dividend change. We again find a highly significant coefficient on the dividend change (β=0.018; t=3.2). Approximately 70% of the year one earnings change forecasted by the dividend change persists.[14] In column (3), we show that for the horizon three years ahead, dividends contain a similar amount of information about future earnings as in year two (β=0.018; t=2.7). Our finding of long-horizon information content is new to the literature. The only other study to find long-horizon information content (Nissim and Ziv, 2001) only finds significant information content out to two years, has been challenged by the subsequent literature (Grullon

[14] Prior literature commonly measures earnings changes on a year-by-year basis, where each subsequent year's earnings are subtracted from the immediately prior year's (e.g., Benartzi, Michaely, and Thaler, 1997; Nissim and Ziv, 2001; and Grullon, Michaely, Benartzi, and Thaler, 2005). However, our interest is in identifying the information about future earnings predicted by the dividend change, which corresponds to the information that market participants would impound into price at the dividend announcement. We therefore model the association between the dividend change and earnings news at each horizon using an ex-ante expectation of earnings. Our results suggest dividends have significant information about long-horizon earnings.

et al., 2005) and discounted by subsequent review studies (Allen and Michaely, 2003; DeAngelo et al., 2009).

The choice of deflator and control variables affects whether dividend changes predict future earnings using the fiscal year approach (Nissim and Ziv, 2001; Grullon et al., 2005). The choice of deflator has no effect using the event window approach. In untabulated analyses, we scale dividends by both the book value of common equity and total assets, and compute these deflators both the quarter before the dividend change and the year before the dividend change. Across all horizons and deflators our inferences are unaffected – dividend changes have an association with future earnings changes that persists up to three years in the future. Our results are also unaffected by the inclusion of firm fixed effects, year fixed effects, industry x year fixed effects or the removal of all control variables.

4.2. Fiscal year approach tests for the information content of dividends

To examine whether the discrepancy between our findings and those of the prior literature are attributable to computing earnings changes over the fiscal year, in Panel B of Table 2, we calculate earnings changes as in the prior literature – earnings in fiscal years after the dividend declaration less earnings in the fiscal year of the dividend declaration, which includes earnings announced both before and after the dividend declaration (for a visual depiction see Figure 1). We include control variables similar to those in Panel A, so that any difference in the coefficients arises as a result of the difference in the calculation of earnings changes. In column (1), the dependent variable is the change in earnings from the fiscal year of the dividend declaration to the fiscal year after. The estimated coefficient on the dividend change is statistically insignificant and economically small, only 4% of the magnitude in Panel A. In columns (2) and (3), we extend the earnings change to the second and third fiscal year after the

dividend change, respectively. We find no evidence of a positive association between the dividend change and future earnings changes at either horizon.

To test whether the difference in results from the fiscal year and event window approaches arises because the fiscal year approach includes earnings realized after the dividend declaration as pre-dividend earnings, in Panel C we separately tabulate results for dividend changes announced in fiscal quarters one through four. Columns (1) – (3) show negative and insignificant information content for quarters one to three, where the fiscal year approach includes at least one quarter after the dividend change as a part of the current year's earnings. In column (4), we show significantly positive information content for dividend changes occurring in the fourth quarter. Note that the fiscal year and event window methodologies are the most similar for dividends announced in quarter four, but differences still exist. Namely, because there is a delay between the fiscal period end and the earnings announcement, fourth quarter earnings are considered post-dividend earnings under the event window approach, but pre-dividend earnings under the fiscal year approach.

Thus, measuring information content using the fiscal year approach, as opposed to the event window approach, has two effects. First, earnings announced soon after the dividend declaration are excluded from the future earnings calculation. Second, earnings announced soon after the dividend declaration also become the new baseline against which future earnings changes are calculated. As a result, unexpected earnings that result from earnings changes starting in the first few quarters *after* the dividend change are masked by grouping quarters into fiscal years. As market participants will create expectations of earnings at the dividend announcement using only pre-dividend declaration information, we argue approaches that

exclude post-dividend earnings realizations are better suited to understanding whether market reactions plausibly reflect information about future earnings.

4.3. Matched sample results

To confirm our results are robust to matching on time and industry, as well as to graphically illustrate the horizon of dividend information content, in Figure 2, we report results from a matched sample comparison of earnings for firms that change dividends and similar firms that leave dividends unchanged. Specifically, we estimate a propensity score model of the probability a firm will change its dividend as a function of the past four quarterly earnings changes and levels. We estimate the model separately for dividend increases and decreases and match each dividend increase or decrease firm to a non-changing firm with the closest propensity score within the same dividend declaration year and industry (two digit SIC).[15]

The results indicate earnings levels are significantly higher (lower) for firms that increase (decrease) dividends, relative to non-changers. These differences in earnings between dividend changers and non-changers persist for three years after the dividend change, though for dividend decreases the magnitude decreases slightly with horizon. In untabulated analysis, we find these differences are statistically significant. Firms that increase (decrease) their dividend have significantly higher (lower) earnings than matched firms at the 10% level or better in each of the twelve (eleven of the twelve) quarters following the dividend change. We find no significant differences in any of the four quarters before the dividend change.

[15] Matching is performed with replacement and we impose a caliper distance of 0.03 (Shipman et al. 2016). Our approach of propensity score matching on past performance differs from Lie (2005a), who matches on past performance without using a propensity score approach and only evaluates dividend decreases. Our approaches yield different results. Lie (2005a) shows no significant differences after the dividend cut, while our matching approach shows persistent differences. In addition, our regression analysis and use of analyst forecasts as an alternative benchmark further support the results of our matching design.

These results provide additional intuition for the disparate findings under the event window and fiscal year methodologies. Because the shift to persistently higher (lower) earnings levels occurs largely through earnings changes in the first several quarters after the dividend change, including these quarters in pre-dividend earnings (which occurs when using the fiscal year approach) biases the estimated relation between dividend and earnings changes toward zero. Overall, our results highlight the importance of timing in measuring future earnings changes when estimating the information content of dividend changes.

5. Persistence of the information content of dividends

Since dividends tend to be viewed as a long-term commitment to pay out cash flows (Brav et al., 2005), we could expect dividend changes to be associated with persistent changes in the cash flows used to fund the payout. Although our results show that dividends have long-horizon information about future earnings, at least a portion of the information about short-horizon earnings does not persist. In this section, we examine in more detail the source of attenuation in our previous results.

5.1. Comparing persistence for net income to other measures of earnings

A potential issue with using accounting income to measure changes in the amount of economic income the firm generates each period is that accounting standards accelerate expenses into earnings.[16] These accelerated expenses often constitute investments, such as advertising or R&D, which are expensed as incurred although the benefits are recognized into revenue in subsequent periods. As suggested by Novy-Marx (2013), these investments could be positively

[16] Two well documented reasons why accounting income differs from economic income are: (i) the accounting system requires immediate expensing of investments such as advertising and research and development, even though the firm realizes the benefits of these expenses over a period of years (Enache and Srivastava, 2017), and (ii) the accounting system requires assets to be written down when impaired (Basu, 1997).

correlated with the dividend change (or the shock to economic income that prompted it). This acceleration of certain types of expenses in net earnings potentially contributes to the transitory information content measured in Table 2. Relatedly, we also investigate whether special items, which accelerate the implications of a persistent negative cash flow shock into earnings in the year of the shock (Basu, 1997), leads earnings to exhibit less persistence than the underlying cash flows.

In Table 3, Panel A, we present estimates of the earnings information content of dividends using a variety of measures from the income statement to test (i) whether our use of net income rather than another measure of economic income drives the apparent attenuation of dividend information content and (ii) whether the attenuation relates to asset write-downs and the immediate expensing of investments. Our regression specification modifies equation (1) by replacing all earnings amounts in the dependent and independent variables with other accounting variables. In addition, we separate positive and negative dividend changes, because the accounting system does not treat good and bad news symmetrically (Basu, 1997).

$$\Delta E_{it+n} = \beta_0 + \beta_1 \, abs(\Delta DIV{>}0_{it}) + \beta_2 \, abs(\Delta DIV{<}0_{it}) + \Sigma \beta_j Controls + \varepsilon \quad (2)$$

We present the results in Table 3, Panel A. First, as a baseline for comparison, we estimate equation (2) using net income to measure earnings.[17] The results show that both dividend increases and decreases convey information about future unexpected earnings for the next three years, though there is attenuation with the horizon in both cases. The β_1 coefficient declines from 0.021 in the first year to 0.018 over the next two years, so the persistence of good news equals 85.7% (0.018/0.021). Dividend decreases (β_2) have much lower persistence of

[17] In this case, the only difference from the results in Table 2, Panel A will be the separation of dividend increases from decreases.

46.8% (-0.047/-0.022), so the earnings after dividend decreases exhibit substantial mean reversion after a substantial decline in the first year (Benartzi et al., 1997).

In columns (4) – (6), we present estimates of the earnings information content of dividends using gross profit to measure earnings, computed as revenues minus cost of goods sold scaled by total assets. Because cost of goods sold are matched explicitly to the revenues they generate, gross profit will remove all expenses not incurred in the production of revenues, so our estimates of information content should be unaffected by accounting standards which accelerate investments into accounting income as well as special items. For both dividend increases and decreases, we now find that information content grows with the horizon. The coefficient on dividend decreases becomes monotonically more negative across the horizon, from -0.023 to -0.034 to -0.047, suggesting the decline in gross profit grows with time, and remains highly statistically significantly at all horizons. The dividend increase coefficient moves from 0.012 to 0.015 to 0.013 as we move from one year ahead to two and three years ahead gross profit changes, though neither the second or third year's coefficient is statistically significant at conventional levels. We show below (Table 5) that this imprecision is driven by a small number of very large dividend increases. Once we account for the presence of these outliers, we find statistically significant long-horizon information content for dividend increases as well.

In Panels B and C, we provide further evidence to understand what drives the difference in results when using gross profit versus net income to measure earnings. Panel B examines the impact of the immediate expensing of investments. Specifically, in columns (1) – (3) we replace all earnings variables with period expenses, computed as the difference between gross profit and income before extraordinary items (positive values indicate more expense). If asset write-downs and investments in items such as research and development or advertising are positively related

to expected profitability, these endogenous responses may mask some of the relation between dividends and future profitability. Further, if they change with a lag because of cost stickiness (Andersen et al., 2003; Banker and Chen, 2006), the slow adjustment of operating expenses could explain a portion of the transitory dividend information content in Table 2.

We find firms that increase (decrease) their dividends increase (decrease) their operating expenses in each year after the dividend change, and these effects monotonically increase in magnitude with the horizon. The notion that firms adjust cost structure in response to adverse news that also causes dividend cuts is not new to the literature (Bulan and Hull, 2013; Koh et al., 2015). However, our evidence suggests that this decline in investment confounds attempts to measure the earnings changes associated with the dividend change. Because operating expenses are subtracted from gross profit to calculate net income, the variation in operating expenses explains why some of the change in gross profit does not hit the income statement in subsequent years.

Our next set of results provides evidence on the specific line items that contribute to the association between dividend changes and operating expenses. Columns (4) – (6) present results for unexpected changes in R&D, an investment which is expensed immediately under the accounting system, but whose benefits will typically be realized into revenue in future years. We find firms that increase (cut) their dividend increase (decrease) future R&D expenditures, and these differences grow with the horizon. The positive association is consistent with firms' investment decisions responding to profitability shocks, as suggested by Novy-Marx (2013), but doing so with a lag (Andersen et al., 2003; Banker and Chen, 2006).

In Panel C, columns (1) – (3) we repeat the analysis with special items and show that firms that cut their dividend take substantial write-downs (and dividend increasing firms take

fewer) in the year following the dividend change. This depresses earnings in the first year for dividend decrease firms, consistent with the results in column (1) of Panel A. These differences in special items are not persistent after the first year, though, which contributes to the attenuation of information content measured using net income.

In columns (4) – (6), we test for the persistence of operating cash flows, a measure of the cash flows generated through operations that can be used to fund payout. For dividend decreases, our estimates show earnings information content is significant at all horizons and grows over the forecast horizon. For dividend increases we observe more nuanced results as the information content grows from one-year ahead to two-year ahead cash flows, before attenuating slightly in the third year.

5.2. Measuring dividend news

While our results suggest persistent information content after using measures of earnings that better coincide with economic income, the functional form used in our previous tests implicitly impose a linear relation between the size of a dividend change and the associated future earnings news. Baker et al. (2015) show that the market reaction to both dividend increases and decreases is initially increasing in the magnitude of the change, but flattens out for larger changes. Further, announcement returns are larger in absolute value for dividend cuts than increases. This suggests that, to the extent that these announcement returns reflect new information about future earnings, the information investors infer varies with the sign and magnitude of the dividend change. Relatedly, we want to understand why market reactions are not linear in the dividend change, particularly for increases. A large majority of managers express a commitment to maintaining the dividend, so we might expect market reactions to be linear in these changes in anticipated payout (Brav et al., 2005).

We begin by noting that the distribution of dividend changes is highly skewed. Figure 3 shows the empirical histogram of non-zero dividend changes in our sample. Two features are noteworthy. First, there are many more dividend increases than cuts. Second, while the vast majority of increases are by less than 50%, there are a small, but non-negligible number of outliers – increases of 100% or 200% or more. These outliers account for a substantial fraction of the cross-sectional variation in our dividend increase variable, and are thus influential observations.

First, we document that, consistent with Baker et al. (2015), announcement returns attenuate as the percentage dividend change increases. To do so, we estimate the following regression:

$$Ret_{(-2,+2)} = \beta_0 + \beta_1 I(\Delta DIV_{it}>0) + \beta_2 I(\Delta DIV_{it}<0) + \beta_3 \Delta DIV_{it} + \beta_4 \Delta DIV_{it} * abs(\Delta DIV_{it}) + \varepsilon \quad (3)$$

$Ret_{(-2,+2)}$ is the cumulative abnormal return (relative to the market return) over the five day window centered on the dividend announcement. Results are reported in the first column of Table 4, Panel A. The positive coefficient on the dividend change indicates that larger (more positive) dividend changes are met on average with more positive market reactions. However, the significantly negative estimate of β_4 shows that the incremental market reaction diminishes with the size of the dividend change. This suggests that very large dividend changes may not contain substantially more information about long-run earnings than more moderate changes. Finally, comparing coefficients on the indicators for positive and negative dividend changes shows sharper reactions to dividend decreases than increases.

These return patterns raise the question of why investors infer different information from very large dividend changes than from more moderate changes. While a full exploration of this issue is beyond the scope of this paper, we offer some suggestive evidence here. First, we find

that firms that make large dividend increases tend to be firms with more volatile dividend policies. In the first two columns of Table 4, Panel B, we regress the average absolute dividend change (column 1) and the percentage of dividend decreases (column 2) over the past 5 years on indicators for the size of the year t dividend change. The results show that firms with very large dividend increases are much more likely to have cut their dividend in the past and have substantially more variable dividend streams. Columns (2) and (3) of Panel A relate dividend announcement returns to these characteristics of past payout policies. The results show that the market reactions to dividend changes are muted for firms with a history of volatile dividends and for firms with more prior dividend cuts. Thus, dividend announcements appear less informative for firms that change their dividend more frequently and by larger amounts.

Columns (3) through (5) of Panel B reinforce this intuition by showing that large dividend increases are themselves less persistent: following large increases, the probability of future dividend cuts is higher (column 5) and the average future dividend change is significantly lower (column 3). Firms that increase the dividend by greater than 100 percent are nearly four times more likely to decrease the dividend than firms that do not change the dividend. Thus, although there are few extremely large increases, these increases do not seem to constitute a firm commitment to maintain the dividend. In the next section, we explore the extent to which using a measure of dividend news more in line with market reactions, which discount large increases, affects our estimate of the persistence of dividend news.

5.3. Heterogeneity in the persistence of dividend news

Our findings in Table 4 show that the market reactions to dividend changes and the persistence of the changes themselves vary with the sign and magnitude of the dividend change. In this next section, instead of measuring dividend news as a linear function of the percentage

change in the dividend, we utilize two alternative functions that take into account the non-linearities in the persistence of, and market reaction to, dividend changes. Our regression specification is similar to that in Table 3 in all other respects.

$$\Delta E_{it+n} = \beta_0 + \beta_1 f(\Delta DIV_{it}|\Delta \text{DIV}_{it}>0) + \beta_2 f(\Delta DIV_{it}|\Delta \text{DIV}_{it}<0) + \Sigma \beta_j Controls + \varepsilon \quad (4)$$

First, we separately percentile rank dividend increases (*rank(ΔDIV>0)*) and dividend decreases (*rank(ΔDIV<0)*). Because dividend changes have a skewed distribution, using the percentile rank as our measure of dividend news increases the variation in dividend news accounted for by small changes and reduces the impact of outliers.[18] Second, we use imputed market returns as our measure of dividend news. Specifically, we regress announcement returns over the five day window centered on the dividend change on (i) the dividend change, (ii) the signed-squared dividend change and (iii) indicators for positive and negative dividend changes (equation 3) and then use the predicted value as our measure of imputed returns. We impute returns out of sample, so the predicted values are only estimated including dividend changes from prior months. We then multiply imputed returns by our positive and negative dividend change indicators to calculate *pret(ΔDIV>0)* and *pret(ΔDIV<0)*.

Table 5 columns (1) – (3) present estimates using our percentile rank variables with earnings defined as net income. Switching to a measure of dividend news that controls for the skewness in the distribution of dividend changes, we find more persistent information content for dividend increases, relative to Table 3. When the dependent variable is the two or three year ahead earnings change, the coefficient on *rank(ΔDIV>0)* is 94% of the magnitude when the dependent variable is the one year ahead earnings change (0.017/0.018). In columns (4) – (6),

[18] For example, the median dividend increase is 12%, while a 100% dividend increase is the ninety-ninth percentile. Measuring dividend news in percentiles, the shift from a 12% increase (fiftieth percentile) to a 100% increase (ninety-ninth percentile) is slightly under a 100% increase. Measuring dividend news using percentage changes the 100% increase is over 800% greater than the 12% increase.

we present our estimates of equation (4) using imputed returns in place of the dividend change. We now find no evidence of attenuation in the earnings information from one to three years after the dividend change. The estimated coefficients on *pret(ΔDIV>0)* grow slightly with the horizon.

The main takeaway from contrasting the results in columns (1) – (3) of Table 3, Panel A, to those in Panel A of Table 5 for dividend increases is that very large dividend increases have less persistent earnings information than small and moderate increases. The skewness of the distribution of dividend increases thus contributes to the apparent attenuation of information content in earlier results. Using the percentage change as our measure of dividend news, large increases (which are less persistent and viewed by investors as less informative) receive a lot of weight. When we use measures of dividend news that mitigate the influence of outliers (e.g., percentile ranks) or better reflect the fact that market reactions discount large increases (e.g. imputed returns), we find no evidence of mean reversion.[19] For negative dividend changes, however, results are little affected by these specification changes. This is expected, since the distribution of dividend cuts is not characterized by the skewness and outliers seen among dividend increases.

In Panel B, we estimate equation (4) replacing earnings with gross profit in both the dependent variable and controls. In columns (1) – (3) we use the percentile rank of the dividend change as our measure of dividend news. For dividend increases, we now find that information content grows with the horizon. The coefficient increases from 0.013 to 0.020 to 0.024 as we move from one year ahead to two and three year ahead earnings changes. Contrasting these

[19] In addition, our coefficient estimates of the earnings information content of positive dividend news are economically large. In columns (4) to (6) the coefficients for dividend increases are approximately one, which suggests a ten percent change in market value is associated with a nearly ten percent change in earnings. As the average earnings to price ratio in our sample is around 10%, this would predict coefficients near 10% instead of 100%. The high coefficient on imputed returns is perhaps expected given the evidence that dividend increases generate substantial post-dividend change drift (Benartzi et al., 1997), so that only a portion of the information about future earnings gets impounded into returns at the announcement.

results with comparable results using the percentage dividend change as the measure of dividend news (Table 3, Panel A), we find that mitigating the impact of very large increases results in (i) larger growth from the one-to-three year horizon and (ii) statistically significant information content across all horizons. We find similar results in columns (4) – (6), when using imputed returns, suggesting our inferences are robust to a different method of controlling for outliers. Our results for dividend decreases show (i) dividend changes have a negative association with future gross profit, (ii) the association increases across the horizon and (iii) the association is statistically significant at each horizon regardless of the measure of dividend news.[20]

In Panel C, we present similar results for operating cash flows. We find significant information content for both measures of dividend news, for both dividend increases and decreases at all horizons. Moreover, the results increase across the horizon, indicating that dividend changes convey persistent information about inflows of cash.

5.4. Dividend changes and analyst forecasts

To measure unexpected future earnings, our previous tests rely on a flexible function of past earnings and past returns to control for earnings that would be expected in the absence of a dividend change (Grullon et al., 2005). In our next set of analyses, we estimate the relation between dividend changes and unexpected earnings using an alternative benchmark, analyst forecasts of earnings. First, we test whether dividend changes predict errors in forecasts, as a robustness check.[21] Second, we examine whether analysts revise their earnings forecasts in the

[20] In untabulated analyses, we present analogous results using ROA (operating income after depreciation scaled by total assets) in place of gross profit. For dividend increases using both percentile ranks and imputed returns we find coefficients for two year ahead earnings equal to, or larger than those for next year's earnings consistent with persistent information content. For dividend decreases, we find some attenuation for both measures, although less than we observe for net income.

[21] Note that we are limited in this analysis to examining net income, because analysts do not commonly produce forecasts of gross profit or operating cash flows.

direction of the dividend change, which provides some evidence that market participants update earnings expectations in response to the dividend change.

5.4.1. Do dividend changes predict errors in analyst forecasts?

We obtain analyst forecasts of earnings per share for the year of the dividend change and the year after.[22] We require the initial analyst forecast be issued between the most recent earnings announcement and one day before the dividend declaration, inclusive, to ensure the initial forecast incorporates information from the previous earnings announcement.[23] We winsorize forecast errors at the top and bottom one percent.[24] We control for prior returns as well as past forecast error to control for the empirical fact that analysts respond slowly to stale information (Abarbanell, 1991; Abarbanell and Bernard, 1992).

If dividend changes contain new information about future earnings, then dividend changes should be positively correlated with forecast errors – i.e., when firms increase (decrease) their dividend, realized future earnings are higher (lower) than analysts' expectations before the dividend declaration. To test this prediction, we regress analyst forecast errors on positive and negative functions of the dividend news.

$$FE_{it+n} = \beta_0 + \beta_1 f(\Delta DIV_{it}|\Delta \text{DIV}_{\text{it}}>0) + \beta_2 f(\Delta DIV_{it}|\Delta \text{DIV}_{\text{it}}<0) + \Sigma\beta_j Controls + \varepsilon \quad (4)$$

We report the forecast error results in Table 6. In columns (1) – (2), we find *rank(ΔDIV>0)* significantly predicts forecast error for both the current year and next year (t=5.0 and t=4.8). In addition, the coefficient estimates increase across the horizon, so that positive

[22] Forecasts of earnings at horizons longer than next year are published infrequently and are optimistically biased.

[23] Controlling for the timing of earnings announcements allows our study to address DeAngelo et al.'s (2009) criticism of prior research studying analyst revisions: "Because they are measured over the month surrounding the dividend announcement, these forecast revisions are noisy measures of analysts' responses to dividend changes per se given that firms may have reported quarterly earnings during the measurement period."

[24] Because we require (i) the analyst to issue a pre-dividend forecast between the prior earnings announcement and the dividend declaration, and (ii) active analyst following, we report results for a subset of the dividend declarations in Table 2. Another factor limiting our sample is the fact that the I/B/E/S detail file has much more limited coverage of firms in the early part of our sample.

dividend changes predict 66% more error in next year's forecasts. Although some of the current year's earnings will have already been reported, the growth in information content is consistent with our persistence results from Table 5. In columns (5) – (6), we obtain similar results using imputed returns as our measure of dividend news. Dividend decreases have significant information content in year one, but less persistence than increases, consistent with results for net earnings in Table 3, Panel A.

5.4.2. Do analysts update expectations of earnings in response to dividend changes?

While prior evidence documents that markets update valuation in response to dividend news, it is unclear whether the market reactions reflect earnings or discount rate news. In this section, we examine whether analysts revise their expectations of future cash flows around the dividend change, which would lend further support to the interpretation that revisions of cash flow expectations contribute to the positive association between announcement returns and dividend changes.

We investigate the relation between analyst revisions and dividend changes by regressing the difference in analyst estimates before and after the dividend declaration on positive and negative functions of the dividend news.

$$REV_{it+n} = \beta_0 + \beta_1 f(\Delta DIV_{it}|\Delta \text{DIV}_{\text{it}}>0) + \beta_2 f(\Delta DIV_{it}|\Delta \text{DIV}_{\text{it}}<0) + \Sigma\beta_j Controls + \varepsilon \quad (5)$$

The revision is the difference between the post-declaration forecast and the pre-declaration forecast, scaled by price at the prior earnings announcement. If the analyst does not revise the forecast in the post-declaration period, the revision is set to zero. In columns (3) – (4) of Table 6, we find significant associations between dividend changes and revisions, for both dividend increases and decreases. In columns (7) – (8), we obtain similar inferences using imputed returns to measure the news in the dividend change. Overall, our evidence suggests

analysts revise their expectations of future earnings around dividend changes in a manner consistent with the dividend change, supporting the notion that the market reaction to dividend changes reflects, at least in part, revised expectations of future earnings.

5.5. Do dividends convey information about the persistence of past earnings changes?

Prior studies have also provided evidence that dividends are associated with greater persistence of past earnings changes (DeAngelo et al., 1992; DeAngelo et al., 1996; Koch and Sun, 2004). Review studies argue that this is the primary channel through which dividends are related to future earnings (Allen and Michaely, 2003; DeAngelo et al., 2009). Our descriptive statistics reveal that firms that change their dividends have pre-dividend declaration earnings changes in the same direction as the dividend change. It remains possible that the information content of dividend changes arises because dividend changes reflect the persistence of past earnings changes rather than new information about future earnings changes.

To differentiate between these alternatives, we modify equation (1) to include the interaction between the dividend change (ΔDIV) and the change in the previous four quarters' earnings ($\Delta E_{(y-1)}$). If dividends only have information content because they are related to the persistence of past earnings changes we would expect (i) a significant positive coefficient on the interaction $\Delta DIV * \Delta E_{(y-1)}$, and (ii) substantial attenuation in the coefficient on the main effect of the dividend change (ΔDIV).

Results are shown in Table 7. In column (1), we first show that when using the fiscal year approach, as the majority of the prior literature has done, dividend changes contain information about the persistence of the current fiscal year's earnings. Our variable of interest, the interaction of ΔDIV and the current year's earnings has a significant positive coefficient.

In column (2), we estimate the same specification computing earnings changes using the event window approach. We find an insignificant coefficient on the interaction. The dividend change however, continues to significantly predict future unexpected earnings. In column (3), we use the full set of controls for past earnings changes and returns to provide a better measure of unexpected earnings. We again find a small and statistically insignificant coefficient on the interaction. In addition, the coefficient on *ΔDIV* is identical to that in Table 2, so we find no attenuation. Overall, our evidence suggests dividends convey new information about future earnings independent of past earnings changes.

6. Buybacks and the information content of dividends

Firms increasingly return cash to shareholders in the form of share repurchases, and these repurchases can substitute for dividends as a means of paying out cash (Grullon and Michaely, 2002).[25] Survey evidence (Brav et al., 2005) suggests that managers view dividends as a more permanent commitment to pay out cash and are much more likely to use repurchases in response to a temporary earnings increase. In that case, we expect dividends should have greater and more persistent information content about future earnings than do share repurchases. In this section, we assess whether managers match the form of payout with the duration of their private information about future earnings, by contrasting the information content of dividends with the information content of buybacks.

6.1. Do buybacks have information about future earnings?

We first test if the authorization of a share repurchase program has information content about future earnings, using a similar research design to that for dividends. Prior literature

[25] The dollar volume of shares repurchased increased markedly during our sample period from approximately $5 billion in 1980 to $349 billion in 2005.

provides mixed evidence on this question. Grullon and Michaely (2004) use a fiscal year approach and find repurchase authorizations contain little or no information about future earnings. Lie (2005b) uses an event window approach and finds repurchase authorizations contain positive information about future performance which persists for at least two years. Guay and Harford (2000) show that repurchase authorizations coincide with a period of abnormal positive earnings, but that the abnormal performance is transitory.

Our sample includes all firm-quarters from the CRSP-Compustat Merged database where prior quarter earnings were announced in 1994 or later (SDC repurchase authorizations are sparse before 1994). Buybacks include all open market repurchase authorizations on SDC. In this section, to create coefficient estimates comparable across buybacks and dividend changes, we percentile rank both the dividend change and buyback amount from zero to one.

Results are presented in Table 8.[26] Column (1) shows a significant positive relation between repurchase authorizations and earnings changes over the next year (sum of the four quarterly earnings following the authorization minus the sum of the four quarterly earnings before). The coefficient magnitude (β=0.008) suggests the earnings of a firm with the largest repurchase authorization will outperform the average firm without a repurchase authorization by 0.8% of the market value of equity of the firm.

In columns (2) – (3) we examine whether the relation between repurchase authorizations and future earnings changes extends beyond the four quarters after the authorization. The relation between the buyback authorization and future earnings completely attenuates by year two and remains insignificant in year three. Overall, our evidence suggests that buyback

[26] Specification and control variables are the same as in column (1) of Table 2, with the exception that the return variables are calculated relative to the prior quarter earnings announcement date rather than the repurchase authorization date, because many of the firm-quarters do not contain a repurchase authorization.

announcements have information content about future earnings, but in contrast to dividend changes, the associated earnings news is entirely transitory.

6.2. Do dividend paying firms match the form of payout to the duration of their earnings information?

Skinner (2008) notes the emergence of two classes of firms with respect to payout form: those that pay out using both dividends and buybacks and those that use only buybacks. Those that use both forms appear to use them in different ways, with repurchases responding more to temporary fluctuations in earnings. Combined with managers' views that repurchases are the more flexible form of payout, we expect dividend payers to use dividend changes to respond to persistent earnings changes and repurchases to pay out temporary cash flows or excess cash on the balance sheet.

In columns (4) – (6), we restrict the sample to firm-quarters with a dividend and examine the difference in the information content of these two forms of payout. Column (4) shows that over a one-year horizon, both buyback authorizations and dividend changes have information content, though the information content is larger for dividend changes and the difference is statistically significant. Further, columns (5) and (6) show that while the information content of dividends persists through the second and third years after the dividend change, the information content of buybacks disappears after one year. These results suggest dividend changes convey persistent information about future earnings while buybacks convey only transitory information. Overall, our evidence suggests dividend paying firms substitute between payout methods depending on their expectations for future earnings. While our findings are similar to the prior literature that shows buybacks respond to transitory earnings (Guay and Harford, 2000; Skinner, 2008), our results demonstrate that a portion of these earnings are realized after the authorization.

7. Conclusion

Grullon et al. (2005) argue that "one of the most important issues in corporate finance is whether dividend changes contain information about future earnings" (p. 1659). While the prevailing view in the literature is that they do not, we provide robust evidence in this paper which challenges that view. Using an event window approach to clearly delineate the timing of earnings relative to dividend announcements, we find that dividend changes predict unexpected earnings changes in the same direction. While this predictability is strongest in the year after the dividend change, we show that any apparent attenuation in the effect is accounted for by (i) endogenous changes in asset write-downs and investment spending associated with profitability shocks, and (ii) outliers in the distribution of dividend increases and the non-linear relation between dividend changes and announcement returns. Once we account for these factors, we find dividend increases are followed by persistently higher unexpected earnings for up to three years.

Our findings help inform payout policy choices by shedding light on the drivers of the market reaction to dividend changes. We show that investors and analysts understand the earnings information contained in dividend announcements and update their expectations accordingly. While other factors such as agency conflicts may also contribute to the value effects of dividend decisions, we find evidence supportive of an earnings information channel. Our results also further our understanding of how payout choices shape the information environment. We provide evidence that managers match the duration of their changes in payout to the duration of the expected earnings changes.

Our evidence raises several questions for future research that may deepen our understanding of the drivers of payout decisions. First, theories based on the agency costs of free cash flow receive the majority of support in recent review articles (Allen and Michaely, 2003;

DeAngelo et al., 2009; Kalay and Lemmon, 2011). Asymmetric information models provide a potential reconciliation between our findings and governance-based theories (Fudenberg and Tirole, 1995; DeMarzo and Sannikov, 2016). In these models, managers map earnings information into dividends to maximize the probability of retaining control. If directors and outside investors "manage by exception," in that their degree of involvement is a decreasing function of payout, with decreases leading to asymmetrically more supervision (Hilton and Platt, 2014), managers have an incentive to increase dividends when they foresee a sustainable increase in earnings. However, they will do so conservatively to minimize the probability of having to decrease dividends in case of an unexpected earnings shortfall.

Second, while much of our evidence is consistent with dividend signaling models, a few caveats are in order. For one, we do not show direct evidence that managers consciously bear dissipative costs to communicate information to investors or, if so, which are the most relevant costs. Related, a remaining challenge for signaling models is the observation that dividend payers tend to be concentrated among those firms we would expect to face the least information asymmetry (e.g., older, larger, more profitable firms). However, if dividends are costly due to the increased need for external finance, then both the cost and benefit of signaling may be decreasing in firm size and transparency. If the costs decrease faster than the benefits, we may observe established firms making a disproportionate share of dividend payments. We leave these issues to future research.

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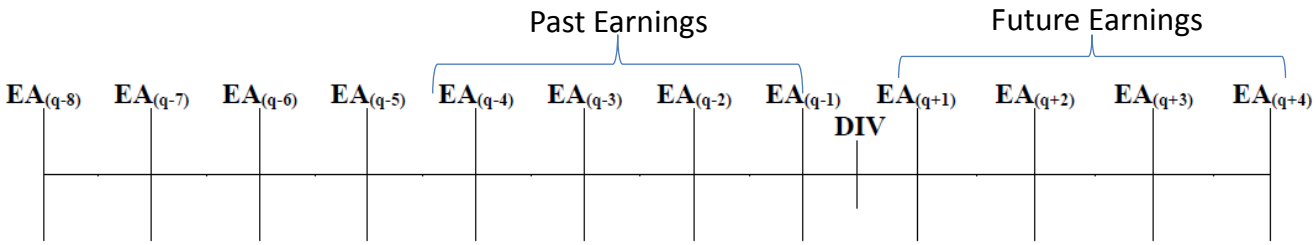
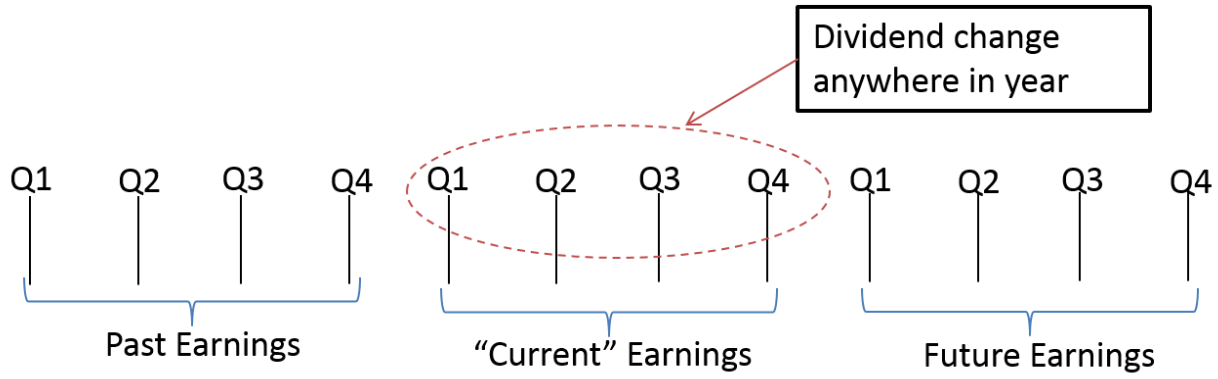
Figure 1: Timeline
Panel A: Event Study Approach

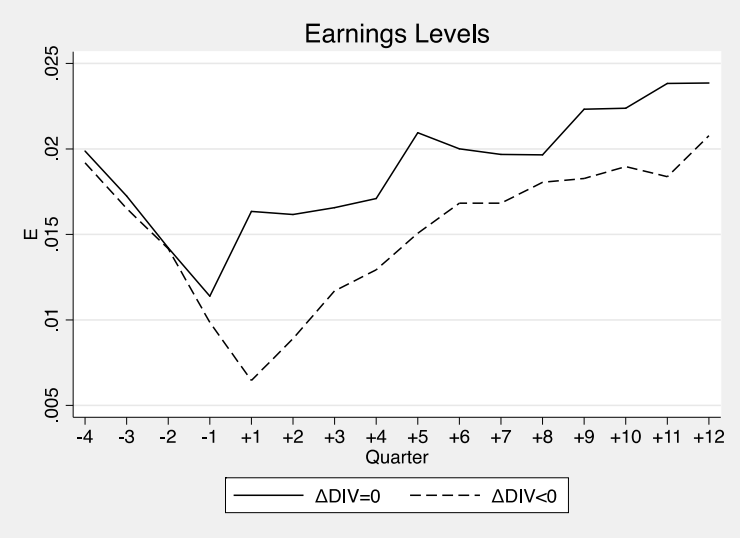


Panel B: Fiscal Year Approach

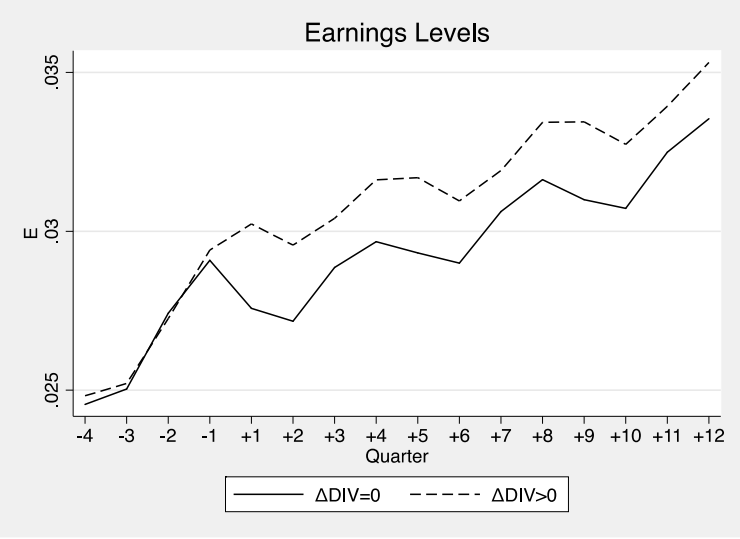


This figure reports a timeline to depict the sample and variable construction. Using the event study approach (Panel A), all dividend declarations in the sample occur between two consecutive earnings announcements. We refer to the lower (upper) bound earnings announcement quarter as quarter q-1 (q+1). If the dividend declaration falls on an earnings announcement date we consider that earnings announcement as quarter q-1. All quarterly earnings definitions follow accordingly. For example, $E_{(q-1)}$ refers to earnings announced at $EA_{(q-1)}$. All annual earnings calculations sum four consecutive quarterly earnings figures. For example, $E_{(y+1)}$ is the sum of the four quarterly earnings figures announced at $EA_{(q+1)}$ through $EA_{(q+4)}$ and $E_{(y-1)}$ is the sum of the four quarterly earnings figures announced at $EA_{(q-4)}$ through $EA_{(q-1)}$. All annual earnings change calculations sum four consecutive quarterly earnings figures less the sum of the four consecutive quarterly earnings figures before the dividend declaration. For example, $\Delta E_{(y+1)}$ is the sum of the four quarterly earnings figures announced at $EA_{(q+1)}$ through $EA_{(q+4)}$ less the sum of the four quarterly earnings figures announced at $EA_{(q-4)}$ through $EA_{(q-1)}$. $\Delta E_{(y+2)}$ is the sum of the four quarterly earnings figures announced at $EA_{(q+5)}$ through $EA_{(q+8)}$ less the sum of the four quarterly earnings figures announced at $EA_{(q-4)}$ through $EA_{(q-1)}$. Using the fiscal year approach (Panel B), the change in earnings is the difference in the sum of earnings over the four quarters of the future fiscal year minus the sum of earnings over the four quarters of the current fiscal year (when the dividend is declared).

Figure 2: Relation Between Dividend Changes and Future Earnings – Matching Analysis
Panel A: Dividend Decreases

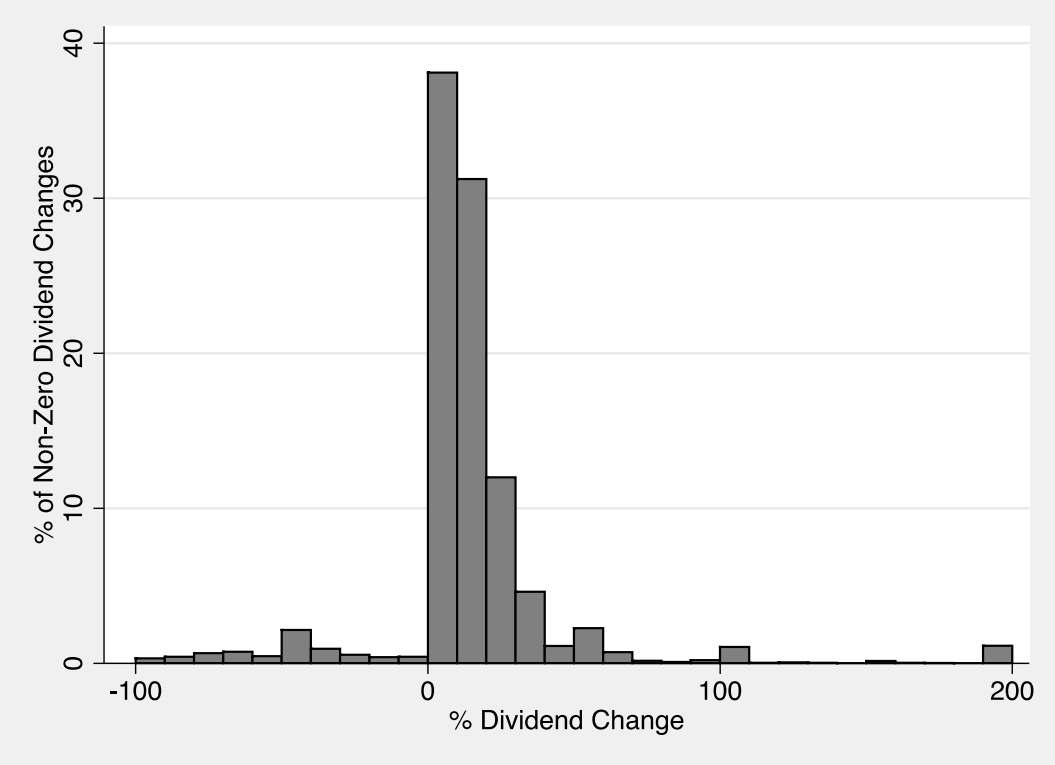


Panel B: Dividend Increases



This figure reports the matching analysis results. In Panel A (B) each dividend decrease (increase) observation is matched to a firm in the same industry and quarter with no dividend change. Observations are matched via the level and change in earnings over quarters q-4 to q-1. Both Panels report graphs that illustrate the earnings levels (E) over quarters q-4 to q+12. Appendix A reports variable definitions. Figure 1 depicts the timeline for quarter and year designations.

Figure 3: Distribution of Dividend Changes



The figure displays the empirical histogram of non-zero dividend changes in our sample. The sample consists of all ordinary quarterly dividend declarations (distribution code 1232) by non-financial CRSP firms over the period 1972 – 2015 for which the firm made a previous quarterly dividend declaration in the past 180 days. Dividend changes are calculated as the current quarterly dividend less the prior quarterly dividend, divided by the prior quarterly dividend. Dividend increases larger than 200% are set to 200%.

Table 1: Descriptive Statistics

	ΔDIV=0 (N=140,733)		ΔDIV<0 (N=1,746)		ΔDIV>0 (N=23,079)	
Variable	Mean	Median	Mean	Median	Mean	Median
ΔDIV	0.000	0.000	-0.492	-0.500	0.188	0.118
$E_{(y-2)}$	0.081	0.071	0.080	0.073	0.087	0.073
$E_{(y-1)}$	0.087	0.075	0.049	0.049	0.107	0.086
$E_{(y+1)}$	0.091	0.078	0.028	0.034	0.121	0.093
$E_{(y+2)}$	0.099	0.083	0.057	0.052	0.128	0.097
$E_{(y+3)}$	0.109	0.089	0.073	0.059	0.138	0.103
$Ret_{(-2,+2)}$	0.001	0.000	-0.033	-0.019	0.009	0.006
$Ret_{(-2,-20)}$	0.000	-0.004	-0.021	-0.022	0.007	0.002
$Ret_{(-21,-40)}$	0.000	-0.004	-0.018	-0.021	0.004	0.001
$Ret_{(-41,-60)}$	0.003	-0.001	-0.011	-0.011	0.007	0.002
$Ret_{(-61,-120)}$	0.003	-0.005	-0.038	-0.045	0.015	0.005
$Ret_{(-121,-240)}$	0.009	-0.009	-0.028	-0.048	0.040	0.016

This table reports descriptive statistics. Columns 1-2 report observations without a dividend change, columns 3-4 report observations with a decrease in the dividend, and columns 5-6 report observations with an increase in the dividend. Appendix A reports variable definitions. Figure 1 depicts the timeline for quarter and year designations.

Table 2: Dividend Changes and Future Earnings Changes
Panel A: Event Window Approach

	(1) $\Delta E_{(y+1)}$	(2) $\Delta E_{(y+2)}$	(3) $\Delta E_{(y+3)}$
ΔDIV	0.025***	0.018***	0.018**
	(5.134)	(3.183)	(2.674)
$Ret_{(-2,-20)}$	0.086***	0.100***	0.095***
	(15.299)	(10.811)	(9.616)
$Ret_{(-21,-40)}$	0.078***	0.091***	0.094***
	(11.451)	(10.512)	(9.138)
$Ret_{(-41,-60)}$	0.074***	0.084***	0.079***
	(11.624)	(9.359)	(8.256)
$Ret_{(-61,-120)}$	0.063***	0.070***	0.071***
	(11.197)	(10.056)	(9.508)
$Ret_{(-121,-240)}$	0.033***	0.037***	0.040***
	(8.258)	(8.161)	(8.901)
$E_{(q-1)}$	0.412***	0.341***	0.332***
	(13.156)	(4.740)	(3.732)
$E_{(q-2)}$	0.066*	0.079	0.128
	(1.781)	(1.097)	(1.364)
$E_{(q-3)}$	0.021	0.030	0.060
	(0.563)	(0.415)	(0.643)
$E_{(q-4)}$	-0.099**	-0.061	0.007
	(-2.051)	(-0.809)	(0.070)
$\Delta E_{(q-1)}$	0.452***	0.298***	0.257***
	(8.527)	(4.273)	(3.220)
$\Delta E_{(q-2)}$	0.161***	0.078	0.039
	(4.386)	(1.191)	(0.486)
$\Delta E_{(q-3)}$	0.075	0.017	-0.047
	(1.558)	(0.232)	(-0.559)
$\Delta E_{(q-4)}$	0.035	-0.035	-0.159
	(0.666)	(-0.421)	(-1.358)
Intercept	-0.007***	0.000	0.004
	(-2.745)	(0.000)	(0.820)
Non-linear Controls	Included	Included	Included
Observations	165,558	154,945	145,042
R-squared	0.187	0.114	0.093

Panel B: Fiscal Year Approach

	(1) $\Delta E_{(fy+1)}$	(2) $\Delta E_{(fy+2)}$	(3) $\Delta E_{(fy+3)}$
ΔDIV	0.001	-0.002	-0.011**
	(0.278)	(-0.663)	(-2.338)
$Ret_{(-2,-20)}$	0.036***	0.043***	0.042***
	(7.683)	(7.015)	(5.276)
$Ret_{(-21,-40)}$	0.036***	0.041***	0.050***
	(7.852)	(5.959)	(5.719)
$Ret_{(-41,-60)}$	0.028***	0.027***	0.035***
	(6.146)	(4.037)	(4.115)
$Ret_{(-61,-120)}$	0.022***	0.025***	0.032***
	(7.671)	(5.112)	(5.137)
$Ret_{(-121,-240)}$	0.012***	0.012***	0.013**
	(5.650)	(3.553)	(2.321)
$E_{(fq4)}$	0.249***	0.189**	0.149
	(5.290)	(2.440)	(1.544)
$E_{(fq3)}$	0.192***	0.180**	0.159*
	(4.273)	(2.470)	(1.834)
$E_{(fq2)}$	-0.031	0.051	0.049
	(-0.453)	(0.443)	(0.322)
$E_{(fq1)}$	0.005	0.004	0.143
	(0.078)	(0.037)	(1.036)
$\Delta E_{(fq4)}$	0.358***	0.240***	0.221***
	(7.451)	(3.468)	(2.710)
$\Delta E_{(fq3)}$	0.308***	0.261**	0.126
	(4.651)	(2.465)	(1.262)
$\Delta E_{(fq2)}$	0.120	0.111	-0.006
	(1.313)	(0.749)	(-0.034)
$\Delta E_{(fq1)}$	-0.060	-0.308**	-0.523***
	(-0.548)	(-2.146)	(-2.987)
Intercept	-0.009***	-0.003	0.004
	(-3.333)	(-0.684)	(0.732)
Non-linear Controls	Included	Included	Included
Observations	176,757	166,052	155,903
R-squared	0.131	0.107	0.103

Panel C: Fiscal Year Approach by Fiscal Quarter

	(1)	(2)	(3)	(4)
	$\Delta E_{(fy+1)}$	$\Delta E_{(fy+1)}$	$\Delta E_{(fy+1)}$	$\Delta E_{(fy+1)}$
ΔDIV	-0.004	-0.005	-0.002	0.010***
	(-1.038)	(-1.142)	(-0.288)	(2.709)
$Ret_{(-2,-20)}$	0.016**	0.013*	0.044***	0.071***
	(2.499)	(1.700)	(5.174)	(9.975)
$Ret_{(-21,-40)}$	0.016**	0.018**	0.036***	0.078***
	(2.306)	(2.255)	(4.326)	(9.896)
$Ret_{(-41,-60)}$	0.018***	0.018**	0.030***	0.048***
	(2.956)	(2.286)	(4.892)	(6.917)
$Ret_{(-61,-120)}$	0.018***	0.019***	0.017***	0.040***
	(4.170)	(4.461)	(3.395)	(7.057)
$Ret_{(-121,-240)}$	0.006**	0.011***	0.016***	0.017***
	(2.044)	(3.184)	(4.946)	(5.560)
$E_{(fq4)}$	0.271***	0.244***	0.252***	0.216***
	(5.079)	(4.532)	(5.257)	(4.388)
$E_{(fq3)}$	0.207***	0.196***	0.197***	0.146***
	(4.323)	(3.848)	(3.760)	(3.235)
$E_{(fq2)}$	-0.001	-0.030	-0.053	-0.034
	(-0.019)	(-0.450)	(-0.715)	(-0.466)
$E_{(fq1)}$	0.034	0.000	0.003	-0.034
	(0.457)	(0.006)	(0.048)	(-0.460)
$\Delta E_{(fq4)}$	0.367***	0.353***	0.363***	0.336***
	(6.549)	(7.267)	(7.138)	(6.874)
$\Delta E_{(fq3)}$	0.309***	0.331***	0.326***	0.239***
	(4.215)	(4.982)	(4.472)	(3.803)
$\Delta E_{(fq2)}$	0.103	0.136	0.127	0.103
	(0.992)	(1.447)	(1.344)	(1.148)
$\Delta E_{(fq1)}$	-0.059	-0.086	-0.033	-0.012
	(-0.542)	(-0.706)	(-0.293)	(-0.104)
Intercept	-0.010***	-0.009***	-0.009***	-0.007**
	(-3.785)	(-3.211)	(-3.002)	(-2.373)
Non-linear Controls	Included	Included	Included	Included
Quarter	Q1	Q2	Q3	Q4
Observations	43,736	44,769	44,243	44,009
R-squared	0.129	0.132	0.134	0.136

This table reports OLS regression results. The dependent variable is the earnings change for the time period denoted in the variable name. The non-linear control variables are functions of past annual earnings levels and changes. In Panel A, the past earnings level (change) is the sum of the four quarterly earnings levels (changes) before the dividend announcement. In Panels B and C, the past earnings level (change) is the fiscal year earnings level (change) in the year of the dividend announcement. We include a total of six variables, three each for the earnings level and change: (i) an interaction between the variable and an indicator equal to one if the variable is negative, (ii) an interaction between a positive indicator and the variable squared, and (iii) an interaction between a negative indicator and the variable squared. Standard errors are clustered by year of the dividend declaration. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Appendix A reports variable definitions. Figure 1 depicts the timeline for quarter and year designations.

Table 3: Information Content of Dividends Using Other Measures of Earnings

Panel A: Earnings and Gross Profit

	(1) $\Delta E_{(y+1)}$	(2) $\Delta E_{(y+2)}$	(3) $\Delta E_{(y+3)}$	(4) $\Delta GP_{(y+1)}$	(5) $\Delta GP_{(y+2)}$	(6) $\Delta GP_{(y+3)}$
abs(ΔDIV>0)	0.021***	0.018***	0.018**	0.012***	0.015	0.013
	(4.938)	(2.706)	(2.186)	(2.718)	(1.513)	(0.905)
abs(ΔDIV<0)	-0.047***	-0.019**	-0.022**	-0.023***	-0.034***	-0.047***
	(-5.284)	(-2.181)	(-2.155)	(-3.641)	(-3.643)	(-3.452)
Intercept	-0.007**	0.000	0.004	0.005***	0.011***	0.016***
	(-2.629)	(0.003)	(0.826)	(4.536)	(4.392)	(4.178)
Controls	Included	Included	Included	Included	Included	Included
Observations	165,558	154,945	145,042	134,439	124,683	115,986
R-squared	0.187	0.114	0.093	0.290	0.199	0.194

Panel B: Operating Expenses and R&D

	(1) $\Delta OpExp_{(y+1)}$	(2) $\Delta OpExp_{(y+2)}$	(3) $\Delta OpExp_{(y+3)}$	(4) $\Delta R\&D_{(y+1)}$	(5) $\Delta R\&D_{(y+2)}$	(6) $\Delta R\&D_{(y+3)}$
abs(ΔDIV>0)	0.009**	0.017*	0.023*	0.000	0.001	0.001
	(2.309)	(2.010)	(1.703)	(1.366)	(1.274)	(1.168)
abs(ΔDIV<0)	-0.025***	-0.055***	-0.072***	-0.001**	-0.002*	-0.003*
	(-3.003)	(-4.488)	(-4.717)	(-2.102)	(-1.999)	(-1.980)
Intercept	0.006***	0.012***	0.016***	0.000*	0.001*	0.002**
	(7.479)	(5.973)	(5.586)	(1.689)	(1.911)	(2.241)
Controls	Included	Included	Included	Included	Included	Included
Observations	134,439	124,675	115,979	112,956	104,228	96,371
R-squared	0.205	0.194	0.209	0.156	0.158	0.160

Panel C: Special Items and Operating Cash Flows

	(1) $\Delta Special_{(y+1)}$	(2) $\Delta Special_{(y+2)}$	(3) $\Delta Special_{(y+3)}$	(4) $\Delta OCF_{(y+1)}$	(5) $\Delta OCF_{(y+2)}$	(6) $\Delta OCF_{(y+3)}$
abs(ΔDIV>0)	0.003***	0.001	0.001	0.011***	0.012***	0.009*
	(3.082)	(1.513)	(1.437)	(4.753)	(2.968)	(1.893)
abs(ΔDIV<0)	-0.007***	0.002	0.002	-0.012**	-0.019**	-0.029***
	(-2.955)	(0.841)	(1.134)	(-2.467)	(-2.724)	(-3.677)
Intercept	-0.004***	-0.005***	-0.006***	0.015***	0.019***	0.022***
	(-8.069)	(-7.908)	(-9.078)	(7.284)	(7.977)	(5.923)
Controls	Included	Included	Included	Included	Included	Included
Observations	113,821	102,440	93,889	80,345	73,704	67,304
R-squared	0.337	0.285	0.238	0.165	0.121	0.087

This table reports OLS regression results. The dependent variable is earnings or gross profit in Panel A, operating expenses or R&D in Panel B, and special items or operating cash flows in Panel C. The control variables are analogous to those reported in Table 2. They include the five past return variables, the level and change of the corresponding dependent variable for the four quarters before the dividend announcement, and the six non-linear controls for the level and change of the corresponding dependent variable for the year before the dividend announcement. Standard errors are clustered by year of the dividend declaration. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Appendix A reports variable definitions. Figure 1 depicts the timeline for quarter and year designations.

Table 4: Dividend Policy and Market Reactions to Dividends

Panel A: Market Reactions to Dividends

	(1)	(2)	(3)
	$Ret_{(-2,+2)}$	$Ret_{(-2,+2)}$	$Ret_{(-2,+2)}$
I(ΔDIV>0)	0.003***	0.005***	0.005***
	(4.986)	(7.852)	(7.892)
I(ΔDIV<0)	-0.023***	-0.027***	-0.028***
	(-6.763)	(-8.300)	(-8.096)
ΔDIV	0.028***	0.018***	0.012***
	(5.824)	(9.547)	(7.411)
ΔDIV*abs(ΔDIV)	-0.011***		
	(-3.604)		
ΔDIV*Past abs(ΔDiv)		-0.089***	
		(-5.577)	
ΔDIV*Past I(ΔDiv<0)			-0.028**
			(-2.575)
Intercept	0.001***	0.001***	0.001***
	(4.887)	(4.887)	(4.887)
Observations	162,747	162,747	162,747
R-squared	0.012	0.012	0.012

Panel B: Dividend Policy

	(1)	(2)	(3)	(4)	(5)
	Past abs(ΔDiv)	Past I(ΔDiv<0)	Future ΔDiv	Future abs(ΔDiv)	Future I(ΔDiv<0)
I(ΔDIV<0)	0.025***	0.021***	0.009***	0.027***	0.025***
	(3.776)	(5.037)	(3.782)	(6.465)	(5.987)
I(ΔDIV[1,50])	0.005***	-0.000	0.003***	0.001	-0.001**
	(9.859)	(-0.013)	(7.303)	(1.358)	(-2.367)
I(ΔDIV[51,100])	0.026***	0.023***	0.017***	0.027***	0.016***
	(9.160)	(9.099)	(11.944)	(11.030)	(5.451)
I(ΔDIV>100)	0.053***	0.048***	-0.018**	0.088***	0.092***
	(7.086)	(5.767)	(-2.456)	(9.372)	(6.903)
Intercept	0.037***	0.024***	0.019***	0.034***	0.024***
	(32.587)	(22.462)	(17.739)	(36.364)	(29.366)
Observations	162,747	162,747	162,747	162,747	162,747
R-squared	0.010	0.005	0.004	0.016	0.009

This table reports OLS regression results. In Panel A the dependent variable is the 5-day market-adjusted return centered on the dividend declaration. In Panel B the dependent variables include past and future dividend policy characteristics. Standard errors are clustered by year of the dividend declaration. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Appendix A reports variable definitions.

Table 5: Information Content with Alternative Measures of Dividend News

Panel A: Earnings

	(1) $\Delta E_{(y+1)}$	(2) $\Delta E_{(y+2)}$	(3) $\Delta E_{(y+3)}$	(4) $\Delta E_{(y+1)}$	(5) $\Delta E_{(y+2)}$	(6) $\Delta E_{(y+3)}$
rank(ΔDIV>0)	0.018***	0.017***	0.017***			
	(10.130)	(5.767)	(4.249)			
rank(ΔDIV<0)	-0.043***	-0.018**	-0.021**			
	(-5.462)	(-2.258)	(-2.212)			
pret(ΔDIV>0)				0.934***	0.983***	1.039***
				(13.563)	(7.310)	(5.670)
pret(ΔDIV<0)				-0.537***	-0.143	-0.105
				(-6.661)	(-1.431)	(-0.932)
Intercept	-0.007***	-0.001	0.004	-0.007***	-0.001	0.003
	(-2.842)	(-0.136)	(0.711)	(-2.851)	(-0.172)	(0.654)
Controls	Included	Included	Included	Included	Included	Included
Observations	165,558	154,945	145,042	165,558	154,945	145,042
R-squared	0.189	0.114	0.093	0.189	0.115	0.094

Panel B: Gross Profit

	(1) $\Delta GP_{(y+1)}$	(2) $\Delta GP_{(y+2)}$	(3) $\Delta GP_{(y+3)}$	(4) $\Delta GP_{(y+1)}$	(5) $\Delta GP_{(y+2)}$	(6) $\Delta GP_{(y+3)}$
rank(ΔDIV>0)	0.013***	0.020***	0.024***			
	(5.824)	(4.601)	(3.593)			
rank(ΔDIV<0)	-0.020***	-0.031***	-0.042***			
	(-3.584)	(-3.670)	(-3.423)			
pret(ΔDIV>0)				0.677***	1.120***	1.405***
				(6.464)	(5.547)	(4.904)
pret(ΔDIV<0)				-0.262***	-0.289**	-0.346**
				(-3.520)	(-2.532)	(-2.035)
Intercept	0.005***	0.010***	0.015***	0.005***	0.010***	0.014***
	(4.280)	(4.171)	(4.009)	(4.057)	(3.951)	(3.821)
Controls	Included	Included	Included	Included	Included	Included
Observations	134,439	124,683	115,986	134,439	124,683	115,986
R-squared	0.290	0.199	0.195	0.290	0.200	0.195

Panel C: Operating Cash Flows

	(1) $\Delta OCF_{(y+1)}$	(2) $\Delta OCF_{(y+2)}$	(3) $\Delta OCF_{(y+3)}$	(4) $\Delta OCF_{(y+1)}$	(5) $\Delta OCF_{(y+2)}$	(6) $\Delta OCF_{(y+3)}$
rank(ΔDIV>0)	0.013***	0.018***	0.017***			
	(10.253)	(7.846)	(5.431)			
rank(ΔDIV<0)	-0.010**	-0.017**	-0.025***			
	(-2.401)	(-2.723)	(-3.661)			
pret(ΔDIV>0)				0.653***	0.912***	0.850***
				(10.712)	(7.993)	(5.667)
pret(ΔDIV<0)				-0.160**	-0.242**	-0.345***
				(-2.212)	(-2.223)	(-3.159)
Intercept	0.014***	0.019***	0.022***	0.014***	0.019***	0.022***
	(7.125)	(7.798)	(5.809)	(7.101)	(7.792)	(5.795)
Controls	Included	Included	Included	Included	Included	Included
Observations	80,345	73,704	67,304	80,345	73,704	67,304
R-squared	0.166	0.122	0.088	0.166	0.122	0.088

This table reports OLS regression results. The dependent variables are changes in earnings in Panel A, gross profits in Panel B, and operating cash flows in Panel C. The control variables are analogous to those reported in Table 2. They include the five past return variables, the level and change of the corresponding dependent variable for the four quarters before the dividend announcement, and the six non-linear controls for the level and change of the corresponding dependent variable for the year before the dividend announcement. Standard errors are clustered by year of the dividend declaration. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Appendix A reports variable definitions. Figure 1 depicts the timeline for quarter and year designations.

Table 6: Analyst Forecasts

	(1) $FE_{(y+1)}$	(2) $FE_{(y+2)}$	(3) $REV_{(y+1)}$	(4) $REV_{(y+2)}$	(5) $FE_{(y+1)}$	(6) $FE_{(y+2)}$	(7) $REV_{(y+1)}$	(8) $REV_{(y+2)}$
rank(ΔDIV>0)	0.003***	0.005***	0.000***	0.001***				
	(5.042)	(4.757)	(3.790)	(4.662)				
rank(ΔDIV<0)	-0.010***	-0.010	-0.002***	-0.002**				
	(-2.790)	(-1.460)	(-3.319)	(-2.294)				
pret(ΔDIV>0)					0.133***	0.293***	0.020***	0.031***
					(4.986)	(4.878)	(3.850)	(4.654)
pret(ΔDIV<0)					-0.181***	-0.160	-0.024***	-0.027***
					(-3.580)	(-1.591)	(-4.562)	(-2.775)
$FE_{(y-1)}$	0.793***	1.121***	0.039***	0.019*	0.791***	1.120***	0.039***	0.019*
	(13.589)	(7.414)	(6.740)	(1.979)	(13.583)	(7.421)	(6.740)	(1.961)
$Ret_{(-2,-20)}$	0.018***	0.051***	0.004***	0.007***	0.018***	0.051***	0.004***	0.007***
	(10.750)	(11.582)	(14.929)	(10.056)	(10.719)	(11.579)	(15.049)	(10.090)
$Ret_{(-21,-40)}$	0.014***	0.047***	0.003***	0.005***	0.014***	0.047***	0.003***	0.005***
	(6.841)	(9.873)	(7.749)	(7.022)	(6.809)	(9.837)	(7.756)	(7.022)
$Ret_{(-41,-60)}$	0.013***	0.041***	0.003***	0.005***	0.013***	0.041***	0.003***	0.005***
	(6.479)	(8.463)	(8.259)	(8.006)	(6.410)	(8.432)	(8.221)	(8.010)
$Ret_{(-61,-120)}$	0.011***	0.034***	0.002***	0.003***	0.011***	0.034***	0.002***	0.003***
	(7.804)	(8.550)	(7.365)	(6.740)	(7.770)	(8.544)	(7.338)	(6.716)
$Ret_{(-121,-240)}$	0.007***	0.018***	0.001***	0.001**	0.007***	0.018***	0.001***	0.001**
	(7.139)	(6.903)	(4.937)	(2.687)	(7.148)	(6.887)	(4.938)	(2.680)
Intercept	-0.003***	-0.011***	-0.001***	-0.001***	-0.003***	-0.011***	-0.001***	-0.001***
	(-5.955)	(-6.476)	(-8.233)	(-5.571)	(-5.916)	(-6.453)	(-8.181)	(-5.555)
Observations	413,510	340,364	413,510	340,364	413,510	340,364	413,510	340,364
R-squared	0.096	0.083	0.032	0.036	0.097	0.083	0.032	0.037

This table reports OLS regression results. The dependent variable is analyst forecast errors or analyst forecast revisions for the time period denoted in the variable name. Standard errors are clustered by year of the dividend declaration. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Appendix A reports variable definitions.

Table 7: Persistence of Past Earnings Changes

	(1) $\Delta E_{(fy+1)}$	(2) $\Delta E_{(y+1)}$	(3) $\Delta E_{(y+1)}$
ΔDIV	-0.013***	0.029***	0.025***
	(-3.018)	(4.551)	(4.707)
$\Delta DIV*\Delta E_{(fy0)}$	0.159**		
	(2.438)		
$\Delta DIV*\Delta E_{(y-1)}$		0.070	0.017
		(1.354)	(0.432)
Intercept	0.008***	0.005**	-0.007***
	(3.318)	(2.632)	(-2.744)
Controls	Excluded	Excluded	Included
Observations	176,757	165,558	165,558
R-squared	0.001	0.003	0.187

This table reports OLS regression results. The dependent variable is the earnings change for the time period denoted in the variable name. The control variables in column (3) are the same as the control variables in Panel A of Table 2. Standard errors are clustered by year of the dividend declaration. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Appendix A reports variable definitions. Figure 1 depicts the timeline for quarter and year designations.

Table 8: Information Content of Buybacks vs. Dividends

	(1) $\Delta E_{(y+1)}$	(2) $\Delta E_{(y+2)}$	(3) $\Delta E_{(y+3)}$	(4) $\Delta E_{(y+1)}$	(5) $\Delta E_{(y+2)}$	(6) $\Delta E_{(y+3)}$
rank(Buyback)	0.008***	0.000	-0.002	0.005***	-0.001	-0.005*
	(6.506)	(0.175)	(-1.152)	(3.134)	(-0.325)	(-2.054)
rank(ΔDIV)				0.009***	0.009***	0.007***
				(6.329)	(4.812)	(3.240)
Intercept	-0.028***	-0.024***	-0.021***	-0.010**	0.002	0.008*
	(-8.560)	(-5.099)	(-4.120)	(-2.329)	(0.609)	(1.917)
rank(ΔDIV) – rank(Buyback)				p<0.05	p<0.05	p<0.01
Controls	Included	Included	Included	Included	Included	Included
Observations	388,170	343,052	301,749	64,445	59,027	53,352
R-squared	0.243	0.231	0.207	0.229	0.178	0.179

This table reports OLS regression results. The dependent variable is the earnings change for the time period denoted in the variable name. The control variables are the same as the control variables in Panel A of Table 2. The only exception is the five past return variables are calculated relative to the quarter q-1 earnings announcement. Standard errors are clustered by year of the quarter q-1 earnings announcement. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Appendix A reports variable definitions. Figure 1 depicts the timeline for quarter and year designations.

Appendix A: Variable Definitions

Dividend Variables	
Name	**Definition**
ΔDIV	Current quarterly dividend less the prior quarterly dividend divided by the prior quarterly dividend.
abs(ΔDIV)	Absolute value of ΔDIV.
rank(ΔDIV)	Percentile rank of ΔDIV.
I(ΔDIV>0) / I(ΔDIV<0)	Indicator variable equal to one if ΔDIV is positive/negative (greater/less than +/- 0.1%), zero otherwise.
Past/Future ΔDIV / abs(ΔDIV) / I(ΔDIV<0)	Average of ΔDIV, abs(ΔDIV), or I(ΔDIV<0) over the past/future five years.
I(ΔDIV[1,50]) / I(ΔDIV[51,100]) / I(ΔDIV>100)	Indicator variable equal to one if ΔDIV is greater than zero and less than or equal to 50%, greater than 50% and less than or equal to 100%, or greater than 100%, zero otherwise.
abs(ΔDIV>0) / abs(ΔDIV<0)	Absolute value of ΔDIV if ΔDIV is greater/less than 0.
rank(ΔDIV>0) / rank(ΔDIV<0)	Percentile rank of ΔDIV if ΔDIV is greater/less than 0.
pret(ΔDIV>0) / pret(ΔDIV<0)	Predicted return if ΔDIV is greater/less than 0. The predicted return is estimated as the predicted value from regressing the five-day return centered on the dividend declaration on (i) the dividend change, (ii) the signed squared dividend change and (iii) indicators for positive and negative dividend changes.
Earnings Variables	
Name	**Definition**
$\Delta E_{(y+n)}$	Difference between the sum of the four quarterly earnings announced before the dividend declaration and earnings for four consecutive quarters after the dividend declaration. The first (second, third) year's earnings changes begin with the first (fifth, ninth) quarters after the dividend declaration. All changes are scaled by the market value of equity one year before the dividend declaration.
$E_{(q-n)}$	Earnings before extraordinary items (IBQ) announced n quarters before the dividend declaration, scaled by the market value of equity one year before the dividend declaration.
$\Delta E_{(q-n)}$	Earnings before extraordinary items (IBQ) announced n quarters before the dividend declaration less earnings before extraordinary items for the same quarter in the prior year, scaled by the market value of equity one year before the dividend declaration.
GP	Gross profit equals revenue (SALEQ) less cost of goods sold (COGSQ) scaled by total assets one year before the dividend declaration. The naming convention for the timing of the variable follows that of the earnings variables above.
OpExp	Operating expenses equal gross profit (SALEQ-COGSQ) less earnings before extraordinary items (IBQ) scaled by total assets one year before the dividend declaration. The naming convention for the timing of the variable follows that of the earnings variables above.
R&D	Research and development expenses (XRDQ) scaled by total assets one year before the dividend declaration. The naming convention for the timing of the variable follows that of the earnings variables above.

Special	Special items (SPIQ) scaled by total assets one year before the dividend declaration. The naming convention for the timing of the variable follows that of the earnings variables above.
OCF	Operating cash flows (OANCFY transformed to quarterly values) scaled by total assets one year before the dividend declaration. The naming convention for the timing of the variable follows that of the earnings variables above.
ROA	Return on assets equals operating income before depreciation (OIBDPQ) scaled by total assets one year before the dividend declaration. The naming convention for the timing of the variable follows that of the earnings variables above.
$\Delta E_{(fy+n)}$	Difference between the fiscal year earnings during which the dividend is announced and fiscal year earnings for the one, two, and three years after the dividend declaration.
$E_{(fqn)}$	Earnings for fiscal quarter n during the fiscal year of the dividend declaration.
$\Delta E_{(fqn)}$	Earnings for fiscal quarter n during the fiscal year of the dividend declaration less the same quarter's earnings in the prior year.
Other Variables	
Name	**Definition**
$Ret_{(-j,+k)}$	Daily compounded returns from j trading days before the dividend declaration to k trading days after the dividend declaration less the daily compounded return to the value-weighted market portfolio over the same period.
$FE_{(y+n)}$	Analyst forecast errors for the earnings per share forecast n years ahead. The forecast error is the EPS forecast issued between the most recent earnings announcement date and one day before the dividend declaration date, inclusive, scaled by price at the prior earnings announcement.
$REV_{(q+n)}$	Analyst revisions to the earnings per share forecast n years ahead. The revision is the difference between the post-declaration forecast and the pre-declaration forecast, scaled by price at the prior earnings announcement. The post-declaration forecast is the EPS forecast issued between the dividend declaration date and one day before the upcoming earnings announcement date, inclusive. If the analyst does not revise the forecast in the post-declaration period, the revision is set to zero.
rank(Buyback)	Percentile rank of the authorized buyback (shares authorized scaled by shares outstanding).