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Dividend Changes and the Persistence of Past Earnings Changes

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ABSTRACT

We examine whether the market interprets changes in dividends as a signal about the persistence of past earnings changes. Prior to observing this signal, investors may believe that past earnings changes are not necessarily indicative of future earnings levels. We empirically investigate whether a change in dividends alters investors' assessments about the valuation implications of past earnings. Results confirm the hypothesis that changes in dividends cause investors to revise their expectations about the persistence of past earnings changes. This effect varies predictably with the magnitude of the dividend change and the sign of the past earnings change.

THIS STUDY EXAMINES THE ROLE OF CHANGES in dividends in informing investors about the persistence of past earnings changes. The persistence of earnings is the extent to which an unexpected change in earnings revises expectations of future earnings (for one or more periods) in the same direction as the unexpected change. Prior theory and evidence suggest that highly persistent changes in earnings are more indicative of changes in firm value than less persistent changes in earnings.[1] However, prior research also suggests that investors are initially unable to discern the persistence of earnings following an earnings announcement. This uncertainty about the persistence of earnings is resolved as later earnings announcements for subsequent quarters provide additional information.[2] Changes in dividends may also play a role in revising investors' assessments of the persistence of past earnings because managers are reluctant to increase (decrease) dividends unless earnings increases (decreases) are persistent. We investigate whether investors interpret a change in dividends as a signal about the persistence of past earnings changes by examining the

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[1] Miller and Rock (1985) develop this idea analytically. Kormendi and Lipe (1987), Easton and Zmijewski (1989), and Penman (1992) predict and find evidence that security price reactions to earnings announcements are positively related to the persistence of earnings.

[2] Freeman and Tse (1989) find a delayed reaction to earnings changes, as investors wait for the earnings announcements from subsequent periods to either confirm or contradict the good or bad news of the current period.

statistical relation between the market reaction surrounding changes in dividends and recent past earnings changes.

While numerous studies have documented a positive association between announced changes in dividends and contemporaneous stock price movements, there is no consensus as to what causes this association.[3] In addition, prior research suggests that contemporaneous earnings announcements and dividend changes have a corroborative effect as if investors use one to evaluate the information content of the other. However, empirical results are mixed and the exact nature of the relation between earnings and dividends is unknown.[4] Finally, prior research suggests that investors reevaluate the persistence of past earnings in light of subsequent earnings announcements. This paper integrates these three lines of research by using the nature of the relation between earnings and dividend changes to suggest that investors interpret changes in dividends as a signal of the persistence of past earnings changes.

Our study modifies Healy and Palepu's (1988) hypothesis that dividend changes signal managers' private information about future earnings changes. Using a sample of dividend initiations (the first instance where a firm pays out cash dividends) and omissions (a skipped dividend payment), Healy and Palepu (1988) find a positive relation between abnormal returns around these events and subsequent changes in earnings. They interpret this as evidence that investors treat extreme changes in dividends as information about managers' forecasts of future earnings changes. The role of dividend changes in signaling the direction of future earnings changes is also consistent with the results of Carroll (1995), who finds a positive relation between dividend changes and analyst forecast revisions spanning up to five quarters ahead. More recently, however, Benartzi, Michaely, and Thaler (1997) find evidence that the relation proposed by Healy and Palepu (1988) does not hold true for the more general case of changes to regular cash dividends. Specifically, Benartzi, Michaely, and Thaler (1997) find that noninitiation and nonomission dividend changes are preceded by earnings changes of the same direction, but do not find evidence that these dividend changes are followed by subsequent earnings changes in the same direction.

We integrate the conflicting results of Healy and Palepu (1988) and Benartzi, Michaely, and Thaler (1997) by investigating whether investors interpret a change in dividends as a signal of the persistence of past earnings. Our paper is similar to Healy and Palepu (1988) in that we also argue there is a

[3] Early studies documenting the association between dividend changes and contemporaneous stock price movements include Pettit (1972) and Watts (1973). More recent studies include Healy and Palepu (1988), Lang and Litzenberger (1989), and Michaely, Thaler, and Womack (1995).

[4] Kane, Lee, and Marcus (1984) suggest that earnings and dividends are both noisy signals of firm value and suggest a corroborative relation—investors give more credence to unanticipated dividend increases (decreases) when earnings are also above (below) expectations, or vice versa. Leftwich and Zmijewski (1994) examine a sample of approximately 1,000 contemporaneous quarterly dividend and earnings announcements and find that the dividend announcement seems to provide little incremental information over the earnings announcement unless the earnings surprise indicates favorable news and the contemporaneous dividend change indicates unfavorable news.

relation between dividend changes and earnings changes. However, consistent with Benartzi, Michaely, and Thaler's (1997) findings that dividend changes are not followed by earnings changes in the same direction, we shift the focus to the role of dividend changes in altering investors' perceptions of past earnings. Whether dividend changes signal future earnings changes (Healy and Palepu's (1988) focus) or the persistence of past earnings changes (our focus) has very different implications for the time series of earnings. In the predictions of Healy and Palepu (1988), a dividend initiation is followed by earnings increases in the next few periods. In contrast, if dividend changes instead signal the persistence of past earnings, there is no reason to expect dividend changes to be followed by earnings changes in the same direction. Under this hypothesis, all that is implied by a dividend increase is that past earnings increases will not "reverse" in future periods. The idea that dividend changes are not necessarily followed by subsequent earnings changes in the same direction is consistent with both the empirical results of Benartzi, Michaely, and Thaler (1997) and our predictions on the statistical relation between price responses to dividend news and past earnings.

We use a simple model of price responses to earnings news to motivate tests of the statistical relation between price reactions to dividend changes and past earnings news. Our statistical tests also include proxies to control for the possibility that changes in dividends signal future changes in earnings (as proposed by Healy and Palepu (1988)). Our results are consistent with the hypothesis that the market interprets changes in dividends as information about the persistence of past earnings changes. We document that when dividend changes confirm past earnings changes, there is a positive statistical relation between market returns around dividend announcements and past earnings changes. This suggests that part of the dividend announcement effect is a delayed reaction to past earnings news. The magnitude of this statistical relation varies predictably with the sign of past earnings changes and the magnitude of the dividend change. For dividend changes that contradict prior earnings news, we find a negative statistical relation between market returns around dividend announcements and past earnings changes.

Our results make two important contributions to the empirical literature. First, this paper extends the findings of Kane, Lee, and Marcus (1984) and Leftwich and Zmijewski (1994) by examining a more precise relation between earnings and dividend changes—specifically, changes in dividends signal managers' private information about the persistence of past earnings changes. Second, while there is a great deal of evidence that price responses to earnings news vary with the persistence of earnings, there is very little evidence on how investors assess the persistence of earnings and how they update that assessment. Our results suggest that changes in dividends play an important role in helping to resolve uncertainty regarding the implications of earnings changes for firm value.

In a recent study, Fama and French (2001) document that the percentage of U.S. industrial firms paying dividends has declined between 1978 and 1999 from 66.5% to 20.8%. In a follow-up study, DeAngelo, DeAngelo, and Skinner

(2004) document that aggregate real dividends paid by industrials have actually increased over the same period (from $31.3 billion in 1978 to $38.4 billion in 2000). DeAngelo, DeAngelo, and Skinner (2004) attribute this increasing concentration in the supply of dividends to an increasing concentration in earnings. The results of DeAngelo, DeAngelo, and Skinner (2004) suggest that dividends are still an important economic phenomenon and confirm the link between dividends and earnings. However, while the fact that a large number of industrial firms do not pay dividends does not invalidate signaling hypotheses, it does raise some doubts regarding whether signaling is a first-order determinant of payout policy. Our study documents the extent to which investors interpret a change in dividends as a signal of the persistence of past earnings changes, but we do not directly examine the extent to which the intent to provide such a signal affects management decisions regarding dividends.

Section I presents a simple model of lagged earnings response coefficients (ERCs) and develops empirical predictions on the relation between past earnings changes and stock price reactions to dividend changes. Our research design and sample selection criteria are discussed in Section II. Results are presented in Section III, and Section IV concludes.

I. Development of Empirical Predictions

Prior theory and evidence suggest that price responses to earnings news vary proportionally with the persistence of earnings, which is defined as the extent to which an unexpected change in earnings revises expectations of future earnings in the same direction. The intuition behind this result is as follows. Assume that stock price equals the discounted value of expected future dividends. The information in earnings announcements generates revisions in expectations of future earnings, although some earnings announcements cause larger revisions in expected future earnings than others. Assuming that changes in expected future earnings proxy for changes in expected future dividends, large revisions in expected future earnings suggest large revisions in expected future dividends. All else being equal, the market reaction to earnings news is therefore increasing in the extent to which the information in an earnings announcement results in revisions of expected future earnings.

Empirical investigations of the relation between unexpected price changes and unexpected earnings are often based on ERCs, the slope coefficient from regressions of unexpected returns on unexpected earnings. An ERC represents the change in price that is associated with a one dollar unexpected change in earnings. Our statistical tests are motivated by Freeman and Tse's (1989) model of lagged ERCs. For ease of exposition, we examine the case in which an earnings change at time q (ΔE_q) is "permanent" (an earnings change associated with large revisions in future earnings) or "transitory" (an earnings change associated with smaller revisions in future earnings). Based on prior research, we assume that if investors can discern the persistence of earnings, then the price reaction to a permanent earnings change (ERC_{perm}) is greater than the price reaction to a transitory earnings change (ERC_{trans}). We assume

that market participants are initially unable to determine the persistence of an earnings change, but instead have initial beliefs such that p represents the probability that the earnings change is permanent, and $(1 - p)$ represents the probability that the earnings change is transitory. The initial reaction to an earnings change ($R_{initial}$) is then a weighted average of the ERCs such that:

$$R_{initial} = [pERC_{perm} + (1 - p)ERC_{trans}]\Delta E_q. \tag{1}$$

While investors are initially unable to discern the persistence of earnings, a subsequent event could help resolve this uncertainty. Such a subsequent event would move the probability that the earnings change is permanent from p (prior belief) to p' (posterior belief). The market reaction to this subsequent event ($R_{subsequent}$) is then:

$$\begin{aligned} R_{subsequent} = {} & [p'ERC_{perm} + (1 - p')ERC_{trans}]\Delta E_q \\ & - [pERC_{perm} + (1 - p)ERC_{trans}]\Delta E_q, \end{aligned} \tag{2}$$

which implies

$$R_{subsequent} = \Delta p(ERC_{perm} - ERC_{trans})\Delta E_q, \tag{3}$$

where

$$\Delta p = p' - p. \tag{4}$$

This suggests that current period returns continue to be a function of prior earnings news, when additional information causes investors to reassess the implications of prior earnings news for expected future earnings. Because $ERC_{perm} > ERC_{trans}$, a firm with $\Delta E_q > 0$ and a subsequent event which increases the market's assessment of the persistence of earnings ($\Delta p > 0$) will have a positive market reaction to the subsequent announcement ($R_{subsequent} > 0$). Furthermore, the market reaction is increasing in both the past earnings change (ΔE_q) and the magnitude of belief revision (Δp). Overall, this suggests a positive relation between an earnings change and the market reaction to a subsequent event that confirms the persistence of that earnings change. As another example, suppose a firm experiences a negative earnings change ($\Delta E_q < 0$) and a subsequent event increases the market's assessment of the persistence of earnings ($\Delta p > 0$). This implies that the market reaction to the subsequent event is now negative. Since the past earnings news is also negative, the relation between the market reaction to the subsequent event and the past earnings change is still positive. In the special case where the subsequent event resolves all uncertainty and indicates that a past earnings change is permanent, the market reaction is given by:

$$R_{subsequent} = (1 - p)(ERC_{perm} - ERC_{trans})\Delta E_q. \tag{5}$$

Prior theory and empirical evidence suggest a connection between changes in dividends and the persistence of past earnings. For example, Lintner (1956)

suggests that firms have target payout ratios. Lintner (1956) also suggests that firms may be unwilling to change dividends unless managers feel that the new dividend level can be sustained, in order to avoid the adverse investor reaction that accompanies dividend cuts. Miller and Modigliani (1961) argue that, given the presence of target payout ratios and an unwillingness to cut dividends, investors have good reason to interpret a change in dividends as a change in managements' view of the future prospects of the firm. A similar idea can be found in Miller and Rock's (1985) asymmetric information model in which managers set dividends based on their private information about the state of the firm's earnings stream and investors are then able to discern the persistence of earnings from the observable change in dividends. The theoretical link between dividend changes and the persistence of earnings changes is consistent with the empirical evidence in Kormendi and Zarowin (1996), DeAngelo, DeAngelo, and Skinner (1992), Benartzi, Michaely, and Thaler (1997), and Guay and Harford (2000). Kormendi and Zarowin (1996) examine a long time-series of earnings and dividend data for a small sample of firms and find that firms that tend to have persistent earnings changes also tend to have dividend changes. DeAngelo, DeAngelo, and Skinner (1992) find that losses followed by dividend cuts tend to persist, while losses that are not followed by dividend cuts are more likely to reverse. Benartzi, Michaely, and Thaler (1997) document that firms which increase dividends following a period of earnings growth are less likely than nonchanging firms to experience a drop in future earnings. Guay and Harford (2000) find that the market uses the announcement regarding the type of cash payout (dividends versus share repurchases) to update its beliefs about the permanence of cash flow shocks.

Our empirical work examines the statistical relation between the market reaction to changes in dividends and past earnings changes. We hypothesize that investors are unable to immediately discern the persistence and valuation implications of an earnings change and that subsequent changes in dividends help resolve this uncertainty. The dividend change therefore provides investors with a previously missing piece of information needed to evaluate the implications that recent past earnings have for expected future earnings. Specifically, a dividend change with the same sign as a past earnings change is interpreted by investors as evidence that the past earnings change is expected to persist, revising their expectations of future earnings in the direction of the past change. In this case, the lagged ERC model presented above predicts a positive relation between the market reaction surrounding the dividend change and the past earnings change. Market reactions surrounding dividend changes are a well-documented phenomenon—our focus is on whether these market reactions are statistically related to past earnings. Specifically, we predict:

H1: When a dividend change is preceded by an earnings change of the same sign, the market reaction surrounding the announcement of the dividend change is positively related to the prior earnings change.

In the lagged ERC model presented above, the market reaction surrounding a confirming dividend change is a function of both the past earnings change

and the magnitude of belief revision (Δp). While it is extremely difficult to empirically observe persistence over short-time horizons, and even more difficult to distinguish proxies of persistence from proxies for investors' *assessment* of persistence, we use two indirect proxies for the extent of belief revision. First, we use the sign of the earnings change as a proxy for investors' initial assessment of persistence. Prior research on the time-series of earnings (e.g., Brooks and Buckmaster (1976) and Fama and French (2000)) suggests that, ceteris paribus, earnings increases are more likely to be persistent than are earnings decreases. If earnings decreases are, ex ante, expected to be less persistent than earnings increases, then a subsequent dividend cut that indicates the persistence of a past earnings decrease is expected to cause a larger belief revision than would be expected for a dividend increase that indicates the persistence of a past earnings increase. This is the basis for Hypothesis 2.

H2: The positive relation between the market reaction surrounding the announcement of a change in dividends and the preceding earnings change is larger for a dividend decrease that confirms a prior earnings decrease than for a dividend increase that confirms a prior earnings increase.

As an additional proxy for the extent of belief revision, we include the absolute value of the dividend change, scaled by the absolute value of the prior earnings change. Lintner (1956) notes that managers often protect themselves from uncertainty about future earnings through the use of "partial adjustments"—dividend changes that are only a fraction of recent changes in earnings. Our intuition is that when the dividend change is large relative to the prior earnings change, the dividend change sends a very strong signal about management's assessment of the persistence of that past earnings change. In contrast, not much information is conveyed when the dividend change is quite small relative to the past earnings change. For example, a one dollar increase in quarterly earnings followed by a one dollar increase in regular quarterly dividends would suggest that management is quite confident that the entire previous earnings change is expected to persist. In contrast, a one dollar increase in quarterly earnings followed by a 10 cent increase in regular quarterly dividends sends a more ambiguous signal about the persistence of the past earnings change. This is the basis for Hypothesis 3.

H3: When a dividend change is preceded by an earnings change of the same sign, the positive relation between the market reaction surrounding the announcement of the dividend change and the prior earnings change is increasing in the magnitude of the scaled dividend change.

II. Sample Selection Criteria and Design of Empirical Tests

We test the above hypotheses on a sample of changes to regular quarterly cash dividends made after 1983 by New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ firms included in the 2001 Compustat

quarterly files and the 2001 Center for Research in Security Prices (CRSP) files. To remain in the sample, a firm must meet each of the following criteria:

(i) at least two consecutive quarterly regular cash dividends (code number 1232 in the CRSP data), a change in those consecutive quarterly regular cash dividends, and the declaration date for the change recorded in the CRSP master files;
(ii) quarterly earnings information for eight quarters prior to and eight quarters subsequent to the announcement of the dividend change (including an announcement date for the quarters immediately prior and subsequent to the dividend change) available in the Compustat quarterly files;
(iii) stock returns and beginning of period price for the 5-day period surrounding the announcement of the dividend change available in the CRSP daily files; and
(iv) Firm size decile returns for NYSE, AMEX, and NASDAQ available in the CRSP files.

In order to avoid the confounding effects of contemporaneous earnings announcements, we eliminate all observations for which an earnings announcement is made within 10 days of the dividend change announcement. This eliminates the special case of contemporaneous dividend and earnings changes examined by Kane, Lee, and Marcus (1984) and Leftwich and Zmijewski (1994). Our sample selection criteria also rule out the special case of dividend initiations. We do not investigate events such as special dividends, stock dividends, stock splits, or stock repurchases because these do not possess the same level of recurring commitment (and so do not have the same link to the persistence of earnings) that is associated with regular cash dividends. In order to focus on dividend changes that either confirm or contradict past earnings changes, we eliminate observations for which the preceding quarterly earnings change ($\Delta QEARN_{t,i}$, defined below) was zero.

Our initial search of CRSP identifies 23,939 changes to regular quarterly cash dividends. Requiring quarterly earnings information from Compustat reduces the sample size to 15,017 dividend changes. Requiring that dividend announcement dates occur on a business day, requiring data from CRSP to calculate announcement window abnormal returns, and eliminating observations with prior earnings changes equal to zero reduce the sample size to 13,945. Excluding observations in which quarterly earnings announcements fall within 10 days of the dividend declaration reduces the final sample size to 6,395 observations across 1,682 firms.[5] All numbers are adjusted for stock splits. Table I (Panel A) shows the breakdown of this sample by the sign of the dividend change and the sign of the prior quarterly earnings change. Our main hypotheses and empirical tests focus on the 4,694 "confirming" observations in which both the dividend change and prior earnings change are of the same sign. Additional

[5] We also conduct tests using the less stringent criterion of eliminating observations in which quarterly earnings announcements fall within five days of the dividend declaration. This criterion results in a final sample of 8,415 dividend changes made by 1,993 firms. The results using this alternate sample selection criterion are qualitatively similar to the results reported in Section III.

Table I
Sample Descriptive Statistics

This table presents descriptive statistics on the initial sample of 6,395 dividend change announcements made by 1,682 NYSE, AMEX, and NASDAQ firms between 1983 and 1999. The variable $\Delta DIV_{t,i}$ is the difference between two consecutive quarterly regular cash dividends. The variable $\Delta QEARN_{t,i}$, is the seasonal random walk change in earnings before extraordinary items, from the most recent quarterly earnings announcement made prior to the announcement of a dividend change. The variable $CAR_{t,i}$ is the summation of 5-day size-adjusted abnormal returns centered on the dividend announcement. The variable $\Delta FUTURE_{t,i}$ is the sum of seasonal random walk earnings changes for the eight quarters following dividend change announcements. The variables $\Delta QEARN_{t,i}$, $\Delta DIV_{t,i}$, and $\Delta FUTURE_{t,i}$ are each deflated by the firm's market value at the start of the 5-day window used to calculate $CAR_{t,i}$. Observations in which the dividend change and the past earnings change have the same sign are classified as confirming changes.

Panel A: Distribution of Dividend Changes and Prior Earnings Changes

	Prior Quarter Change in Earnings		
Change in Dividend	Increase in Earnings	Decrease in Earnings	Total
Dividend increase	4,444	1,446	5,890
Dividend decrease	255	250	505
Total	4,699	1,696	

Panel B: Percentiles of Key Variables for the Sample of 4,694 Confirming Changes

Variable	Max	90%	75%	Median	25%	10%	Min
$\Delta QEARN_{t,I}$	0.063	0.015	0.007	0.003	0.002	0.001	−0.057
$\Delta DIV_{t,i}/\Delta QEARN_{t,i}$	84	0.833	0.4	0.183	0.083	0.037	0.000
$CAR_{t,i}$	0.132	0.056	0.029	0.005	−0.015	−0.037	−0.111
$\Delta FUTURE_{t,i}$	0.21	0.054	0.028	0.012	−0.006	−0.046	−0.359

Panel C: Frequency of Dividend Changes over the Sample Period

Number of Firms	Number of Dividend Changes
531	1
325	2
219	3
143	4
98	5
76	6
290	More than 6

analysis (reported in Section III.C) is conducted on the remaining 1,701 "contradictory" observations in which the dividend change and prior earnings change have opposite signs.

In order to investigate the relation between market reactions to dividend changes and past earnings changes, we use the confirmation sample to estimate the following regression equation:

$$CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \varepsilon_{t,i}, \quad (6)$$

where $CAR_{t,i}$ is the cumulative abnormal returns for firm i for the 5-day period surrounding the announcement of a dividend change; $\Delta QEARN_{t,i}$ is the change in quarterly earnings for the most recent quarterly earnings announcement made prior to the dividend announcement (to test H1), deflated by market value at the start of the 5-day window used to calculate $CAR_{t,i}$; $\Delta FUTURE_{t,i}$ is the sum of the actual earnings changes for the eight quarters following the dividend announcement (to control for confounding effects posited by Healy and Palepu (1988)), deflated by market value at the start of the 5-day window used to calculate $CAR_{t,i}$; and $\varepsilon_{t,i}$ is the error term.

Cumulative abnormal returns ($CAR_{t,i}$) is the sum of daily abnormal returns beginning 2 days before the announced dividend change and ending 2 days after the announced dividend change. Daily abnormal returns are calculated using AMEX, NYSE, and NASDAQ size matched portfolios.

We calculate the most recent earnings change for firm i ($\Delta QEARN_{t,i}$) as the seasonal random walk change (i.e., earnings from quarter q minus earnings from quarter $q - 4$), from the most recent quarterly earnings announcement made prior to the announcement of the dividend change.[6] This variable is converted to a percentage of firm value by deflating the earnings change by the firm's market value at the start of the 5-day window used to calculate $CAR_{t,i}$. The coefficient on $\Delta QEARN_{t,i}$, β_1, measures the extent to which the most recent earnings change is statistically related to the market reaction surrounding a change in dividends. Hypothesis 1 (H1) predicts β_1 is greater than zero.

The change in future earnings ($\Delta FUTURE_{t,i}$) is defined as the sum of the eight actual quarterly seasonal random walk earnings changes announced subsequent to the announcement of a dividend change at time t for firm i. This variable is also converted to a percentage of firm value by deflating the future earnings change by the firm's market value at the start of the 5-day window used to calculate $CAR_{t,i}$. The coefficient β_2 measures the extent to which future earnings changes are anticipated by the market at the time that a dividend change is announced.

We expect that past earnings ($\Delta QEARN_{t,i}$) will have explanatory power for returns even after including $\Delta FUTURE_{t,i}$ because revisions in the assessment of past earnings can influence expectations of future earnings without suggesting either further additional earnings growth or subsequent earnings declines. For example, Benartzi, Michaely, and Thaler (1997) document that firms which increase dividends following a period of earnings growth are not more likely than nonchanging firms to experience subsequent increases in earnings. Instead, they find that firms which increase dividends following a period of earnings growth are less likely than nonchanging firms to experience a drop in future earnings. The results of Benartzi, Michaely, and Thaler (1997) suggest that a dividend increase could signal that prior earnings growth is unlikely to reverse in the near term without signaling any additional future growth. In this

[6] A seasonal random walk expectations model of earnings is used by Teets and Wasley (1996) and Lipe, Bryant, and Widener (1998). Our expectation model of earnings is also consistent with Hayn (1995) and Basu (1997), who use random walk models in calculating changes in annual earnings.

case, any revision in expected future earnings around a dividend change is not caused by an anticipation that there will be a near term earnings change—it is instead caused by the anticipation that there will *not* be a near term earnings change (i.e., recent earnings growth is not expected to reverse). While Healy and Palepu (1988) predict that the market reaction to extreme dividend changes (initiations and omissions) is positively related to the next 2 years of earnings changes, our tests focus on changes in regular cash dividends and we do not provide any prediction for this coefficient. We include $\Delta FUTURE_{t,i}$ as a link to prior research and to control for the results documented by Healy and Palepu (1988).

Hypotheses 2 and 3 suggest that the relation between the market reaction to a dividend change and the most recent earnings change varies cross-sectionally with the sign of the earnings change and the magnitude of the dividend change. To investigate whether the strength of this relation varies with the sign of the earnings change, we estimate the following regression equation:

$$CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \beta_3 \Delta QEARN_{t,i} \times POSDUM_{t,i} + \varepsilon_{t,i}, \quad (7)$$

where $POSDUM_{t,i}$ is the qualitative variable taking the value of one if the prior earnings change was positive and zero otherwise (to test H2), and all other variables are as defined in equation (6). For firms with negative prior earnings news, the relation between the market reaction at the dividend announcement and past earnings changes is given by β_1. For firms with positive prior earnings news, the relation between the market reaction at the dividend announcement and past earnings changes is given by $\beta_1 + \beta_3$. The coefficient β_3, therefore, captures the extent to which the relation between the dividend announcement effect and prior earnings changes differs across the sign of past earnings news. Hypothesis 2 (H2) predicts that β_3 will be negative.

We use the absolute value of the dividend change scaled by the absolute value of the prior earnings change as our second proxy for cross-sectional variation in belief revision. We first rank all confirmatory observations by the size of the scaled dividend change and then partition the sample into quartiles based on the size of the scaled dividend change. To examine how the relation between the market reaction to a dividend change and the most recent earnings change varies cross-sectionally across these four quartiles, we estimate the following regression equation:

$$\begin{aligned} CAR_{t,i} = {} & \alpha' + \beta_1' \Delta QEARN_{t,i} \times SIZEDUM1_{t,i} \\ & + \beta_2' \Delta QEARN_{t,i} \times SIZEDUM2_{t,i} + \beta_3' \Delta QEARN_{t,i} \times SIZEDUM3_{t,i} \\ & + \beta_4' \Delta QEARN_{t,i} \times SIZEDUM4_{t,i} + \beta_5' \Delta FUTURE_{t,i} + \varepsilon_{t,i}, \end{aligned} \quad (8)$$

where $SIZEDUMX_{t,i}$ is the qualitative variable taking the value of one if the absolute value of the dividend change scaled by the absolute value of the prior earnings change falls in quartile X and taking the value of zero otherwise, where X equals one through four (four being the quartile of largest scaled dividend

changes), and all other variables are as defined in equation (6). While there are four categories and four qualitative variables, the above specification does not suffer from perfect collinearity because each qualitative variable is interacted with $\Delta QEARN_{t,i}$. Additional diagnostics (not reported in the tables) suggest that the above specification also does not suffer from near-collinearity.

This specification allows us to separately estimate the relation between the market reaction to a dividend change and the most recent earnings change for each quartile of scaled dividend changes. Coefficients β'_1 through β'_4 give the relation for the quartile of smallest through largest changes. Hypothesis 3 (H3) predicts that the regression coefficients should increase monotonically as we move from the quartile of the smallest (β'_1) through the largest (β'_4) scaled dividend changes.

III. Results

A. Descriptive Statistics and Regression Results

Descriptive statistics for our sample of 4,694 confirming dividend changes are presented in Table I (Panel B). All independent variables from equation (6) are winsorized at the 1- and 99-percentiles to mitigate outlier effects.[7] The descriptive statistics suggest that dividend changes ($\Delta DIV_{t,i}$) tend to be smaller than the preceding earnings change ($\Delta QEARN_{t,i}$), with a median $\Delta DIV_{t,i}/\Delta QEARN_{t,i}$ of 0.183. Table I (Panel C) displays the frequency of dividend changes (both confirming and contradictory) per firm over the sample period. A total of 1,682 firms are present in our sample. These firms change their quarterly dividends 6,395 times during our sample period with a mean (median) of 3.8 (2) dividend changes.

Table II presents preliminary evidence on the extent to which a dividend change could signal a change in investors' expectations of future earnings. We compare the probability of reversals in past earnings performance for our sample of dividend changes to the probability of earnings reversals for a sample of firms that did not change dividends. This no-change sample is constructed by imposing the same sample selection criteria described in Section II except that in this control group we retain only those observations in which the next dividend announcement following the earnings change indicates no change in quarterly dividends. This generates a sample of 37,804 earnings changes (17,737 earnings increases and 20,067 earnings decreases) that are not followed by a change in dividends.

Table II (Panel A) displays the probability of experiencing future earnings decreases following an earnings increase in quarter t. We examine future earnings changes relative to a seasonal random walk for quarter $t+1$, quarter $t+4$, the sum of the next four quarters of earnings changes, and the sum of the next eight quarters of earnings changes. In every case, the probability that an earnings increase at quarter t will be followed by a subsequent reversal is lowest

[7] All results are qualitatively similar if the dependent variable is also winsorized. All results are also qualitatively similar if no adjustments are made to these outliers.

Table II
Probability of Earnings Reversals Conditioned on Changes in Earnings and Dividends

The main sample consists of 6,395 dividend change announcements made by 1,682 NYSE, AMEX, and NASDAQ firms between 1983 and 1999. This sample is compared to a control group of 37,804 earnings changes made by 2,061 firms in which the earnings change is not followed by a change in dividends. The probability of reversals in past earnings performance is examined over four horizons: one quarter ahead (q_{t+1}), the corresponding quarter from the next fiscal year (q_{t+4}), the sum of the next four quarters (1 year), and the sum of the next eight quarters (2 years). All earnings changes are calculated using a seasonal random walk model.

Panel A: Probability of Future Earnings Decreases Following an Earnings Increase in q_t

		Probability of Future Earnings Decrease			
Dividend Change	Obs	q_{t+1}	q_{t+4}	One Year	Two Years
Dividend increase	4,444	0.1625**	0.3220**	0.2507**	0.2982**
No change	17,737	0.2243	0.3757	0.3116	0.3426
Dividend decrease	255	0.2980**	0.3686	0.3922**	0.3569

Panel B: Probability of Future Earnings Increases Following an Earnings Decrease in q_t

		Probability of Future Earnings Increase			
Dividend Change	Obs	q_{t+1}	q_{t+4}	One Year	Two Years
Dividend increase	1,446	0.5076**	0.6812**	0.5961**	0.6425**
No change	20,067	0.3707	0.6388	0.5046	0.5616
Dividend decrease	250	0.2040**	0.5000**	0.3360**	0.4680**

**Indicates a significant difference from the respective no dividend change group at the 0.01 level based on a chi-square test and *Z*-test of proportions.

when the earnings increase is followed by a dividend increase. The probability of a reversal in earnings is significantly higher when the earnings increase is not followed by a change in dividends. The probability of reversal is highest when the earnings change is followed by a dividend cut.[8] Table II (Panel B) displays the probability of experiencing future earnings increases following an earnings decrease in quarter t. In every case, the probability that an earnings decrease in quarter t will be followed by a subsequent reversal is significantly lower when earnings decreases are followed by dividend cuts and significantly higher when followed by dividend increases. These results are consistent with our hypothesis that a dividend change with the same sign as the preceding earnings change indicates that the earnings change is less likely to reverse in future periods. Overall, these results are similar to the basic pattern of earnings following dividend changes documented by Benartzi, Michaely, and Thaler (1997), despite differences in sample period, sample selection criteria, and our focus on quarterly (rather than annual) dividends.

[8] The only exception to this pattern occurs at quarter $t + 4$. In that quarter, the probability of an earnings decrease is lower for firms with dividend cuts than it is for firms with no dividend change. A chi-square test and *Z*-test of proportions indicate the distributions here are not significantly different.

Table III
Estimation Results on the Confirmatory Effect of Dividend Announcements

This table reports the confirming effect of dividend announcements for a sample of dividend changes in which the dividend change and the most recent earnings change have the same sign.

Model (6) $CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \varepsilon_{t,i}$

Model (7) $CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \beta_3 \Delta QEARN_{t,i} \times POSDUM_{t,i} + \varepsilon_{t,i}$

Model (8) $CAR_{t,i} = \alpha' + \beta'_1 \Delta QEARN_{t,i} \times SIZEDUM1_{t,i} + \beta'_2 \Delta QEARN_{t,i} \times SIZEDUM2_{t,i} + \beta'_3 \Delta QEARN_{t,i} \times SIZEDUM3_{t,i} + \beta'_4 \Delta QEARN_{t,i} \times SIZEDUM4_{t,i} + \beta'_5 \Delta FUTURE_{t,i} + \varepsilon_{t,i}$

The variable $CAR_{t,i}$ is cumulative abnormal returns for the 5-day period beginning 2 days before the dividend change announcement and ending 2 days after the dividend change announcement. The variable $\Delta QEARN_{t,i}$ is the seasonal random walk earnings change for the quarter prior to the dividend announcement. The variable $\Delta FUTURE_{t,i}$ is the sum of the actual seasonal random walk earnings changes for the eight quarters following the dividend announcement. Both $\Delta QEARN_{t,i}$ and $\Delta FUTURE_{t,i}$ are deflated by the firm's market value at the start of the 5-day window used to calculate $CAR_{t,i}$. The qualitative variable $POSDUM_{t,i}$ takes a value of one if the prior earnings change was positive and zero otherwise. The variable $\varepsilon_{t,i}$ is an error term. The qualitative variables $SIZEDUM1_{t,i}$ through $SIZEDUM4_{t,i}$ take the value of one if the absolute value of the dividend change scaled by the absolute value of the prior earnings change falls into that particular quartile and take the value of zero otherwise. The variable $SIZEDUM1_{t,i}$ denotes the smallest quartile, and $SIZEDUM4_{t,i}$ denotes the largest quartile. The t-scores are in parentheses.

Panel A: Results for All Confirmation Observations ($n = 4{,}694$)

Model	α	β_1	β_2	β_3	Adj-R^2
Model (6)	0.005	0.575	0.055	–	0.04
	(6.58)	(11.18)	(5.69)	–	
Model (7)	0.007	1.035	0.046	−0.727	0.04
	(8.71)	(11.27)	(4.73)	(−6.04)	

Panel B: Confirmation Effect by Quartile of Dividend Size

Model	α'	β'_1	β'_2	β'_3	β'_4	β'_5	Adj-R^2
Model (8)	0.005	0.326	0.589	1.079	3.362	0.038	0.06
	(7.06)	(5.11)	(5.36)	(9.51)	(10.56)	(3.87)	

We test H1 by estimating equation (6) on our sample of 4,694 confirmatory dividend changes. Regression results are presented in Table III (Panel A). The coefficient on $\Delta QEARN_{t,i}$ is positive and statistically significant at the 0.01 level ($\beta_1 = 0.575, t = 11.18$). This suggests that the market reaction to dividend changes that confirm prior earnings changes are statistically related to past earnings changes, providing support for H1. The coefficient on $\Delta FUTURE_{t,i}$ is also significantly greater from zero ($\beta_2 = 0.055, t = 5.69$), suggesting that the market reaction to dividend changes that confirm prior earnings changes is also statistically related to the next 2 years of future earnings changes. This finding

is consistent with Healy and Palepu's (1988) findings for dividend initiations. Together these results suggest that part of the market reaction surrounding dividend changes is due to the resolution of uncertainty about the persistence of past earnings news as well as due to the market's anticipation of future earnings changes.

Hypothesis 2 (H2) is tested by estimating equation (7) on the sample of 4,694 confirmatory dividend changes. In this regression, $\beta_1(\beta_1 + \beta_3)$ indicates the relation between market reactions to dividend changes and past earnings when past earnings are negative (positive). The coefficient on $\Delta QEARN_{t,i} \times POSDUM_{t,i}$, β_3, indicates the extent to which the relation between the market reaction to dividend changes and the prior earnings change varies with the sign of the prior earnings change. Hypothesis 2 (H2) predicts that β_3 will be negative, implying that the relation is weaker for positive earnings changes (which are, ex ante, more likely to be persistent). Both β_1 and $\beta_1 + \beta_3$ are positive and significantly greater than zero ($\beta_1 = 1.035; \beta_1 + \beta_3 = 0.308$), suggesting that the positive relation between returns around dividend changes and past earnings changes holds regardless of the sign of the past earnings changes. The coefficient on $\Delta FUTURE_{t,i}$ remains statistically greater than zero ($\beta_2 = 0.046, t = 4.73$). The coefficient β_3 is significantly less than zero ($\beta_3 = -0.727, t = -6.04$), providing support for H2.

Hypothesis 3 (H3) predicts that, for our sample of confirming dividend changes, the positive relation between the market reaction to dividend changes and the prior earnings change increases with the magnitude of the dividend change (scaled by the magnitude of the prior earnings change). In regression equation (8), we rank all confirmatory observations by the size of the scaled dividend change, partition the sample into quartiles based on the size of the scaled dividend change, and use qualitative variables to separately estimate the relation between the market reaction to a dividend change and the most recent earnings change for each quartile. If H3 is correct, the strength of the relation between the market reaction to dividend changes and the prior earnings change should increase as we move from the smallest quartile of scaled dividend changes towards the largest quartile. Results are presented in Table III (Panel B). The coefficient on $\Delta QEARN_{t,i}$ increases monotonically as the size of the scaled dividend change increases. Specifically, the coefficient for quartile 1 of dividend size ($\beta_1' = 0.326, t = 5.11$) becomes larger as we move to quartile 2 of dividend size ($\beta_2' = 0.589, t = 5.36$), and this difference is statistically significant ($\beta_2' - \beta_1' = 0.263, t = 2.14$). The coefficient again becomes larger moving to quartile 3 of dividend size ($\beta_3' = 1.079, t = 9.51$), and this difference is also statistically significant ($\beta_3' - \beta_2' = 0.490, t = 3.12$). The coefficient becomes largest for quartile 4 of scaled dividend size ($\beta_4' = 3.362, t = 10.56$), which is also statistically different from the coefficient for quartile 3 ($\beta_4' - \beta_3' = 2.283, t = 6.81$). Overall, these results suggest that the relation between price reactions to dividend news and past earnings changes varies with size of the scaled dividend changes, providing support for H3.

B. Specification Checks

To test the sensitivity of our results to the time horizon of past earnings used, we repeat the empirical tests of H1, H2, and H3 using three alternate definitions of past earnings: the sum of the prior two quarterly earnings changes, the sum of the prior three quarterly earnings changes, and the sum of the prior four quarterly earnings changes. Results from each of these three proxies are qualitatively similar, both to each other and to the results reported in Section III.A. Given that the results are similar, Table IV (Panel A) reports only the results from using the sum of the prior four quarterly earnings changes. Using the past four quarters of earnings data, our confirming sample consists of 4,772 observations. In reestimating equation (6), the coefficient on $\Delta QEARN_{t,i}$ remains positive and statistically significant at the 0.01 level ($\beta_1 = 0.197, t = 11.84$). The coefficient on $\Delta FUTURE_{t,i}$ also remains positive and significantly greater than zero ($\beta_2 = 0.042, t = 4.22$). In reestimating equation (7), the coefficient on $\Delta QEARN_{t,i} \times POSDUM_{t,i}$ remains significantly less than zero ($\beta_3 = -0.230, t = -5.80$). In reestimating equation (8), the coefficient on $\Delta QEARN_{t,i}$ increases monotonically when moving from the quartile of the smallest dividend changes to the quartile of the largest dividend changes. The coefficient for quartile 2 is significantly greater than that of quartile 1 ($\beta_2' - \beta_1' = 0.136, t = 3.50$), the coefficient for quartile 3 is significantly greater than the coefficient for quartile 2 ($\beta_3' - \beta_2' = 0.130, t = 2.64$), and the coefficient for quartile 4 is significantly greater than the coefficient for quartile 3 ($\beta_4' - \beta_3' = 0.737, t = 7.49$). Overall, the results presented in Section III.A in support of H1, H2, and H3 appear robust to changes in the horizon of past earnings.

We also examine the special case in which each of the past earnings changes included in the proxy for past earnings are of the same sign as the subsequent dividend change. We again repeat the empirical tests of H1, H2, and H3 using the sum of the prior two quarterly earnings changes, the sum of the prior three quarterly earnings changes, and the sum of the prior four quarterly earnings changes as alternate proxies. In these tests, however, we eliminate observations where at least one prior individual quarterly earnings change used in the regression is of the opposite sign as the dividend change. This additional requirement eliminates the possible confound that the quarterly earnings changes themselves could be contradicting each other. Results are again robust to each alternate horizon (one quarter, two quarters, three quarters, and four quarters) of past earnings, and Table IV (Panel B) reports only the results from using the sum of the last four quarterly earnings changes. Imposing the additional requirement that all earnings changes must be of the same sign restricts the sample size to 2,639 observations. In reestimating equation (6), the coefficient on $\Delta QEARN_{t,i}$ remains positive and statistically significant ($\beta_1 = 0.158, t = 7.08$), while the coefficient on $\Delta FUTURE_{t,i}$ also remains positive and significant ($\beta_2 = 0.059, t = 3.58$). In reestimating equation (7), the coefficient on $\Delta QEARN_{t,i} \times POSDUM_{t,i}$ remains significantly less than zero ($\beta_3 = -0.343, t = -5.94$). In reestimating equation (8), the coefficient on

Table IV

Estimation Results on the Confirmatory Effect Using Alternate Windows of Past Earnings Changes

This table reports the confirming effect of dividend announcements for a sample of dividend changes in which the dividend change and the sum of the most recent four quarterly earnings changes have the same sign.

Model (6) $CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \varepsilon_{t,i}$

Model (7) $CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \beta_3 \Delta QEARN_{t,i} \times POSDUM_{t,i} + \varepsilon_{t,i}$

Model (8) $CAR_{t,i} = \alpha' + \beta'_1 \Delta QEARN_{t,i} \times SIZEDUM1_{t,i} + \beta'_2 \Delta QEARN_{t,i} \times SIZEDUM2_{t,i} + \beta'_3 \Delta QEARN_{t,i} \times SIZEDUM3_{t,i} + \beta'_4 \Delta QEARN_{t,i} \times SIZEDUM4_{t,i} + \beta'_5 \Delta FUTURE_{t,i} + \varepsilon_{t,i}$

The variable $CAR_{t,i}$ is cumulative abnormal returns for the 5-day period beginning 2 days before the dividend change announcement and ending 2 days after the dividend change announcement. The variable $\Delta QEARN_{t,i}$ is the sum of seasonal random walk earnings changes for the four quarters prior to the dividend announcement. The variable $\Delta FUTURE_{t,i}$ is the sum of the actual seasonal random walk earnings changes for the eight quarters following the dividend announcement. Both $\Delta QEARN_{t,i}$ and $\Delta FUTURE_{t,i}$ are deflated by the firm's market value at the start of the 5-day window used to calculate $CAR_{t,i}$. The qualitative variable $POSDUM_{t,i}$ takes a value of one if the prior earnings change was positive and zero otherwise. The variable $\varepsilon_{t,i}$ is an error term. The qualitative variables $SIZEDUM1_{t,i}$ through $SIZEDUM4_{t,i}$ take the value of one if the absolute value of the dividend change scaled by the absolute value of the prior earnings change falls into that particular quartile and take the value of zero otherwise. The variable $SIZEDUM1_{t,i}$ denotes the smallest quartile, and $SIZEDUM4_{t,i}$ denotes the largest quartile. The t-scores are in parentheses.

Panel A: $\Delta QEARN_{t,i}$ Is the Sum of Prior Four Quarters of Earnings Changes ($n = 4{,}772$)

	α	β_1	β_2	β_3			Adj-R^2
Model (6)	0.004	0.197	0.042	–			0.03
	(5.87)	(11.84)	(4.22)	–			
Model (7)	0.007	0.342	0.032	−0.230			0.04
	(8.00)	(11.41)	(3.18)	(−5.80)			
	α'	β'_1	β'_2	β'_3	β'_4	β'_5	Adj-R^2
Model (8)	0.004	0.091	0.227	0.357	1.094	0.026	0.06
	(6.18)	(4.29)	(6.56)	(10.19)	(11.85)	(2.64)	

Panel B: $\Delta QEARN_{t,i}$ Is the Sum of Prior Four Quarters, All Four Quarters Have the Same Sign ($n = 2{,}639$)

	α	β_1	β_2	β_3			Adj-R^2
Model (6)	0.004	0.158	0.059	–			0.02
	(3.89)	(7.08)	(3.58)	–			
Model (7)	0.007	0.406	0.045	−0.343			0.03
	(16.26)	(8.59)	(2.74)	(−5.94)			
	α'	β'_1	β'_2	β'_3	β'_4	β'_5	Adj-R^2
Model (8)	0.004	0.068	0.234	0.282	0.723	0.039	0.04
	(3.51)	(2.55)	(4.95)	(5.64)	(7.88)	(2.36)	

$\Delta QEARN_{t,i}$ again increases monotonically with the size of the dividend change. The coefficient from quartile 2 is significantly greater than that of quartile 1 ($\beta_2' - \beta_1' = 0.166, t = 3.24$). The coefficient from quartile 3 appears greater than that of quartile 2, although this difference is not statistically significant ($\beta_3' - \beta_2' = 0.048, t = 0.71$). The coefficient from quartile 4 is significantly greater than that of quartile 3 ($\beta_4' - \beta_3' = 0.441, t = 4.27$). Overall, these results provide further support that the findings presented in Section III.A in support of H1, H2, and H3 are robust to changes in the definition of past earnings.

One possible concern in evaluating our results is that large changes in earnings could tend to be followed by large changes in dividends. Pettit (1972) documents that the abnormal returns immediately surrounding the announcement of an increase in dividends are positively related to the size of that change in dividends. If the market reaction to a change in dividends is primarily determined by the size of the dividend change, it is possible that the changes in prior earnings simply serve as a proxy for the size of dividend change. To rule out this possibility, we examine the extent to which including the size of the dividend change as an additional independent variable helps explain cross-sectional variation in market reactions to dividend announcements. As proxies for the size of a dividend change, Benartzi, Michaely, and Thaler (1997) use both the dividend change deflated by a preannouncement period price and the dividend change scaled by the prior period's dividend amount. We separately include each of these as additional independent variables in reestimations of equation (6). Specifically, we estimate the following regression equations:

$$CAR_{t,i} = \varphi + \gamma_1 \Delta QEARN_{t,i} + \gamma_2 \Delta FUTURE_{t,i} + \gamma_3 \Delta DIV_{t,i} + \varepsilon_{t,i}, \qquad (9)$$

where $\Delta DIV_{t,i}$ is the dividend change deflated by market value at the start of the 5-day window used to calculate $CAR_{t,i}$, and

$$CAR_{t,i} = \varphi + \gamma_1 \Delta QEARN_{t,i} + \gamma_2 \Delta FUTURE_{t,i} + \gamma_3 \%\Delta DIV_{t,i} + \varepsilon_{t,i}, \qquad (10)$$

where $\%\Delta DIV_{t,i}$ is the dividend change deflated by the previous quarterly dividend amount, and all other variables are as defined in equation (6).

Results from estimating equations (9) and (10) on our sample of 4,694 confirming changes are presented in Table V. In estimating equation (9), the coefficient on $\Delta QEARN_{t,i}$ remains positive and significantly greater than zero ($\gamma_1 = 0.140, t = 2.27$). The coefficient on $\Delta FUTURE_{t,i}$ also remains positive and significantly greater than zero ($\gamma_2 = 0.035, t = 3.55$). The coefficient on $\Delta DIV_{t,i}$ is also positive and significant ($\gamma_3 = 4.403, t = 12.28$). The positive coefficient on $\Delta DIV_{t,i}$, coupled with a decrease in the coefficients on $\Delta QEARN_{t,i}$ and $\Delta FUTURE_{t,i}$ relative to those estimated for model (6), suggests that the magnitude of the dividend change itself may play a role in revising investors' estimates of expected future earnings. In estimating equation (10), the coefficient on $\Delta QEARN_{t,i}$ remains positive and statistically significant at the 0.01 level ($\gamma_1 = 0.363, t = 6.57$). The coefficient on $\Delta FUTURE_{t,i}$ also remains positive and significantly significant ($\gamma_2 = 0.046, t = 4.80$). The coefficient on

Table V

Estimation Results on the Confirmatory Effect, Including Controls for Dividend Size

This table reports the statistical relation between market reactions around dividend changes and the past earnings change, while including the size of the dividend change or the percentage change in quarterly dividends as additional explanatory variables.

Model (9) $CAR_{t,i} = \varphi + \gamma_1 \Delta QEARN_{t,i} + \gamma_2 \Delta FUTURE_{t,i} + \gamma_3 \Delta DIV_{t,i} + \varepsilon_{t,i}$

Model (10) $CAR_{t,i} = \varphi + \gamma_1 \Delta QEARN_{t,i} + \gamma_2 \Delta FUTURE_{t,i} + \gamma_3 \%\Delta DIV_{t,i} + \varepsilon_{t,i}$

The variable $CAR_{t,i}$ is cumulative abnormal returns for the 5-day period beginning 2 days before the dividend change announcement and ending 2 days after the dividend change announcement. The variable $\Delta QEARN_{t,i}$ is the seasonal random walk earnings change for the quarter prior to the dividend announcement. The variable $\Delta FUTURE_{t,i}$ is the sum of the actual seasonal random walk earnings changes for the eight quarters following the dividend announcement. Both $\Delta QEARN_{t,i}$ and $\Delta FUTURE_{t,i}$ are deflated by the firm's market value at the start of the 5-day window used to calculate $CAR_{t,i}$. The qualitative variable $POSDUM_{t,i}$ takes a value of one if the prior earnings change was positive and zero otherwise. The variable $\varepsilon_{t,i}$ is an error term. The qualitative variables $SIZEDUM1_{t,i}$ through $SIZEDUM4_{t,i}$ take the value of one if the absolute value of the dividend change scaled by the absolute value of the prior earnings change falls into that particular quartile and take the value of zero otherwise. The variable $SIZEDUM1_{t,i}$ denotes the smallest quartile, and $SIZEDUM4_{t,i}$ denotes the largest quartile. The variable $\Delta DIV_{t,i}$ is the dividend change deflated by market value at the start of the 5-day window used to calculate $CAR_{t,i}$. The variable $\%\Delta DIV_{t,i}$ is the dividend change deflated by the previous quarterly dividend amount. The t-scores are in parentheses.

	φ	γ_1	γ_2	γ_3	Adj-R^2
Model (9)	0.005	0.140	0.035	4.403	0.07
	(7.09)	(2.27)	(3.55)	(12.28)	
Model (10)	0.002	0.363	0.046	0.030	0.05
	(2.01)	(6.57)	(4.80)	(9.75)	

$\%\Delta DIV_{t,i}$ is also positive and significant ($\gamma_3 = 0.030, t = 9.75$). Overall, these results suggest that the statistical relation between market reactions around dividend changes and the past earnings change remains even after including the size of the dividend change or the percentage change in quarterly dividends as additional explanatory variables.

C. Additional Analysis on Contradictory Changes

Our primary hypotheses relate to the market reaction to confirming dividend changes—earnings increases (decreases) followed by dividend increases (decreases). As a link to prior research (particularly Leftwich and Zmijewski (1994)), we also examine the more infrequent case of contradictory dividend changes in which dividend increases (dividend decreases) can serve to contradict previous bad news (good news), signaling to the market that recent earnings decreases (increases) are not expected to recur. Forming ex ante hypotheses for these contradictory changes is more difficult, because most prior

theory and evidence focus on situations where earnings and dividend changes are sending corroborating signals.

Recall that in our lagged ERC model, the market reaction to a subsequent event such as a dividend change ($R_{subsequent}$) is given by:

$$R_{subsequent} = \Delta p(ERC_{perm} - ERC_{trans})\Delta E_q, \tag{11}$$

where

$$\Delta p = p' - p, \tag{12}$$

and where p is investors' initial assessment of the persistence of an earnings change, p' is the subsequent assessment after observing a dividend change, ERC_{perm} and ERC_{trans} are the ERCs for permanent and transitory earnings changes, and ΔE_q is the past earnings change. Again, prior research suggests that $ERC_{perm} > ERC_{trans}$. When a dividend change contradicts a past earnings change, that reduces investors' assessment of the persistence of the earnings change ($p' < p$). Overall, this suggests a negative relation between an earnings change and the market reaction to a subsequent event that contradicts the persistence of the earnings change. Based on our lagged ERC model, when dividend changes indicate a past earnings change is not persistent, we expect a negative relation between price reactions to dividend news and past earnings changes. Specifically, we predict:

H4: When a dividend change is preceded by an earnings change of the opposite sign, the market reaction surrounding the announcement of the dividend change is negatively related to the prior earnings change.

As discussed in Section I, prior research on the time-series of earnings suggests that, ceteris paribus, earnings increases are more likely to be persistent than are earnings decreases. If good news is, ex ante, expected to be more persistent than bad news, then a subsequent dividend cut that indicates that a past earnings increase was not persistent is expected to cause larger belief revisions than would be expected for a dividend increase that indicates the transitory nature of a past earnings decrease. This is the basis for Hypothesis 5.

H5: The negative relation between the market reaction surrounding the announcement of a change in dividends and the preceding earnings change is more negative for a dividend decrease that contradicts a prior earnings increase than for a dividend increase that contradicts a prior earnings decrease.

Finally, we again use the absolute value of the dividend change scaled by the absolute value of the prior earnings change as a proxy for information conveyed by the dividend change. We predict that less information is conveyed when the dividend change is small relative to the past earnings change. This is the basis for Hypothesis 6.

H6: When a dividend change is preceded by an earnings change of the opposite sign, the negative relation between the market reaction surrounding

the announcement of the dividend change and the prior earnings change becomes more negative as the magnitude of the scaled dividend change increases.

We test these hypotheses using our sample of 1,701 contradictory observations in which dividend changes and prior earnings changes differ in sign. Regression results from reestimating equation (6) using the contradictory observations are presented in Table VI (Panel A). The coefficient on $\Delta QEARN_{t,i}$, which indicates the relation between the market reaction to dividend changes and past earnings changes, is negative and statistically significant ($\beta_1 = -0.220$,

Table VI
Estimation Results on the Contradictory Effect of Dividend Announcements

This table reports the contradicting effect of dividend announcements for a sample of dividend changes in which the dividend change and the most recent earnings change have the opposite sign.

Model (6) $CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \varepsilon_{t,i}$

Model (7) $CAR_{t,i} = \alpha + \beta_1 \Delta QEARN_{t,i} + \beta_2 \Delta FUTURE_{t,i} + \beta_3 \Delta QEARN_{t,i} \times POSDUM_{t,i} + \varepsilon_{t,i}$

Model (8) $CAR_{t,i} = \alpha' + \beta'_1 \Delta QEARN_{t,i} \times SIZEDUM1_{t,i} + \beta'_2 \Delta QEARN_{t,i} \times SIZEDUM2_{t,i} + \beta'_3 \Delta QEARN_{t,i} \times SIZEDUM3_{t,i} + \beta'_4 \Delta QEARN_{t,i} \times SIZEDUM4_{t,i} + \beta'_5 \Delta FUTURE_{t,i} + \varepsilon_{t,i}$

The variable $CAR_{t,i}$ is cumulative abnormal returns for the 5-day period beginning 2 days before the dividend change announcement and ending 2 days after the dividend change announcement. The variable $\Delta QEARN_{t,i}$ is the seasonal random walk earnings change for the quarter prior to the dividend announcement. The variable $\Delta FUTURE_{t,i}$ is the sum of the actual seasonal random walk earnings changes for the eight quarters following the dividend announcement. Both $\Delta QEARN_{t,i}$ and $\Delta FUTURE_{t,i}$ are deflated by the firm's market value at the start of the 5-day window used to calculate $CAR_{t,i}$. The qualitative variable $POSDUM_{t,i}$ takes a value of one if the prior earnings change was positive and zero otherwise. The variable $\varepsilon_{t,i}$ is an error term. The qualitative variables $SIZEDUM1_{t,i}$ through $SIZEDUM4_{t,i}$ take the value of one if the absolute value of the dividend change scaled by the absolute value of the prior earnings change falls into that particular quartile and take the value of zero otherwise. The variable $SIZEDUM1_{t,i}$ denotes the smallest quartile, and $SIZEDUM4_{t,i}$ denotes the largest quartile. The t-scores are in parentheses.

Panel A: Results for Contradictory Observations ($n = 1{,}701$)

Model	α	β_1	β_2	β_3	Adj-R^2
Model (6)	0.004	−0.220	0.052	–	0.02
	(3.77)	(−3.70)	(3.53)	–	
Model (7)	0.007	−0.034	0.055	−0.853	0.03
	(5.60)	(−0.49)	(3.78)	(−5.18)	

Panel B: Contradictory Effect by Quartile of Dividend Size

Model	α'	β'_1	β'_2	β'_3	β'_4	β'_5	
Model (8)	0.005	−0.004	−0.601	−0.606	−2.54	0.059	0.04
	(4.47)	(−0.06)	(−4.78)	(−2.87)	(−5.77)	(4.07)	

$t = -3.70$). This provides support for H4 and suggests that part of the market reaction in response to a dividend change that contradicts a past earnings change is a decrease in the market's assessment regarding the persistence of the past earnings change. The coefficient on $\Delta FUTURE_{t,i}$ is positive and statistically significant ($\beta_2 = 0.052, t = 3.53$), suggesting that when dividend changes are inconsistent with past earnings changes, the dividend change is also interpreted as a signal of managements' forecast of future earnings changes. This is again consistent with Healy and Palepu's (1988) finding that extreme dividend changes are interpreted as signals of future earnings changes.

Results from reestimating equation (7) using the contradictory observations are also presented in Table VI (Panel A). In this regression, β_1 indicates the relation between market reactions to dividend changes and past earnings when past earnings changes are negative, while $\beta_1 + \beta_3$ indicates the relation between market reactions to dividend changes and past earnings when past earnings changes are positive. The coefficient on $\Delta QEARN_{t,i} \times POSDUM_{t,i}$, β_3, indicates the extent to which the relation between the market reaction to dividend changes and the prior earnings change varies with the sign of the prior earnings change. The coefficient on $\Delta QEARN_{t,i}$ is negative, but not statistically less than zero ($\beta_1 = -0.034, t = -0.49$), while the coefficient on $\Delta QEARN_{t,i} \times POSDUM_{t,i}$ is statistically less than zero ($\beta_3 = -0.853, t = -5.18$). The coefficient on $\Delta FUTURE_{t,i}$ is qualitatively similar to that in equation (6) ($\beta_2 = 0.055, t = 3.78$). The lack of a significant coefficient on $\Delta QEARN_{t,i}$ suggests that when earnings decreases are followed by dividend increases the market reaction to that dividend news is unrelated to the prior earnings decrease.[9] This suggests that the relation between the market response to dividend changes and preceding earnings changes of the opposite sign is driven primarily by situations in which prior earnings increases are contradicted by later dividend cuts. This is consistent with the notion that earnings increases are ex ante expected to be more persistent. While this should result in a larger initial market reaction at the time of the earnings announcement, this should also result in a correspondingly larger reversal when the dividend decrease indicates that the prior earnings increase is not representative of future earnings. This result provides support for H5.

Table VI (Panel B) presents results from reestimating equation (8) using the contradictory observations. Moving from the quartile of smallest scaled dividend changes to the quartile of largest scaled changes, the coefficient on $\Delta QEARN_{t,i}$ does appear to decrease monotonically (becoming progressively more negative), providing support for H6. The decreases between quartile 1 and quartile 2 ($\beta'_1 - \beta'_2 = 0.597, t = 4.26$) and between quartile 3 and quartile 4 ($\beta'_3 - \beta'_4 = 1.934, t = 3.96$) are each statistically significant. The coefficient does appear to decrease slightly between quartile 2 and quartile 3, but this difference is not statistically significant ($\beta'_2 - \beta'_3 = 0.005, t = 0.00$).

[9] Additional analysis (not reported in the tables) suggests when earnings decreases are followed by dividend increases the market reaction is instead determined by the size of the dividend change. In this particular case, the information conveyed by the dividend increase appears to go beyond simply disconfirming the prior earnings decrease.

Overall, these results suggest that dividend changes that contradict prior earnings changes do cause investors to revise their assessment of the persistence of past earnings changes. The market experiences a reversal of the prior market reaction as investors revise their assessment of the persistence of past earnings changes downward. This reversal is driven by situations where the past earnings increase was positive (because, ex ante, good news is considered more likely to persist). This reversal also appears more pronounced when the dividend change is large relative to the prior earnings change.

IV. Conclusions

This study examines the statistical relation between the market reaction to changes in dividends and recent past earnings changes. We extend prior research by documenting that part of the market reaction surrounding the announcement of a dividend change is a delayed reaction to past earnings news. For dividend changes that confirm prior earnings news, we find a positive statistical relation between the market reaction around the announcement of the dividend change and the prior earnings change. This result is robust to a number of alternate proxies for past earnings news and robust to the inclusion of dividend size as an additional explanatory variable. The strength of this statistical relation varies predictably with both the sign of the past earnings change and the size of the scaled dividend change. For dividend changes that contradict prior earnings news, we find a negative statistical relation between the market reaction surrounding the dividend change announcement and the prior earnings change. This result is driven by situations in which positive earnings changes are followed by dividend cuts. Results for observations in which dividend changes contradict prior earnings news also vary predictably with the size of dividend change. Overall, the results are consistent with our hypothesis that investors use changes in dividends to help assess the persistence of past earnings.

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