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Dividend Changes and Future Profitability

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ABSTRACT

We investigate the relation between dividend changes and future profitability, measured in terms of either future earnings or future abnormal earnings. Supporting "the information content of dividends hypothesis," we find that dividend changes provide information about the level of profitability in subsequent years, incremental to market and accounting data. We also document that dividend changes are positively related to earnings changes in each of the two years after the dividend change.

It is well documented that dividend changes are positively associated with stock returns in the days surrounding the dividend change announcement (see, e.g., Aharony and Swary (1980), Asquith and Mullins (1983), Kalay and Loewenstein (1985), and Petit (1972)). According to "the information content of dividends hypothesis" (Miller and Modigliani (1961)), dividend changes trigger stock returns because they convey new information about the firm's future profitability. However, recent studies have not supported this hypothesized relation between dividend changes and future earnings (e.g., DeAngelo, DeAngelo, and Skinner (1996), Benartzi, Michaely, and Thaler (BMT, 1997)). We reexamine the relation between dividend changes and alternative measures of future profitability, and provide strong evidence that dividend changes are positively related to future earnings changes, future earnings, and future abnormal earnings.

To investigate whether dividend changes convey new information about future profitability, one has to estimate expected profitability. Most prior studies assume that earnings follow a random walk with drift, and measure unexpected profitability as the realized change in earnings minus the estimated drift. They then examine the association between dividend changes and unexpected earnings. We first use a similar approach and find, like prior studies, that dividend changes are not positively related to future earnings changes. We then modify the regression model to address two specifi-

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cation issues related to the estimation of unexpected earnings: measurement error and omitted correlated variables. With the modified model, we demonstrate that dividend changes are positively associated with earnings changes in each of the two years following the dividend change.

Next, we extend our analysis and examine the relation between dividend changes and the *level* of future profitability, controlling for profits in the dividend change year and for expected profits based on information that is available before the dividend change. As discussed in Section II, the level analysis allows for a more direct interpretation of the results and avoids some measurement issues that exist in the change analysis. We use two alternative measures of profits: earnings and abnormal earnings. "Abnormal earnings" are defined as the difference between total earnings and normal earnings, where "normal earnings" are defined as the required return to owners based on the cost and level of invested equity capital (see Edwards and Bell (1961)). By definition, future normal earnings that result from future retained earnings and future net stock issues are not relevant for current price. To affect price, the earnings information that dividend changes convey must be about future abnormal earnings rather than future normal earnings. We thus consider abnormal earnings as an alternative measure of profitability. A disadvantage of using abnormal earnings, however, is that their measurement involves error. Therefore, whether measures of abnormal earnings are more adequate than earnings is an empirical issue.

With both measures of profitability—earnings and abnormal earnings—we find that dividend increases are positively related to profits in each of the four subsequent years, but dividend decreases are not related to future profits. The results for abnormal earnings are stronger, suggesting that accounting for the required return more than offsets the error in measuring abnormal earnings.

As a robustness check, we repeat the analysis using consensus analysts' earnings forecasts as an alternative measure of expected earnings. Using a subsample with available data, we find that dividend increases are positively related to unexpected earnings in each of the three subsequent years (out of five years examined), while dividend decreases are not significantly related to subsequent earnings. We demonstrate that the results for the subsample are different from the results for the full sample because of sample characteristics, and are not due to the information contained in consensus analysts' earnings forecasts.

Finally, we conduct numerous sensitivity checks, including using alternative sets of control variables, measurement approaches, deflators, and estimation methods. The results are robust to these checks.

In Section I, we describe the data. Section II presents empirical results of the relation between dividend changes and future earnings changes. In Section III, we examine the relation between dividend changes and future profitability, measured in terms of either future earnings or future abnormal earnings. Section IV concludes the paper. In the Appendix, we discuss our variable measurement procedures.

I. Data

We searched the CRSP monthly event file for dividend events using the following criteria: (1) the company paid an ordinary quarterly cash dividend (U.S. dollars) in the current quarter and in the previous quarter; (2) no other distributions were announced between the declaration of the previous dividend and four days after the declaration of the current dividend; (3) there were no ex-distribution dates between the ex-distribution dates of the previous and the current dividends; and (4) the current dividend was declared between the start of the second quarter of fiscal 1963 and the end of first quarter of fiscal 1998. We set criteria (2) and (3) because changes in ordinary quarterly dividends may be compensated for by other distributions.

Following Watts (1973), we allocated each observation to a particular year if the current dividend was declared in the second, third, or fourth fiscal quarters of that year, or in the first quarter of the following fiscal year. The resulting sample was matched with the Compustat annual files and the following additional criteria were applied: (5) the company was listed on the NYSE or AMEX and (6) the company was not a financial institution (SIC codes 6000–6999). These criteria were set to increase homogeneity.

Table I presents descriptive statistics for the sample. The sample selection criteria resulted in a sample of 100,666 observations: 811 dividend decreases, 13,221 dividend increases, and 86,634 no-change observations. Similar to DeAngelo and DeAngelo (1990), we observe that dividend increases, although more frequent than dividend decreases, are smaller in magnitude (see Panel A). Panel B reflects that the rate of change in dividend per share relative to the previous quarter ($R\Delta DIV$) has a conditional mean (median) of 16.42 percent (11.54 percent) for dividend increases and −42.67 percent (−44.44 percent) for dividend decreases.

The market reaction to the dividend change announcement in our sample is consistent with prior studies (e.g., Aharony and Swary (1980)). The mean stock return during the three days surrounding the announcement date (days −1, 0, and 1) is −4.78 percent for the dividend decrease sample (t-statistic −19.25), 0.17 percent (t-statistic 12.72) for the no-change sample, and 1.07 percent (t-statistic 32.05) for the dividend increase sample. The mean excess stock return (stock return minus contemporaneous return on the CRSP equally weighted index) is −4.97 percent (t-statistic −20.69) for the dividend decrease sample, 0.00 percent (t-statistic 0.29) for the no-change sample, and 0.87 percent (t-statistic 27.50) for the dividend increase sample.

We use annual rather than quarterly data because, arguably, dividends are set in response to annual rather than quarterly earnings (Watts (1973)). Since we examine the information in dividend changes about future annual earnings, and the sample selection criteria usually identify more than one dividend announcement per firm-year, we calculate the geometric sum of $R\Delta DIV$ across observations with the same firm and year values. The resulting firm-year sample includes 31,806 observations: 697 dividend decreases, 12,105 dividend increases, and 19,004 no-change observations. The number

Table I

Description of Sample

$R\Delta DIV$ is the rate of change in quarterly dividend per share. R is cumulative stock return during days −1, 0, and 1 relative to the dividend declaration. ER is R minus contemporaneous return on the CRSP equally weighted index.

Panel A: Sample

	Dividend Decreases	No Change	Dividend Increases	Total
Dividend event observations that satisfy all selection criteria	811	86,634	13,221	100,666
Firm-year observations with at least one dividend event	697	19,004	12,105	31,806
Firms with at least one firm-year observation	504	2,170	1,717	2,216

Panel B: Descriptive Statistics for Dividend Event Observations

	Mean	*SD*	10%	25%	50%	75%	90%
	Dividend decreases (N = 811)						
$R\Delta DIV$	−0.4267	0.1848	−0.6667	−0.5000	−0.4444	−0.3200	−0.1892
R	−0.0478	0.0707	−0.1357	−0.0909	−0.0390	0.0000	0.0286
ER	−0.0497	0.0684	−0.1402	−0.0874	−0.0416	−0.0043	0.0269
	No change (N = 86,634)						
R	0.0017	0.0383	−0.0385	−0.0174	0.0000	0.0185	0.0435
ER	0.0000	0.0358	−0.0377	−0.0185	−0.0015	0.0166	0.0388
	Dividend increases (N = 13,221)						
$R\Delta DIV$	0.1642	0.2566	0.0400	0.0714	0.1154	0.2000	0.3077
R	0.0107	0.0385	−0.0284	−0.0097	0.0071	0.0278	0.0544
ER	0.0087	0.0364	−0.0282	−0.0117	0.0055	0.0248	0.0494
	All dividend events (N = 100,666)						
$R\Delta DIV$	0.0181	0.1166	0.0000	0.0000	0.0000	0.0000	0.0667
R	0.0025	0.0391	−0.0380	−0.0167	0.0000	0.0197	0.0447
ER	0.0008	0.0367	−0.0374	−0.0178	−0.0007	0.0177	0.0402

(*continued*)

of dividend decreases and increases is only slightly smaller than their number in the event sample, whereas the number of no-change observations is less than 25% of their number in the event sample. The reason is that most companies change their dividends only once every few years. For example, if a company increases its dividend every three years, six years of data would provide 24 event observations (22 no change and 2 increases) and six annual observations (4 no change and 2 increases).

Table 1—*Continued*

Panel C: Frequency of Firm-year Observations with at Least One Dividend Event by Fiscal Year

Year	Div. Dec.	No Change	Div. Inc.	Total	Year	Div. Dec.	No Change	Div. Inc.	Total
1963	4	166	86	256	1981	16	665	457	1,138
1964	1	181	120	302	1982	60	664	301	1,025
1965	1	297	173	471	1983	24	613	332	969
1966	4	398	203	605	1984	15	566	364	945
1967	2	500	167	669	1985	20	646	274	940
1968	9	562	152	723	1986	23	568	304	895
1969	15	619	147	781	1987	10	532	366	908
1970	64	623	116	803	1988	16	453	441	910
1971	39	602	150	791	1989	16	478	422	916
1972	15	590	260	865	1990	28	541	345	914
1973	16	564	454	1,034	1991	34	566	298	898
1974	31	585	485	1,101	1992	37	565	324	926
1975	37	669	457	1,163	1993	25	570	340	935
1976	4	562	653	1,219	1994	19	537	395	951
1977	18	557	710	1,285	1995	18	580	361	959
1978	9	587	671	1,267	1996	19	595	341	955
1979	13	563	652	1,228	1997	13	612	255	880
1980	22	628	529	1,179	Total	697	19,004	12,105	31,806

Finally, additional accounting and market value data were extracted from COMPUSTAT and consensus analysts' earnings forecasts from IBES. We discuss these variables as we introduce them. In the Appendix, we further describe our variable measurement procedures.

II. Dividend Changes and Future Earnings Changes

A. Initial Analysis

In this section, we investigate the relation between dividend changes and future earnings changes. We start with the basic specification that Benartzi et al. (1997) use in their comprehensive study of the relation between dividend changes and earnings changes.[1] BMT examine the correlation between the rate of change in dividend per share in year zero and the change in earnings in years zero, one, and two scaled by the market value of equity at the beginning of the dividend change year. The underlying assumption is that earnings follow a random walk, so the change in earnings measures unexpected profitability. Using categorical and regression analyses, BMT find that dividend increases (decreases) indicate that current-year earnings

[1] For a review of earlier literature, see Benartzi et al. (1997).

Table II

Summary Statistics from Regressions of Future Earnings Change, Deflated by Price, on the Dividend Change

E_τ denotes earnings in year τ relative to the dividend event year (year 0). P_{-1} is market value of equity at the beginning of the dividend event year. $R\Delta DIV_0$ is the rate of change in dividend per share. For each regression, the first row reports the coefficient and the second row reports White's (1980) t-statistic.

$(E_\tau - E_{\tau-1})/P_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \epsilon_\tau$				
τ	α_0	α_1	R^2	N
0	0.002	0.120	0.020	30,826
	1.766	21.71		
1	0.011	0.000	0.000	29,916
	14.77	0.027		
2	0.012	−0.007	0.000	28,212
	15.97	−0.916		

will be higher (lower) than the previous year's earnings. For subsequent years, however, BMT find no significant relation between dividend changes and earnings changes. They further demonstrate that their results are robust to drift and industry adjustments for the earnings variable, and to the inclusion of many control variables.

To verify that the BMT results hold in our sample, we regress

$$(E_\tau - E_{\tau-1})/P_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \epsilon_\tau, \tag{1}$$

for $\tau = 0$, 1, and 2, where E_τ denotes earnings in year τ, P_{-1} is the market value of equity at the beginning of the dividend change year, and $R\Delta DIV_0$ is the rate of change in dividend per share in year zero. Since we identify dividend events (i.e., dividend increases, decreases, and no-change) in the years 1963 through 1997, and have earnings data through 1998, the sample includes dividend events that occurred from 1963 through 1997 for $\tau = 0$ and $\tau = 1$, and from 1963 through 1996 for $\tau = 2$. Table II provides pooled OLS estimation results.[2] Consistent with the findings of BMT, α_1 is positive and highly significant for $\tau = 0$, but it is insignificant for $\tau = 1$ and 2.

B. Alternative Specifications

We argue that specification issues with equation (1) may cause α_1 to be nonpositive for $\tau = 1$ and 2. The specification issues are measurement error in the dependent variable that is correlated with the dividend change, and

[2] To reduce the effect of influential observations, we winsorize, throughout the entire paper, the independent variables using the 0.1 percent and 99.9 percent of the empirical distribution. We obtain similar results without winsorizing, with trimming instead of winsorizing, with alternative percentile cuts, and without observations with high standardized residuals.

the omission of an important control variable that is correlated with the dividend change. We estimate regressions that address these specification issues. We also estimate regressions that allow for different coefficients for dividend increases and dividend decreases and control for the earnings change in the dividend change year.

B.1. Measurement Error in the Dependent Variable

An implicit assumption in specifying equation (1) is that the change in earnings in year τ is unrelated to the level of earnings in year $\tau - 1$, and thus may serve as a proxy for "unexpected earnings" in year τ. This assumption may be appropriate for undeflated earnings. However, the change in earnings in equation (1) is deflated by price at the beginning of the dividend change year (P_{-1}). Since price reflects expectations about future earnings, the ratio of earnings to price is likely to be negatively related to the expected change in earnings (see Penman (1996)). Specifically, the ratio of current earnings to price (E_0/P_{-1}) is likely to be negatively related to the price-deflated change in earnings in year one ($(E_1 - E_0)/P_{-1}$), which is the dependent variable in equation (1) for $\tau = 1$. That is, the dependent variable in equation (1) measures unexpected earnings with error that is negatively correlated with the ratio of current earnings to price. Since companies that increase (decrease) dividends usually have a high (low) ratio of current earnings to price (correlation of 0.21 for our sample; see also Benartzi et al. (1997)), the dividend change is likely to capture this measurement error in a way that biases against finding information content in dividends. A similar argument applies to subsequent earnings changes.

To address this issue, we deflate the earnings change by the book value of common equity (B_{-1}) rather than its market value. To avoid any potential distortions from the deflation, we delete observations where the book value is less than 10 percent of total assets (approximately 0.006 of the observations).[3]

B.2. Omitted Correlated Variable

If one considers only earnings information, the expected change in earnings may be zero (or constant, if there is a drift). However, in the presence of additional information, this property may not hold. For example, Freeman, Ohlson, and Penman (1982) show that an important predictor of earnings changes is the ratio of earnings to the book value of equity (*ROE*). Specifically, they show that since *ROE* is mean reverting, high (low) *ROE* implies an expected decrease (increase) in earnings (see also Fama and French (2000)). Since dividend changes are positively correlated with current *ROE*, the expected change in earnings is likely to be negatively correlated with the dividend change. Hence, a lack of correlation between earnings changes and

[3] The proportion of companies with book value less than 10 percent of total assets is small since the sample includes only companies that pay dividends.

dividend changes would actually indicate that dividend changes are informative about future earnings. To address this omitted correlated variable problem, we include $ROE_{\tau-1}$ as an additional explanatory variable.

Panel A of Table III presents results of estimating the following model:

$$(E_\tau - E_{\tau-1})/B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{\tau-1} + \epsilon_\tau, \quad (2)$$

for $\tau = 1$ and 2, where $ROE_{\tau-1}$ is measured as $E_{\tau-1}/B_{\tau-1}$ and B denotes the book value of common equity.[4] We report results from two sets of regressions. In the first set of regressions, we use the same statistical approach as in Table II (i.e., pooled OLS regressions with heteroskedasticity-robust White (1980) t-statistics). We report these regressions to demonstrate that the difference in results between equations (2) and (1) is due to specification issues and not to differences in the statistical procedure. In the second set of regressions, we account for heteroskedasticity and autocorrelation in the regression residual by using a refined Fama and MacBeth (1973) procedure. We refine the Fama and MacBeth approach by including the previous year's dependent and independent variables as additional explanatory variables. If the error in the original equation follows an AR(1), possibly with time-varying coefficient, then the inclusion of the lagged variables transforms the residual into white noise.[5] For these regressions, we report summary statistics for the cross-sectional coefficients of interest (i.e., the original coefficients). Specifically, we report the time series means of the cross-sectional coefficients, the t-statistics associated with the time series distribution of the cross-sectional coefficients, and the proportion of times that each coefficient is positive.

The results reported in Table III show that in both years ($\tau = 1$ and 2), α_1 is positive and significant and α_2 is negative and significant. These results demonstrate the importance of accounting for the two specification issues discussed above. Supporting the information content of dividend hypothesis, the results indicate that dividend changes are informative about future earnings changes in each of the two subsequent years.

Dividend changes are highly correlated with contemporaneous earnings changes (see Benartzi et al. (1997) and the results in Table II). Therefore, the positive relation between dividend changes and earnings changes in the two subsequent years may be due to autocorrelation in the earnings change series. To examine whether dividend changes contain information on future earnings changes, incremental to the earnings change in the dividend change

[4] In measuring ROE, we set the book value of equity equal to 10 percent of total assets whenever it was less than that amount.

[5] Let $y_{tj} = x'_{tj}b_t + e_{tj}$ where j is a firm subscript, t is a time index, x_{tj} is a vector of explanatory variables, b_t is a vector of coefficients, $e_{tj} = r_t e_{t-1j} + u_{tj}$, and u_{tj} is white noise. Then, $y_{tj} = x'_{tj}b_t + r_t y_{t-1j} - x'_{t-1j}b_{t-1}r_t + u_{tj} = x'_{tj}b_t + r_t y_{t-1j} + x'_{t-1j}c_t + u_{tj}$, where c_t is a vector of coefficients. We obtained similar results when, instead of our approach, we used the Fama-MacBeth procedure and adjusted the t-statistics for autocorrelation in the coefficients.

Table III

Summary Statistics from Regressions of Future Earnings Change, Deflated by Book Value, on the Dividend Change and Control Variables

E_τ denotes earnings in year τ relative to the dividend event year (year 0). $R\Delta DIV_0$ is the rate of change in dividend per share. ROE_τ is calculated as E_τ/B_τ, where B_τ is the book value of common equity at the end of year τ relative to the dividend event year. DPC (DNC) is a dummy variable that equals one for dividend increases (decreases). For each of the pooled regressions, the first row reports the coefficient and the second row reports White's (1980) t-statistic. For the cross-sectional (CS) regressions, the reported statistics are based on $35 - \tau$ annual regressions (dividend events from 1964 through $1998 - \tau$). The first row reports the mean coefficient, the second reports the t-statistic for the time series distribution of the coefficient (mean coefficient divided by its standard deviation and multiplied by the square-root of the number of cross sections), and the third row reports the proportion of regressions in which the coefficient is positive. To correct for autocorrelation in the residual through time, in the cross-sectional regressions, we include the firm's previous year dependent and independent variables as additional explanatory variables (see footnote 5). The coefficients and statistics associated with these auxiliary variables are not reported.

Panel A: $(E_\tau - E_{\tau-1})/B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{\tau-1} + \epsilon_\tau$

	α_0	α_1	α_2	R^2	N
			$\tau = 1$		
Pooled	0.041	0.049	−0.246	0.032	29,734
	12.59	7.814	−9.200		
CS					
Mean	0.023	0.038	−0.461	0.122	793
t-stat.	5.735	4.624	−6.518		
Prop +	0.735	0.853	0.147		
			$\tau = 2$		
Pooled	0.045	0.028	−0.273	0.048	28,046
	10.69	3.624	−7.868		
CS					
Mean	0.022	0.015	−0.396	0.118	770
t-stat.	4.474	1.647	−7.242		
Prop +	0.758	0.515	0.091		

Panel B: $(E_\tau - E_{\tau-1})/B_{-1} = \alpha_0 + \alpha_{1p} DPC_0 \times R\Delta DIV_0 + \alpha_{1n} DNC_0 \times R\Delta DIV_0 + \alpha_2 ROE_{\tau-1} + \alpha_3 (E_0 - E_{-1})/B_{-1} + \epsilon_\tau$

CS	α_0	α_{1p}	α_{1n}	α_2	α_3	R^2	N
				$\tau = 1$			
Mean	0.018	0.049	0.038	−0.465	0.031	0.146	793
t-stat.	4.158	5.217	2.436	−4.493	0.156		
Prop +	0.735	0.882	0.656	0.147	0.529		
				$\tau = 2$			
Mean	0.013	0.027	−0.004	−0.398	−0.125	0.136	770
t-stat.	2.878	2.773	−0.266	−7.369	−4.254		
Prop +	0.727	0.758	0.355	0.091	0.212		

year, we include $(E_0 - E_{-1})/B_{-1}$ as an additional control variable. Also, the descriptive statistics in Table I suggest that the relation between dividend changes and earnings changes is not symmetric for dividend increases and decreases (see also DeAngelo and DeAngelo (1990) and Benartzi et al. (1997)). We thus allow for different coefficients on dividend increases and decreases. We regress the following model

$$(E_\tau - E_{\tau-1})/B_{-1} = \alpha_0 + \alpha_{1p} DPC_0 \times R\Delta DIV_0 + \alpha_{1n} DNC_0 \times R\Delta DIV_0 + \alpha_2 ROE_{\tau-1} + \alpha_3 (E_0 - E_{-1})/B_{-1} + \epsilon_\tau, \tag{3}$$

for $\tau = 1$ and 2, where *DPC* (*DNC*) is a dummy variable that equals one for dividend increases (decreases) and zero otherwise.

Results are reported in Panel B of Table III. The inclusion of the earnings change in the dividend change year has only a small effect on the results. For $\tau = 1$, the coefficients on dividend increases and decreases are both positive and significant. The coefficient on dividend increases is slightly larger than the coefficient on dividend decreases, but this difference is insignificant (the t-statistic associated with the time series of differences in the coefficients equals 0.71). The coefficient on dividend increases is much more significant than the coefficient on dividend decreases, but this difference is at least partially due to the relative number of observations: There are many more dividend increases than dividend decreases. For $\tau = 2$, the coefficient on dividend increases remains positive and significant, but the coefficient on dividend decreases is essentially zero (the t-statistic for the difference in the coefficients equals 1.94).

III. Dividend Changes and the Level of Future Profits

A. Methodology

In the previous section, we used earnings changes as the measure of future profitability. According to the information content of dividends hypothesis, management increases dividends when it receives information that indicates that future earnings will be higher than previously anticipated. It may not have the same level of confidence about the timing of those earnings increases. Since we cannot observe management's estimate of future earnings, we use actual earnings as a surrogate. The resulting measurement error has a stronger effect on earnings change specifications than it has on levels specifications. To see this, consider a case where management predicts a permanent earnings increase of \$4 starting year one. Assume further a timing error, so that \$1 of earnings increase is realized in year three rather than in year two (that is, relative to year zero, earnings are higher by \$4, \$3, \$5, and \$4 in years one through four, respectively). When using a levels specification, earnings in year two are \$1 below expectations and earnings in year three are \$1 above expectations. On the other hand, when using a changes specification, the earnings change in year two is \$1 below the (no-change) expectations, the earnings change in year three is $2 above expectations, and the earnings change in year four is $1 below expectations. That is, the impact of a timing error is more significant on the individual observations under a changes specification.[6]

More importantly, as demonstrated in the previous section, when using the earnings change as a proxy for unexpected earnings, one has to control for *ROE* in the year before the earnings change. This requires the use of future years' information in measuring a control variable, which makes it difficult to interpret the coefficient on the dividend change as a measure of the new information in the dividend change on future earnings. On the other hand, the levels analysis does not require the use of future information in measuring any of the explanatory variables.

Therefore, in this section, we extend our analysis and examine the relation between dividend changes and the level of profits in each of the five years following the dividend change year. We use two alternative measures of profits: earnings and abnormal earnings. Earnings (E) measure the overall return to equity holders. Abnormal earnings (AE) are measured as the difference between earnings and the required return given the cost and level of invested equity capital (Edwards and Bell (1961)). That is, abnormal earnings are an accounting measure of economic profitability. This alternative measure of profitability is generating increasing interest in the literature (see Campbell (2000)).

According to the information content of dividends hypothesis, dividend changes trigger stock returns because they convey new information about the firm's future profitability, which in turn determines equity price. Future earnings are affected by value-creating activities, but they are also affected by actions that are not directly relevant for current price, such as future retained earnings, stock issues and stock repurchases. Abnormal earnings remove from future earnings the effect of capital contributions, earnings, and dividends between the dividend change year and the future year.[7] By

[6] There is an additional related interpretation problem the change regressions may cause. Consider the hypothesis that the dividend change is associated with a permanent earnings change starting the subsequent year. As a result, one should anticipate that the earnings change in year one is positively related to the dividend change in year zero, and that earnings changes after year one are unrelated to the dividend change. While observing no significant relation between the dividend change in year zero and earnings changes after year one is consistent with this hypothesis, it is also consistent with the tests having low power. Thus, one may "accept" the hypothesis that the dividend change is associated with a *permanent* increase in earnings by failing to reject the null hypothesis—a weak form of inference. This interpretation problem does not exist when the relation between dividend changes and the *level* of future earnings is directly examined.

[7] BMT, in their robustness section, acknowledge this issue and adjust for the effect of future dividends on future earnings (Benartzi et al. (1997, p. 1025)). However, they do not include an adjustment for the amounts associated with future retained earnings and future stock issues and repurchases. The importance of such adjustments is demonstrated by Penman and Sougiannis (1997), who find that dividends are negatively related to subsequent earnings, after controlling for cum-dividend price, earnings, and book value.

subtracting the required return from earnings, abnormal earnings include only the effect of value-creating activities. For example, consider a firm that announces today it will issue stock and invest the proceeds in a large zero NPV project. The announcement does not change the value of the firm, but it increases expected future earnings. On the other hand, the announcement does not change expected abnormal earnings because the opportunity cost of the additional investment is deducted from earnings in calculating abnormal earnings. Measuring abnormal earnings so that they capture economic profitability is not a straightforward empirical task. One needs to estimate a required rate of return, which involves measurement error. Thus, whether an empirical measure of abnormal earnings is superior to earnings is not clear. We therefore perform the analysis with both earnings and abnormal earnings.

Because we attempt to test whether dividend changes contain new information about future profitability, we control for expected profits based on information that is available prior to the dividend change. We also control for profits in the dividend change year (E_0 or AE_0), which are partially known at the time of the dividend change (e.g., from intermediate quarterly reports or from the financial press). We control for current year profits to assure that our results are not biased in favor of finding information content in dividends. Prior studies document that dividend changes are correlated with current profitability (see, e.g., Benartzi et al. (1997)), which in turn is likely to be correlated with future profitability.

We use three types of instruments to control for expected profits: past accounting variables, market value of equity, and past dividend changes. (In the robustness section, we also control for consensus analysts' forecasts.) The accounting variables are: profits in the year before the dividend change (E_{-1} or AE_{-1}), and the book value of equity at the beginning of the dividend change year (B_{-1}). We include both variables because under U.S. Generally Accepted Accounting Principles (GAAP), each of these variables should be informative about future earnings. Some accounting principles use an income statement approach (i.e., attempt to measure permanent income) and others use a balance sheet approach (i.e., attempt to measure value). The first (second) set of accounting rules suggests that current earnings (book value of equity) are the most relevant for predicting future earnings.

We include the market value of equity at the beginning of the dividend change year (P_{-1}) as an additional instrument because the information content of accounting variables is restricted by the accounting rules, which report primarily past transactions. On the other hand, market values incorporate information about future profitability from all possible sources.

If dividend changes are informative about future profits for more than a year ahead, past dividend changes are also relevant for predicting future profits. We therefore include the dividend change and the level of common dividends in the year prior to the current dividend change as additional explanatory variables. Because the relation between profits and dividend changes may be different for dividend increases and decreases, we allow for different coefficients on past dividend increases and decreases.

Our instruments for expected profits are likely to be predictors of dividend changes as well. Thus, including these variables as explanatory variables, together with the dividend change, allows us to interpret the coefficient on the dividend change as the effect of an unexpected dividend change on future earnings.

We estimate regression models where the dependent variable is either earnings or abnormal earnings in year τ relative to the dividend change year ($\tau = 1, 2, \ldots 5$). In all cases, the independent variables are the dividend change (allowing for different coefficients for increases and decreases), the instruments for expected earnings or abnormal earnings discussed above, and earnings or abnormal earnings in the dividend change year. The regression models are:

$$\begin{aligned} E_\tau = {} & \beta_{0\tau} + \beta_{1\tau} DPC_0 \times \Delta DIV_0 + \beta_{2\tau} DNC_0 \times \Delta DIV_0 + \beta_{3\tau} E_{-1} \\ & + \beta_{4\tau} B_{-1} + \beta_{5\tau} P_{-1} + \beta_{6\tau} DIV_{-1} + \beta_{7\tau} DPC_{-1} \\ & \times \Delta DIV_{-1} + \beta_{8\tau} DNC_{-1} \times \Delta DIV_{-1} + \beta_{9\tau} E_0 + \epsilon_\tau \end{aligned} \tag{4}$$

and

$$\begin{aligned} AE_\tau = {} & \beta_{0\tau} + \beta_{1\tau} DPC_0 \times \Delta DIV_0 + \beta_{2\tau} DNC_0 \times \Delta DIV_0 + \beta_{3\tau} AE_{-1} \\ & + \beta_{4\tau} B_{-1} + \beta_{5\tau} P_{-1} + \beta_{6\tau} DIV_{-1} + \beta_{7\tau} DPC_{-1} \\ & \times \Delta DIV_{-1} + \beta_{8\tau} DNC_{-1} \times \Delta DIV_{-1} + \beta_{9\tau} AE_0 + \epsilon_\tau \end{aligned} \tag{5}$$

for $\tau = 1, 2, \ldots, 5$, where ΔDIV_0 is the change in dividends and the other variables are as defined above. To simplify the notation, observation (firm-year) subscripts are omitted. To mitigate the effect of heteroskedasticity, we deflate equations (4) and (5) by the book value of common equity at the beginning of the dividend change year.

B. Regression Results

Panel A of Table IV presents summary statistics from regressions of equation (4) for $\tau = 1, 2, \ldots, 5$. Since we identify dividend events in the years 1963 through 1997, have data on earnings through 1998, use a lagged value of the dividend change as an explanatory variable, and include lagged values of the dependent and independent variables to correct for autocorrelation (see footnote 5), the sample includes dividend events that occurred in the period 1965 through $(1998 - \tau)$ for year τ's regression.

As shown, dividend increases are positively related to earnings in each of the four subsequent years (for the third year, the coefficient is only marginally significant), and dividend decreases are not related to future earnings. The magnitude of the coefficient on dividend increases trends down from about one for $\tau = 1$ to about 0.5 for $\tau = 5$.

Table IV

Summary Statistics from Cross-sectional Regressions of Future Profits on the Dividend Change, Instruments for Expected Profits and Current Profits

The equations are deflated by the book value of common equity at the beginning of the dividend event year, B_{-1}. E_τ is earnings in year t relative to the dividend event year. AE_τ is abnormal earnings in year t relative to the dividend event year (earnings minus beginning book value times the cost of equity capital). ΔDIV is the annualized change in dividends. DPC (DNC) is a dummy that equals one for dividend increases (decreases). P_{-1} is market value of equity at the beginning of the dividend event year. DIV_{-1} is total common dividends in the year before the dividend change. The reported statistics are based on $34 - \tau$ annual regressions (dividend events from 1965 through $1998 - \tau$). The first row reports the mean coefficient, the second reports the t-statistic for the time series distribution of the coefficient (mean coefficient divided by its standard deviation and multiplied by the square-root of the number of cross sections), and the third row reports the proportion of regressions in which the coefficient is positive. To correct for autocorrelation in the residual through time, we include the firm's previous year dependent and independent variables as additional explanatory variables (see footnote 5). The coefficients and statistics associated with these auxiliary variables are not reported.

Panel A: Earnings as a Measure of Profits:

$$E_\tau = \beta_{0\tau} + \beta_{1\tau}DPC_0 \times \Delta DIV_0 + \beta_{2\tau}DNC_0 \times \Delta DIV_0 + \beta_{3\tau}E_{-1} + \beta_{4\tau}B_{-1} + \beta_{5\tau}P_{-1} + \beta_{6\tau}DIV_{-1} + \beta_{7\tau}DPC_{-1} \times \Delta DIV_{-1} + \beta_{8\tau}DNC_{-1} \times \Delta DIV_{-1} + \beta_{9\tau}E_0 + \epsilon_\tau$$

τ	Stat.	$\beta_{0\tau}$	$\beta_{1\tau}$	$\beta_{2\tau}$	$\beta_{3\tau}$	$\beta_{4\tau}$	$\beta_{5\tau}$	$\beta_{6\tau}$	$\beta_{7\tau}$	$\beta_{8\tau}$	$\beta_{9\tau}$	R^2	N
1	Mean	0.323	1.062	−0.273	0.166	0.010	0.011	−0.395	−0.606	−4.550	0.841	0.644	760
	t-stat.	0.841	6.174	−0.519	1.271	2.165	4.165	−0.870	−0.519	−0.622	5.115		
	Prop +	0.636	0.879	0.563	0.636	0.697	0.848	0.515	0.424	0.419	0.848		
2	Mean	0.639	0.560	−0.068	1.076	0.010	0.012	−0.079	−0.985	10.25	−0.057	0.650	738
	t-stat.	1.263	3.043	−0.302	8.757	2.312	3.232	−0.613	−0.554	0.313	−1.425		
	Prop +	0.563	0.719	0.516	0.969	0.656	0.750	0.469	0.594	0.467	0.375		
3	Mean	−0.015	0.249	−0.100	1.052	0.007	0.009	−0.093	−0.950	−26.61	0.122	0.685	715
	t-stat.	−0.020	1.178	−0.375	7.684	1.644	1.615	−0.356	−0.398	−1.225	2.462		
	Prop +	0.516	0.516	0.500	0.968	0.613	0.677	0.645	0.484	0.310	0.710		
4	Mean	1.474	0.574	−0.075	1.069	0.005	0.008	0.305	−2.686	−13.27	0.134	0.722	693
	t-stat.	1.828	1.647	−0.259	7.180	1.076	1.407	1.001	−0.496	−1.399	3.426		
	Prop +	0.600	0.667	0.483	0.933	0.633	0.767	0.533	0.500	0.393	0.767		
5	Mean	0.305	0.435	0.312	1.192	0.006	−0.006	−0.478	2.477	8.024	0.129	0.739	670
	t-stat	0.449	0.710	0.758	5.321	1.067	−1.139	−0.701	0.596	0.350	2.896		
	Prop +	0.552	0.586	0.571	0.931	0.621	0.552	0.552	0.586	0.333	0.690		

Panel B: Abnormal Earnings as a Measure of Profits:

$$AE_\tau = \beta_{0\tau} + \beta_{1\tau}DPC_0 \times \Delta DIV_0 + \beta_{2\tau}DNC_0 \times \Delta DIV_0 + \beta_{3\tau}AE_{-1} + \beta_{4\tau}B_{-1} + \beta_{5\tau}P_{-1} + \beta_{6\tau}DIV_{-1} + \beta_{7\tau}DPC_{-1} \times \Delta DIV_{-1} + \beta_{8\tau}DNC_{-1} \times \Delta DIV_{-1} + \beta_{9\tau}AE_0 + \epsilon_\tau$$

1	Mean	0.692	1.179	−0.257	0.002	−0.023	0.008	−0.382	2.084	2.832	0.714	0.579	742
	t-stat.	1.702	6.665	−0.484	0.015	−2.882	3.727	−0.760	1.375	0.820	3.852		
	Prop +	0.667	0.909	0.613	0.485	0.182	0.788	0.606	0.606	0.467	0.879		
2	Mean	0.599	0.730	0.098	0.440	−0.023	0.013	0.171	1.517	31.43	−0.099	0.561	720
	t-stat.	1.173	3.939	0.425	3.397	−3.042	3.420	1.483	0.613	1.190	−2.909		
	Prop +	0.500	0.781	0.567	0.719	0.219	0.781	0.594	0.594	0.552	0.313		
3	Mean	−0.802	0.391	−0.127	0.588	−0.023	0.009	0.113	−0.376	−3.463	0.049	0.570	698
	t-stat.	−1.080	1.585	−0.473	3.006	−2.520	1.945	0.446	−0.135	−1.418	1.050		
	Prop +	0.484	0.516	0.483	0.710	0.258	0.710	0.710	0.419	0.429	0.484		
4	Mean	0.517	0.805	−0.039	0.289	−0.023	0.007	0.437	−1.793	−0.644	0.057	0.594	675
	t-stat.	0.921	2.045	−0.128	1.510	−2.860	1.389	1.125	−0.340	−0.151	1.446		
	Prop +	0.567	0.733	0.500	0.667	0.300	0.667	0.567	0.567	0.444	0.567		
5	Mean	−0.421	0.689	0.477	0.167	−0.023	−0.001	−0.546	6.424	−10.23	0.006	0.604	653
	t-stat.	−0.527	1.260	1.140	0.609	−2.849	−0.209	−0.663	2.499	−2.224	0.104		
	Prop +	0.379	0.655	0.593	0.621	0.310	0.655	0.552	0.655	0.308	0.586		

The lack of correlation between dividend decreases and future earnings does not necessarily imply that dividend decreases are not informative about future earnings. The information content of dividend decreases may be captured by current year's earnings, which are disclosed after the dividend decrease announcement. (Hence, our result is not inconsistent with a stock price reaction to the announcement of a dividend decrease.) Indeed, current year earnings are highly correlated with dividend decreases (see also DeAngelo, DeAngelo, and Skinner (1992) and Benartzi et al. (1997)), and when we omit current year earnings, the coefficient on dividend decreases becomes positive and significant.

The insignificance of dividend decreases in explaining future earnings after controlling for current earnings is consistent with the accounting concept of conservatism: losses should be recognized in earnings when anticipated whereas profits should be recognized only when earned. As a result, current year earnings cannot contain the future implications of the good news that caused management to increase the dividend. On the other hand, future implications of the bad news that triggered the dividend decrease should be reflected in current earnings (see also DeAngelo et al. (1992)). A second possible explanation for the dividend decrease result is related to management behavior. It is well documented that in the presence of bad news, management, in many cases, elects to take a "big bath" in order to create accounting reserves for the future (e.g., by recognizing restructuring liabilities) or reduce future depreciation and amortization charges (e.g., by writing off assets). As a result, current earnings are significantly reduced. The big bath explanation is consistent with the documented earnings reversal: Earnings increase in the years following the dividend decrease (see, e.g., Healy and Palepu (1988) and Benartzi et al. (1997)).

Panel B of Table IV reports estimation results of equation (5). The results are qualitatively similar to the corresponding results in Panel A, where earnings are used as the measure of profitability. However, in Panel B the magnitude and significance of the coefficients on dividend increases are generally larger. Thus, accounting for the effect of changes in equity capital on future earnings, although it involves measurement error, results in a better measure of value added.

C. Robustness

To evaluate the robustness of the results, we repeated the analysis using alternative estimation procedures, alternative sets of instruments for expected earnings/abnormal earnings, alternative deflators, alternative measures of the dividend change, and alternative measures of the cost of equity capital in measuring abnormal earnings. Details are provided below.

C.1. Alternative Estimation Procedure

In the main part of the paper, we report summary statistics from cross-sectional regressions that are refined to account for autocorrelation in the residuals through time. We also estimated the equations using pooled regressions with year- and firm-fixed effects. The results were qualitatively similar to those reported, but the coefficients on the dividend change variables were generally larger and more significant. This difference in results suggests that the fixed effects do not completely capture the correlation in the residual, and we therefore report only the cross-sectional results.

C.2. Alternative Instruments for Expected Earnings

In the main part of the paper, we control for expected earnings prior to the dividend change using variables that are assumed to be correlated with expected earnings. As a robustness check, we repeat the analysis using consensus analysts' earnings forecast as an alternative measure of expected earnings. This variable has the advantage of being a direct measure of expected future earnings.[8] We regress

$$E_\tau = \beta_{0\tau} + \beta_{1\tau} DPC_0 \times \Delta DIV_0 + \beta_{2\tau} DNC_0 \times \Delta DIV_0 + \beta_{3\tau} AF_\tau + \beta_{4\tau} E_0 + \epsilon_\tau, \tag{6}$$

for $\tau = 1, 2, \ldots, 5$, where AF_τ is consensus analysts' earnings forecast for year τ, measured at the beginning of the second quarter of the dividend change year (see the Appendix).

Results for estimating equation (6) are provided in Panel A of Table V. The sample used in these regressions is much smaller and is statistically different from our original sample.[9] Analysts' forecast data are available since 1982, but we drop the first four years of data (1982 through 1985) because the number of observations during each of these years is only about 50, whereas the number of observation for each of the years from 1986 is about 500.

We find that dividend increases are positively related to earnings in each of the three subsequent years (for the third year, the coefficient is only marginally significant), whereas dividend decreases are insignificant. That is, the results for the three years subsequent to the dividend change are consistent with those reported in Panel A of Table IV, whereas for later years, all dividend change variables are insignificant. We also reestimate equation (4) supplemented by analysts' earnings forecasts and obtain results similar to those reported in Panel A of Table V.

[8] For a discussion of the pros and cons of using analysts' earnings forecasts as proxies for expected earnings, see, for example, Brown (1993).

[9] The number of observations with available analysts' earnings forecasts is about 25 percent of the full sample. The mean (median) market value of equity for the subsample with available analysts' earnings forecasts is $3,489 ($1,094) million relative to $610 ($124) for the full sample. The mean (median) book value of total asset for the subsample is $4,818 ($1,407) million relative to $832 ($185) for the full sample. The mean (median) book-to-price ratio for the subsample is 0.58 (0.55) relative to 0.92 (0.78) for the full sample.

Table V

Summary Statistics from Cross-sectional Regressions for a Subsample with Available Analysts' Earnings Forecast Data

The equations are deflated by the book value of common equity at the beginning of the dividend event year, B_{-1}. E_τ denotes earnings in year τ relative to the dividend event year (year 0). ΔDIV is the annualized change in dividends. *DPC* (*DNC*) is a dummy that equals one for dividend increases (decreases). AF_t is consensus analysts' earnings forecast for year t. P_{-1} is market value of equity at the beginning of the dividend event year. DIV_{-1} is total common dividends in the year before the dividend change. The reported statistics are based on $34 - \tau$ annual regressions (dividend events from 1965 through $1998 - \tau$). The first row reports the mean coefficient, the second reports the t-statistic for the time series distribution of the coefficient (mean coefficient divided by its standard deviation and multiplied by the square-root of the number of cross sections), and the third row reports the proportion of regressions in which the coefficient is positive. To correct for autocorrelation in the residual through time, we include the firm's previous year dependent and independent variables as additional explanatory variables (see footnote 5). The coefficients and statistics associated with these auxiliary variables are not reported.

Panel A: Measuring Expected Earnings Using Consensus Analysts' Earnings Forecasts:

$$E_\tau = \beta_{0\tau} + \beta_{1\tau} DPC_0 \times \Delta DIV_0 + \beta_{2\tau} DNC_0 \times \Delta DIV_0 + \beta_{3\tau} AF_\tau + \beta_{4\tau} E_0 + \epsilon_\tau$$

τ	Stat.	$\beta_{0\tau}$	$\beta_{1\tau}$	$\beta_{2\tau}$	$\beta_{3\tau}$	$\beta_{4\tau}$	R^2	N
1	Mean	−0.683	1.485	0.030	0.190	0.788	0.667	489
	t-stat.	−0.274	5.168	0.103	2.951	6.811		
	Prop +	0.417	1.000	0.455	0.750	1.000		
2	Mean	14.36	0.820	−0.158	0.273	0.148	0.684	475
	t-stat.	4.788	1.989	−0.780	3.578	2.792		
	Prop +	1.000	0.636	0.500	0.909	0.909		
3	Mean	10.23	0.605	0.004	0.257	0.124	0.683	461
	t-stat.	4.078	1.345	0.011	5.445	1.904		
	Prop +	0.900	0.600	0.556	0.900	0.800		
4	Mean	12.32	−0.204	−0.311	0.278	0.192	0.702	448
	t-stat.	4.045	−0.272	−0.679	2.801	1.727		
	Prop +	0.889	0.444	0.625	0.889	0.556		
5	Mean	11.48	−0.027	−0.231	0.173	0.204	0.707	436
	t-stat.	3.481	−0.038	−0.810	3.364	2.019		
	Prop +	0.875	0.500	0.429	0.875	0.875		

Panel B: Measuring Expected Earnings Using Instruments:

$$E_\tau = \beta_{0\tau} + \beta_{1\tau} DPC_0 \times \Delta DIV_0 + \beta_{2\tau} DNC_0 \times \Delta DIV_0 + \beta_{3\tau} E_{-1} + \beta_{4\tau} B_{-1} + \beta_{5\tau} P_{-1} + \beta_{6\tau} DIV_{-1} + \beta_{7\tau} DPC_{-1} \times \Delta DIV_{-1} + \beta_{8\tau} DNC_{-1} \times \Delta DIV_{-1} + \beta_{9\tau} E_0 + \epsilon_\tau$$

τ	Stat.	$\beta_{0\tau}$	$\beta_{1\tau}$	$\beta_{2\tau}$	$\beta_{3\tau}$	$\beta_{4\tau}$	$\beta_{5\tau}$	$\beta_{6\tau}$	$\beta_{7\tau}$	$\beta_{8\tau}$	$\beta_{9\tau}$	R^2	N
1	Mean	0.170	1.456	0.031	0.145	0.009	0.011	−0.039	0.984	0.092	0.620	0.694	489
	t-stat.	0.074	7.705	0.089	1.029	1.171	2.265	−0.237	0.694	0.028	3.541		
	Prop +	0.500	1.000	0.455	0.750	0.667	0.750	0.500	0.583	0.500	0.917		
2	Mean	8.344	0.583	0.150	0.446	0.008	0.011	0.112	3.092	5.742	0.085	0.707	475
	t-stat.	3.242	2.395	0.874	3.454	0.848	2.053	1.387	1.410	1.239	2.332		
	Prop +	0.727	0.818	0.500	0.909	0.636	0.727	0.818	0.727	0.636	0.818		
3	Mean	0.697	0.547	0.083	0.696	−0.004	0.017	0.213	1.374	−5.084	0.056	0.713	461
	t-stat.	0.251	1.946	0.257	10.042	−0.366	1.875	2.382	0.620	−1.889	0.869		
	Prop +	0.600	0.700	0.444	1.000	0.600	0.900	0.800	0.600	0.300	0.600		
4	Mean	2.497	−0.673	−0.429	0.466	−0.004	0.031	0.033	4.021	1.149	0.159	0.724	448
	t-stat.	0.691	−0.983	−0.762	4.725	−0.401	2.755	0.408	1.249	0.408	1.337		
	Prop +	0.556	0.333	0.750	1.000	0.444	1.000	0.556	0.889	0.556	0.556		
5	Mean	1.727	−0.262	−0.481	0.499	0.004	0.024	−0.050	8.231	−5.231	0.119	0.726	436
	t-stat.	0.727	−0.576	−1.303	3.745	0.293	3.117	−0.302	2.485	−1.321	1.371		
	Prop +	0.625	0.375	0.286	1.000	0.625	1.000	0.500	0.875	0.250	0.500		

We next examine whether the differences between the full sample results (Panel A of Table IV) and the results for the subsample with available analysts' earnings forecasts (Panel A of Table V) are due to the use of analysts' earnings forecasts or stem from differences between the two samples. To this end, we reestimate equation (4) for the subsample with available analysts' earnings forecasts. The results, reported in Panel B of Table V, are similar to those reported in Panel A and indicate that the use of analysts' earnings forecasts has essentially no effect: The differences in results are due to differences in the samples (larger firms and later years in the subsample). The differences in results could be due to the fact that large firms tend to be followed more closely and so have a richer information environment. They are also consistent with the documented weaker market reaction to dividend change announcements by large firms (e.g., Bajaj and Vijh (1990)).

Finally, for the full sample analysis (i.e., Table IV), we repeat the analysis using only the accounting variables as instruments for future profitability, only the price variable, only the dividend variables, and the three combinations of these subsets of control variables. The results (not reported) are qualitatively the same as before, indicating that our findings are not likely to be the result of measurement error in the instruments for expected earnings or abnormal earnings.

C.3. Deflation

We check whether the results are robust to alternative deflators. We rerun the regressions deflating by either the market value of common equity or the book value of total assets at the beginning of the dividend change year, instead of the book value of common equity. In both cases, the results are similar to those reported.

C.4. The Dividend Change Measure

We repeated the analysis using three alternative dividend change measures (instead of ΔDIV deflated by the book value of common equity): the rate of change in dividend per share ($R\Delta DIV$), the price-deflated dividend change (see, e.g., Bajaj and Vijh (1990) and the Appendix), and the stock return during the three days surrounding the dividend change announcement (see, e.g., Benartzi et al. (1997)). In all cases, we obtained similar results.

C.5. The Proxy for Expected Abnormal Earnings

To measure abnormal earnings, an estimate for the cost of equity capital is required. In the main analysis, we use the one-year interest rate at the beginning of the year, plus 6 percent average risk premium (see the Appendix). We repeated the analysis using the five-year zero coupon yield at the beginning of the year plus 4 percent, a constant rate of 12 percent, and the one-year interest rate plus market beta multiplied by 6 percent. In all cases, we obtain similar results.

IV. Conclusions

Using different methodologies, we provide strong evidence in support of the information content of dividends hypothesis. This evidence is important, especially because recent studies have cast doubt on whether the hypothesis holds empirically.

We document that, after controlling for the expected change in future earnings, dividend changes are positively related to earnings *changes* in each of the two years following the dividend change. We also show that dividend changes are positively related to the *level* of future profitability, after controlling for book value, past and current profitability, market expectations of future profitability as reflected in price prior to the dividend change, past dividends and dividend changes, and consensus analysts' earnings forecasts (where available). The results hold when profitability is measured in terms of future earnings and future abnormal earnings, but are stronger for abnormal earnings. We believe our results shed new light on the controversy regarding the informativeness of dividend changes about future profitability.

The findings are not symmetric for dividend increases and decreases. For our full sample, dividend increases are associated with future profitability for at least four years after the dividend change, whereas dividend decreases are not related to future profitability after controlling for current and expected profitability. We conjecture that the lack of association between dividend decreases and future profitability is due to accounting conservatism.

Appendix

In this appendix, we describe our variable measurement procedures. In the set of tests where unexpected profitability is estimated by future earnings changes, we measure earnings as "income before extraordinary items" (COMPUSTAT item #18). We use this measure to make the results comparable to BMT. An alternative measure is "usual earnings" defined as "income before extraordinary items—available for common" (item #237) minus after-tax "special items" (item #17 adjusted for income taxes). The latter measure has two advantages: It excludes preferred dividends from earnings, which is an advantage since we compare earnings with common dividends, and it excludes special items, which is an advantage since special items, like extraordinary items, are likely to be transitory and unpredictable. Hence, we revert to this measure when we examine the level of profitability (earnings and abnormal earnings). The choice between these two measures has only a minor impact on the results.

We use two measures of the dividend change: the rate of change in dividend per share relative to the previous quarter ($R\Delta DIV$), and the total change in dividends (ΔDIV). We measure the total change in dividends as four times the change in quarterly dividend per share multiplied by the number of shares outstanding. When there is more than one dividend change per year, $R\Delta DIV$ (ΔDIV) represents the geometric (arithmetic) sum across the observations. BMT measure the dividend change using the dividend per share in the last fiscal quarter, compared with the dividend per share in the last quarter of the previous year. Our measures are slightly different because we attempt to assure that no other distributions were declared to compensate for the dividend change. Note that similar to BMT, we do not "spread" the dividend change over the subsequent year (see Benartzi et al. (1997) for a discussion of this issue). We measure total common dividends in the year prior to the dividend change (DIV_{-1}) as Compustat item #21.

We measure the book value of common equity as "total common equity" (item #60), plus "treasury stock—preferred" (item #227) and minus "preferred dividends in arrears" (item #242). We measure ROE as the ratio of earnings to the book value of common equity.

We measure abnormal earnings as usual earnings minus an estimate of the cost of equity capital multiplied by book value of common equity at the beginning of the year. We estimate the cost of equity capital as the one-year risk-free interest rate at the beginning of the year, plus six percent average risk premium. We extract the risk-free interest rate from the Fama–Bliss Discount Bond File. We use the spot rather than the forward interest rate because we use actual earnings as a surrogate for expected earnings after the dividend change. We use a constant risk premium, because any measure of firm-specific risk premium is subject to substantial measurement error. Thus, using a firm-specific risk premium may produce an abnormal earnings estimate that is more "noisy" than an estimate obtained using a constant risk premium. Moreover, our focus is on accounting profitability, not the cost of capital. Robustness tests indicate that this assumption does not affect the inference.

For the alternative calculation of abnormal earnings (in the robustness subsection), we estimate beta using monthly stock returns during the five years that ended at the beginning of the year for which abnormal earnings are calculated (at least 30 observations were required). As a market index, we use the CRSP value-weighted returns including all distributions.

We measure the price-deflated dividend change as four times the change in dividends per share, deflated by the closing price two days prior to the announcement of the dividend change. Similar to the calculation of $R\Delta DIV$, we calculate the geometric sum of the price-deflated dividend change across observations with the same firm and year values. We also use the geometric sum in calculating the announcement return for the robustness test that uses the return as a proxy for the dividend change.

We measure consensus mean analysts' earnings forecasts in the fourth month of the fiscal year, since dividend changes in the first fiscal quarter are assigned to the previous fiscal year. We delete observations for which previous-year earnings have not yet been announced. For most companies, explicit earnings forecasts are available only for the current year and for the subsequent fiscal year. For future years with no explicit forecast, we generate forecasts by applying the mean long-term growth forecast (g) to the mean forecast for the prior year in the horizon, that is, $eps_{\tau+s} = eps_{\tau+s-1} \times (1+g)$. To obtain total earnings, we multiply the per share forecasts by the number of shares outstanding (from IBES).

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