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Are Dividend Changes a Sign of Firm Maturity?*

Firms that increase (decrease) dividends experience a significant decline (increase) in their systematic risk. The dividend-increasing firms do not increase their capital expenditure and experience a decline in profitability in the years after the dividend change. The positive market reaction to a dividend increase is significantly related to the subsequent decline in systematic risk. In the long run, the dividend-increasing firms with the largest decline in systematic risk also experience the largest increase in price over the next three years, suggesting that the market reaction to dividend changes may not incorporate the full extent of the decline in the cost of capital associated with dividend changes.

I. Introduction

What is the information content of dividend changes? Theoretical models by Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) tell us that changes in dividend policy convey news about future cash flows—specifically, dividend increases convey good news, and dividend decreases convey bad news. The models also predict a positive relationship between dividend changes and the price reaction to dividend changes. Empirical evidence strongly supports the latter prediction and has been widely used to justify the theory.[1]

One of the key implications of these models is that dividend changes should be followed by changes in profitability (earnings growth rates or return on assets)

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1. See Asquith and Mullins (1983); Brickley (1983); and Healy and Palepu (1988) among many others.

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in the same direction.[2] Benartzi, Michaely, and Thaler (1997) test this implication in a recent paper and find that the earnings growth rates of firms that increase dividends do not subsequently increase. Firms that decrease dividends, on the other hand, experience significant increases in earnings growth rates in the 2 years following the dividend decrease.[3] This evidence and the results we present here contradict the central supposition of dividend information/signaling models, namely, that dividend changes signal changes in profitability in the same direction.

The price reaction to dividend increases and dividend decreases suggests that investors interpret these changes as positive or negative news, as the case may be, about the firm. If the positive or negative news is not about changes in future profitability, however, what else could it be? One possibility is that dividend changes convey information about changes in discount rates. By definition, fundamental news about a firm has to be either about its cash flows or about its discount rates. If the good news in a dividend increase is not about future cash flows, then it may be about systematic risk. Therefore, in this article, we examine the relation between dividend changes and changes in systematic risk of a firm.[4] We also examine changes in profitability using different measures of profitability than Benartzi, Michaely, and Thaler (1997) and relate these results to changes in risk. Our initial objective is to use these findings to understand the information content of dividend changes. But the overall goal of our analysis is to relate changes in dividend policy to changes in a firm's life cycle, the key idea being that firms tend to increase their cash payouts (reduce their plowback rates) as they become more mature (because of a diminishing investment opportunity set), and, therefore, we should expect dividend increases to be associated with subsequent declines in profitability and risk. We develop this idea more fully below.

Using a sample of 7,642 dividend changes announced between 1967 and 1993, we find that firms that increase dividends experience a significant decline in their systematic risk while firms that decrease dividends experience a significant increase in systematic risk. The changes in systematic risk translate to a decline in risk premium of 1% a year for dividend-increasing firms and an increase in risk premium of 2% a year for dividend-decreasing firms. Using simple Gordon growth model calculations, we illustrate that changes in risk premium of this magnitude are sufficient to generate the observed announce-

2. Miller and Modigliani (1961) were the first to discuss the "information content of dividends." Specifically, they suggested that when a firm follows a policy of paying stable dividends, investors might reasonably interpret a change in dividend payout as providing information about changes in (management's views of) future profitability. For more on this view, see the survey on dividend policy by Allen and Michaely (1995).

3. In earlier work, Watts (1973) and Gonedes (1978) find some weak evidence of earnings increases following dividend decreases. Using a large sample and controlling for potential biases, we also find that dividend changes do not convey information either about the growth in earnings or about their level.

4. Using a sample of 72 initiations, Venkatesh (1989) finds that the idiosyncratic risk of firms that initiate dividends declines.

ment-day price reactions, even when the firm's cash flows do not grow, or even decline.

An examination of bond ratings around dividend change announcements indicates that the decline in the firm's risk manifests itself not only through a reduction in the systematic risk of equity but also through an improvement in the firm's debt ratings. We also find that firms that increase dividends experience a significant decline in return on assets (not just a decline in earnings growth, as in Benartzi, Michaely, and Thaler 1997), which is consistent with the decline in systematic risk.

Regression tests involving (dividend change) announcement period abnormal returns indicate that the market understands, at least partially, the implication of a change in dividend policy for the subsequent change in a firm's riskiness. We find that the greater the subsequent decline in risk, the more positive is the market reaction to the announced dividend. Thus, changes in risk, conditional on changes in profitability, begin to provide an explanation for the price reaction to dividend announcements. Indeed, our main findings are that dividend increases are associated with subsequent decreases in risk and profitability and that the initial market reaction to the dividend increase is strongly associated with the decline in risk.

These findings have strong implications for existing theories of dividend policy. Clearly, the evidence is inconsistent with traditional cash flow signaling models, which predict positive association between dividend changes and subsequent earnings changes. But some of our findings do provide support for Lintner's (1956) findings. Based on a survey of managers, Lintner reports that managers increase dividends only when they are confident that they will not have to reverse that decision in the near future. In accordance with this result, we find that payout ratios of dividend-increasing firms increase permanently, suggesting that these firms are indeed able to maintain their higher dividends. On the other hand, since Lintner does not discuss the relation between dividend changes and market reaction and also does not discuss the relation to systematic risk, it is hard to explain our findings on systematic risk and stock price reactions based on Lintner.

Our results provide some support for the free cash flow hypothesis of Jensen (1986). We find that dividend-increasing firms maintain their current level of capital expenditures in the future while the level of cash and short-term investments on their balance sheet declines. These findings, combined with the evidence on declining return on assets, are consistent with firms increasing their cash payouts in anticipation of a declining investment opportunity set as predicted by the free cash flow hypothesis. However, the free cash flow hypothesis has no explicit predictions concerning changes in risk. Therefore, the free cash flow hypothesis cannot be the complete story.

We suggest that increases in dividends convey information (although imprecise) about changes in a firm's life cycle, specifically, as to a firm's transition from a higher growth phase to a lower growth phase, which we refer to as a mature phase. As firms become more mature, their investment opportunity set becomes smaller. This manifests itself in a declining rate of reinvestment (the amount the firm retains from its earnings to reinvest into the firm), declining return on investment and growth rates, and declining risk. The declining reinvestment rate, in turn, gives rise to excess cash, which should be ultimately paid out. We refer to this explanation as the *maturity* hypothesis. The idea of a firm going through different phases of growth through its life is not new and is prevalent in popular MBA valuation textbooks (see Damodaran 1994; Copeland, Koller, and Murrin 2000). However, there are no formal models in finance relating this idea to changes in dividend policy. We would like to emphasize, however, that maturation is a process that is likely to be played out gradually over a long time and not necessarily completed over a few years or over a few events. Our point is simply that large cash payouts may be important signs of this long maturation process.

But why would the market react positively to such cash payouts? For two possible reasons: first, it is quite likely that the market was not aware of the change in risk—hence, it is a positive surprise involving news about changing risk. Second, the market may react positively to the news that the firm is less likely to burn the excess cash (as in Jensen 1986; Stulz 1990).

Risk changes may also provide some partial explanation for the long-term drift in stock prices (in the same direction) observed after dividend changes (see Charest 1978; Benartzi et al. 1997). In our article, we find that the long-term drift is positively associated with future changes in profitability while negatively associated with future changes in risk. Thus, in the long run, stock prices of dividend-increasing firms seem to decline with declining profitability and increase with declining risk. This price behavior is suggestive of a securities market in which investors only gradually learn the full implications of a dividend change for a firm's future profitability and systematic risk.[5] Some of this learning is likely to take place through publicly observable confirming events such as changes in bond ratings. As mentioned earlier, a firm's bond ratings improve significantly in the years following a dividend increase.[6]

The rest of the article is organized as follows: Section II describes the data and provides summary statistics. Section III discusses the new evidence on changes in profitability and risk following dividend changes. Section IV examines the link between the informational role of dividends and future changes in risk and profitability. Finally, Section V discusses the implications of our findings for existing theories of dividend policy, proposes the maturity explanation, and concludes.

5. This pattern is consistent with behavioral models of limited rationality on the part of investors, as well as with models in which fully rational investors face uncertainty about economic parameters. See Brav and Heaton (in press) for a detailed discussion of this issue.

6. We show later that the decline in the systematic risk of equity and the improvement of bond ratings are not just due to a decline in leverage. Our analysis suggests a decline in the underlying operating risk of the firm.

II. Sample, Data Items, and Descriptive Statistics

A. Sample

Our sample is drawn from all dividend announcements of firms listed on the New York (NYSE) and American (AMEX) stock exchanges between 1967 and 1993. The choice of the time period is limited by the requirement that at least 4 years of data be available before and after the dividend announcement date.[7] To be included in the sample, a dividend announcement must satisfy the following criteria:

a) The firm's financial data are available on CRSP (Center for Research in Security Prices) and Compustat.

b) The distribution is a quarterly taxable cash dividend in U.S. dollars.

c) The shares on which the dividends are paid are ordinary common shares and are not shares of Americus Trust components, closed-end funds, or REITS (real estate investment trusts).

d) The previous cash dividend payment was paid within a window of 20–90 trading days prior to the current dividend announcement.

e) The percentage change in dividends is between 12.5% and 500%. The lower bound of 12.5% ensures that we include only economically significant dividend changes, and the upper bound of 500% eliminates outliers. In addition, eliminating small dividend changes would also minimize problems arising from misspecification in the model of expected dividends since large dividend changes are likely to be categorized as dividend surprises regardless of the expectation model employed. The 12.5%–500% range is based on an examination of the frequency distribution of all dividend increases and decreases and seems to be the best in terms of including only big dividend changes.[8]

f) Other nondividend distribution events such as stock splits, stock dividends, mergers, and so on, do not occur within 15 trading days surrounding the dividend announcement.

g) The dividend announcement is not an initiation or an omission.

The resulting sample contains 6,284 dividend increases and 1,358 dividend decreases for a total of 7,642 dividend change announcements.

7. We have checked and found that requiring 4 years of data after the dividend announcement does not induce any survivorship bias in the data. Specifically, the delisting rates for dividend-decreasing firms are not different from the delisting rates of dividend-increasing firms. In fact, 90% of the firms that increase or decrease dividends have data available for the entire 4-year period after the dividend change.

8. We have repeated all our tests using a 5% or 10% cutoff, and the results (not reported here) are not appreciably different. We have also repeated the analysis based on change in dividend yield (e.g., 0.25% or 0.5%) rather than the percent change in dividends. Given the very high correlation between yield changes and percent dividend changes, it is not surprising that the alternate analysis yields similar results.

B. Data Items and Definitions

For each announcement in the sample, we obtain current and lagged quarterly dividends, stock returns, and NYSE/AMEX value-weighted and equal-weighted market returns for a 3-day window (-1 to $+1$) around the dividend announcement and for a 3-year period after the dividend announcement from the CRSP database. In addition, we obtain stock price and market capitalization at least 5 days prior to the announcement and the average daily turnover over a 252-day period prior to the dividend announcement. These variables help us understand the characteristics of dividend-increasing and dividend-decreasing firms.

From Compustat, we obtain accounting data for the 7 years (-3 to $+3$) surrounding the announcement year. Year 0, or the base year, is defined to be the fiscal year corresponding to the calendar year of the dividend announcement. For instance, if a dividend (change) announcement took place in calendar year 1990, then the base year for Compustat data will be fiscal year 1990 regardless of when in 1990 the dividend announcement took place. The following data items are obtained from Compustat (annual data item shown in parentheses):

a) total assets (6),
b) operating income before depreciation and amortization (13),
c) net income before extraordinary items (18),
d) common dividends (21),
e) book value of common equity (60),
f) capital expenditures (128), and
g) cash and short-term investments (1).

The quarterly dividend change corresponding to the dividend announcement is defined as the percentage difference between current quarterly dividends, $D_{i,0}$, and the previous quarterly dividends, $D_{i,-1}$:

$$\Delta D_{i,0} = \frac{D_{i,0} - D_{i,-1}}{D_{i,-1}}. \tag{1}$$

The abnormal stock price reaction to the dividend announcement is defined as the sum of the difference between the stock return and the value-weighted NYSE/AMEX market return:[9]

$$\text{CAR}_i = \sum_{t=-1}^{1} (r_{i,t} - r_{m,t}), \tag{2}$$

where $r_{i,t}$ is the return on security i at date t, and $r_{m,t}$ is the return on the market portfolio m at date t.

Following Barber and Lyon (1996), we use return on assets (ROA) based

9. We have repeated all our tests using abnormal returns measured with respect to the equal-weighted index, and the results are similar.

on operating income before depreciation to measure profitability.[10] The return on assets is defined as the ratio of operating income to total assets:

$$\text{ROA}_t = \frac{\text{Operating Income}_t}{\text{Total Assets}_t}. \tag{3}$$

The unadjusted change in return on assets of firm i is defined as

$$\Delta\text{ROA}_{i,t} = \text{ROA}_{i,t} - \text{ROA}_{i,t-1}. \tag{4}$$

To account for the possibility that return on assets may have an industry component, we compute the abnormal change in return on assets by subtracting the change in return on assets of a matching firm in the same two-digit SIC (standard industrial classification) code as the dividend-changing firm and the closest average change in ROA during the 3 years prior to year 0. The abnormal change in ROA is a measure of the firm-specific change in ROA and controls for any systematic change in profitability across similar firms. The abnormal change in return on assets is defined as

$$\Delta\text{ROAI}_{i,t} = (\text{ROA}_{i,t} - \text{ROA}_{i,t-1}) - (\text{ROA}_{m,t} - \text{ROA}_{m,t-1}), \tag{5}$$

where $\text{ROA}_{m,t}$ is the return on assets for the matching firm.[11] The capital expenditure ratio of a firm is defined as the ratio of capital expenditures to the total assets of the firm:

$$\text{CE}_t = \frac{\text{Capital Expenditures}_t}{\text{Total Assets}_t}. \tag{6}$$

Cash and short-term investments are computed as follows:

$$\text{Cash}_t = \frac{\text{Cash and Short-Term Investments}_t}{\text{Total Assets}_t}. \tag{7}$$

The abnormal or (matching firm) adjusted capital expenditures or cash levels are computed as the difference between the values for the dividend-changing firm and the values for a matching firm chosen using the same criteria as that used to compute abnormal changes in ROA.

Finally, the dividend payout ratio is defined as the ratio of common dividends to net income before extraordinary items:

$$\text{Payout Ratio} = \frac{\text{Div}_t}{\text{NI}_t}. \tag{8}$$

Abnormal or adjusted dividend payout ratio is computed in the same manner as abnormal ROA, capital expenditures, or cash levels.

10. Using net income instead of operating income provides similar results.

11. We have repeated the analysis when each firm in the sample is matched to a portfolio of firms in the same industry. The results are similar.

C. Preliminary Statistics

Table 1 provides preliminary statistics on percent dividend change, price reaction to dividend changes, and other characteristics for dividend-increasing and dividend-decreasing firms. The average increase in dividends is 30.1%, and the average 3-day abnormal return around a dividend-increase announcement is 1.34%, both of which are statistically significant. The median dividend-increasing firm resides in size decile 9 (1 is the smallest, 10 is the largest) among NYSE/AMEX stocks, has a stock price of $24.50, a turnover of about 30% a year, and has been in existence for at least 15 years. The quarterly dividend announced by the median firm represents an annualized dividend yield of 3.46% (based on the stock price just before the dividend announcement). These statistics indicate that dividend-increasing firms are fairly large, long-lived, and liquid firms.

The average decrease in dividends is around 45%, and the average CAR is −3.71%. It is interesting to note that while the magnitude of a dividend decrease is about one-and-a-half times that of a dividend increase, the magnitude of the price reaction to a dividend decrease is about two-and-a-half times that of a dividend increase. The median dividend-decreasing firm resides in size decile 8 among NYSE/AMEX firms, is fairly high priced, has trading volume comparable to that of the median dividend-increasing firm, and has been in existence for at least 19 years. The quarterly dividends announced by the median dividend-decreasing firm correspond to an annualized dividend yield of 2.87% (based on price just before the dividend announcement). The average market-to-book ratio for dividend-increasing and dividend-decreasing firms are 1.43 and 1.23, respectively. In comparison, the average market-to-book (M/B) ratio for the Dow Jones Industrial Average (DJIA) during 1963–96 is 1.49 (see Lee, Myers, and Swaminathan 1999). Thus, the M/B ratios of dividend-increasing firms are similar to those of other large industrial firms. Overall, dividend-increasing and dividend-decreasing firms look similar across most characteristics and seem to be fairly large firms. The main difference is that dividend-decreasing firms have somewhat lower stock prices and M/B ratios.[12]

III. Changes in Future Profitability and Risk Characteristics

We begin our analysis by examining changes in future profitability. Benartzi et al. (1997) show that earnings growth rate does not increase subsequent to dividend changes. It has been argued that their results may be attributed to inadequate controls for expected changes in profitability (Nissim and Ziv 2000). We utilize a procedure that controls for expected change in profitability and show that (1) profitability declines after dividend increases and (2) the level of dividends does not increase after dividend increases. We then examine

12. Results for a more recent subsample from 1982 to 1993 are similar.

TABLE 1 Firm Characteristics of Dividend-Changing Firms

	Mean	Standard	Minimum	5%	50%	95%	Maximum	*N*
A. Dividend increases:								
CHGDIV %	30.1	29.3	12.5	13.6	22.2	66.7	500.0	6,284
CAR %	1.34	4.33	−38.31	−4.55	.95	8.74	42.50	6,284
SIZE	1,185.1	3,796.1	1.1	12.8	195.9	5,140.3	86,802.7	6,284
RSIZE	8.1	2.1	1	4	9	10	10	6,284
PRICE	29.60	24.23	1.87	8.25	24.50	66.00	616.00	6,284
TOVR	.16	.14	.003	.03	.12	.43	1.81	6,153
M/B	1.43	.99	.37	.73	1.12	3.01	15.29	6,160
DY %	3.74	2.09	.24	1.05	3.46	7.26	50.82	6,284
IYREXST	20.1	15.9	0	3	15	54	68	6,284
B. Dividend decreases:								
CHGDIV	−44.8	16.4	−98.3	−75.0	−45.9	−20.0	−13.0	1,358
CAR %	−3.71	6.89	−32.70	−17.35	−2.05	5.35	23.84	1,358
SIZE	757.4	2,489.4	1.9	9.0	148.0	2,661.9	46,732.4	1,358
RSIZE	7.7	2.4	1	3	8	10	10	1,358
PRICE	26.31	25.31	1.63	5.13	18.50	76.00	287.00	1,358
TOVR	.15	.15	.004	.03	.10	.44	1.46	1,346
M/B	1.23	.94	.40	.71	1.01	2.34	14.95	1,310
DY %	3.29	2.19	.04	.59	2.87	7.29	17.89	1,358
IYREXST	23.3	17.0	0	3	19	57	68	1,358

NOTE.—This table reports the firm characteristics for the sample of firms that change their cash dividends over the period 1967–93. To be included in the sample, the observation must satisfy the following criteria: (1) the firm's financial data are available on CRSP and Compustat, (2) the cash dividend announcement is not accompanied by other nondividend events, (3) only quarterly cash dividends are considered, (4) cash dividends changes less than 12.5% or greater than 500% are excluded, (5) cash dividend initiations and omissions are excluded, (6) the previous cash dividend payment was paid within a window of 20–90 trading days prior to the current dividend announcement. CHGDIV = percentage change in the cash dividend payment, CAR = 3-day cumulative NYSE/AMEX value-weighted abnormal return around the dividend announcement, SIZE = market value of equity at the time of the announcement of the cash dividend change, RSIZE = size decile ranking relative to the entire sample of firms on CRSP, PRICE = average price, TOVR = average daily turnover over a 252-day period prior to the dividend announcement in percent, M/B = market-to-book ratio at the beginning of the year of the announcement, DY = dividend yield at the time of the announcement of the cash dividend change, and IYREXST = number of years that the firm has been on CRSP.

changes in risk by examining factor loadings from the Fama and French (1993) three-factor model, debt ratings, and financial leverage. Finally, we examine changes in capital expenditures and cash levels in the years subsequent to a dividend change announcement.

A. Change in Return on Assets

Table 2 presents change in future profitability for dividend-changing firms. The table presents the average annual change in return on assets (ROA) for the 3 years prior to the dividend change (-3 to -1) and the 3 years after the dividend change ($+1$ to $+3$). The average change is defined as the arithmetic average of the changes in each year. The table also presents the change in year 0, which is the base year (recall that year 0 is always the fiscal year corresponding to the calendar year of the dividend announcement).

The column "$Ld - Lg$" is the average change in return on assets during years $+1$ to $+3$ minus the average change in return on assets during years -3 to -1. The column "$Ld - 0$" is the average change in return on assets during years $+1$ to $+3$ minus the change in return on assets during year 0. Subtracting the average change in the past from the average change in the future is a way to control for any firm-specific drift in ROA unrelated to dividend changes. We also compute an abnormal change in ROA by subtracting the change in ROA of a matching firm chosen based on industry and past ROA performance (recall that the matching firm was chosen based on the two-digit SIC code and the closest average change in ROA during the past 3 years—see Sec. IIB for further details) from the dividend-changing firm's change in ROA. This approach controls for any systematic changes in ROA of the firm unrelated to dividend changes. The table presents both the mean and the median of unadjusted and matching firm-adjusted changes in ROA (see eqq. [4] and [5]). While the adjusted results are more robust, the unadjusted results are easier to interpret. The significance levels for the means are based on a two-tailed *t*-test, and the significance levels for the medians are based on a two-tailed Wilcoxon signed-rank test.

The median firm announcing a dividend increase experiences a significant decline in ROA of 0.53% during the 3 years after the increase in dividends. Note that this number is not adjusted for changes in the ROA of the matching firm; therefore this is an actual decline in ROA. This decline is in contrast to an increase of 0.44% experienced during the 3 years prior to the dividend increase. The median differences for $Ld - Lg$ and $Ld - 0$ are, respectively, -0.95% and -1.05%, both of which are statistically significant at the 1% level. The adjusted decline in ROA after the dividend increase is -0.27% and is statistically significant at the 1% level. The results show that a dividend-increasing firm moves from a period of increasing ROA before the dividend increase to a period of declining ROA after the dividend increase. The matching firm-adjusted results confirm the basic unadjusted results.

Table 2 also presents results for quintiles of dividend-increasing firms where quintile 1 contains the smallest 20% of dividend increases and quintile 5 contains the largest 20% of dividend increases.[13] The results show that there is a negative relationship between dividend increases and subsequent declines in profitability. Firms that increase dividends the most experience the greatest decline in profitability. For example, for quintile 5 firms with a median dividend increase of 50%, the drift in ROA (the average change in ROA) declines by 1.02% and 1.47% (based on median $Ld - Lg$ and $Ld - 0$, respectively). In contrast, for quintile 1 firms with a median dividend increase of only 14.29%, the drift in ROA declines by only 0.63% and 0.60% (based on median $Ld - Lg$ and $Ld - 0$, respectively).[14]

For dividend-decreasing firms, we find the opposite result: ROA improves significantly in the 3 years after the dividend decrease. These firms seem to move from a period of declining ROA before the dividend decrease to a period of increasing ROA after the dividend decrease. However, before the ROA improves, it worsens in the year of the dividend decrease (year 0). The median firm suffers a decline in ROA of –1.05% in year 0 compared to a decline of only 0.51% during the 3 years prior to the dividend decrease. Yet, in the 3 years after the dividend decrease, the ROA improves by a healthy 0.44% a year. Not surprisingly, the differences $Ld - Lg$ and $Ld - 0$ are both significant at the 1% level.[15]

B. Level of Return on Assets

Suppose that a dividend increase signals a permanent increase in current ROA instead of an increase in future ROA (as the Lintner model implies). This would then suggest that the average ROA in the future years (say, during years $+1$ to $+3$) should be higher than the average ROA in the past (say, during years -1 to -3). At the same time, there could be a decline in ROA during years $+1$ to $+3$ if the ROA in year 0 temporarily overshoots its higher permanent level. To illustrate this point, consider the following sequence of (artificial) ROA numbers from year -3 to year $+3$: 13%, 14%, 15%, 18% (temporarily high), 17%, 16%, and 16%. The permanent ROA increases from

13. The quintiles are formed from the pooled time-series, cross-sectional data. We have also formed quintiles by year and then combined the quintiles across years. The results are similar. The reason the number of observations are different in each quintile is due to the fact that the dividend increases are not continuously distributed but, rather, discretely distributed with some values occurring more often than others. The resulting ties lead to more observations being assigned to one group.

14. These results suggest that misspecification in the model of expected dividends in computing dividend surprises is not likely to confound our results (recall that we use a naive expectation model; last quarter's dividends are the best forecast of this quarter's dividends). The reason is that large dividend increases (with a median increase of 50%) are likely to be categorized as positive dividend surprises regardless of the expectation model employed. Therefore, we should expect to see correspondingly large improvements in profitability for these firms. In fact, what we see is large declines in profitability. In addition, our sample selection process, which leaves out dividends lower than 12.5%, should also minimize problems arising from misspecification in models of expected dividends.

15. We do not divide dividend decreases into smaller groups because the number of dividend decreases is only about one-fifth of the number of dividend increases in our sample.

TABLE 2 Change in Return on Assets

	Unadjusted					Industry- and Performance-Adjusted				
Dividend Changes	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0
Increases (all):										
Mean	.58*	.64*	−.92*	−1.46*	−1.53*	.02*	1.07*	−.45*	−.48*	-1.48*
Median	.44*	.50*	−.53*	−.95*	−1.05*	.00	.54*	−.27*	−.28**	−.79*
N	5,940	6,053	5,407	5,230	5,391	5,933	5,598	4.261	4,261	4,261
Increases (quintile 1):										
Mean	.26*	.16*	−.69*	−.93*	−.87*	−.003	.39**	−.35*	−.35*	−.64*
Median	.23*	.14*	−.45*	−.63*	−.60*	−.0004	.11**	−.24*	−.21*	−.39*
N	1,214	1,219	1,113	1,099	1,111	1,191	1,125	874	874	874
Increases (quintile 2):										
Mean	.52*	.50*	−.91*	−1.44*	−1.31*	.02*	1.06*	−.42*	−.45*	−1.27*
Median	.43*	.40*	−.55*	−.93*	−.98*	.00	.46*	−.32*	−.33*	−.74*
N	1,647	1,661	1,499	1,464	1,495	1,665	1,562	1,219	1,219	1,219
Increases (quintile 3):										
Mean	.63*	.63*	−1.03*	−1.66*	−1.71*	.02*	1.11*	−.61*	−.65*	−1.81*
Median	.53*	.59*	−.66*	−1.17*	−1.34*	.00	.55*	−.37*	−.35*	−.97*
N	1,248	1,267	1,112	1,075	1,109	1,247	1,179	858	858	858
Increases (quintile 4):										
Mean	.86*	.67*	−.84*	−1.66*	−1.44*	.02*	1.37*	−1.08	−.14	−1.48*

Median	.66*	.69*	−.42*	−1.20*	−1.08*	.00	.90*	.00	−.06	−.94*
N	753	785	683	645	681	753	709	532	532	532
Increases (quintile 5):										
Mean	.78*	1.38*	−1.11*	−1.74*	−2.43*	.04*	1.59*	−.69**	−.74*	−2.42*
Median	.53*	1.03*	−.52*	−1.02*	−1.47*	.002**	1.01*	−.29*	−.31*	−1.35*
N	1,078	1,121	1,000	947	995	1,077	1,023	778	778	778
Decreases (all):										
Mean	−.79*	−2.16*	.45*	1.23*	2.55*	.01***	−1.22*	.33*	.31*	1.57*
Median	−.51*	−1.05*	.44*	.93*	1.36*	.00	−0.63*	.22*	.22*	.58*
N	1,269	1,307	1,183	1,137	1,179	1,267	1,214	969	969	969

NOTE.—This table reports the annual change in return on assets (ROA) based on operating income before depreciation (Compustat annual item no. 13) for the sample of firms that change their dividends over the period 1967–93. The industry- and performance-adjusted annual change in ROA is equal to the unadjusted change minus the change of a matching firm with the same two-digit SIC code as the dividend-changing firm and the closest average change in ROA during years −3 to −1 to that of the dividend-changing firm. See eqq. (3), (4), and (5) in the text for further details. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles. Column "$Ld - Lg$" is the average change in ROA during years +1 to +3 minus the average change during years −3 to −1. Column "$Ld - 0$" is the average change in ROA during years +1 to +3 minus the change during year 0. The number of dividend announcements is represented by *N*. The significance levels of the means (medians) are based on a two-tailed *t*-test (two-tailed Wilcoxon rank test).

* Significant at the 1% level.

** Significant at the 5% level.

*** Significant at the 10% level.

TABLE 3 **Level of Return on Assets**

Dividend Changes	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0
Increases (all):					
Mean	17.24*	18.79*	16.91*	−.44*	−1.91*
Median	16.64*	18.32*	16.66*	−.02**	−1.12*
N	6,026	6,070	5,429	5,305	5,407
Increases (quintile 1):					
Mean	18.03*	18.56*	17.24*	−.88*	−1.42*
Median	17.76*	18.74*	17.33*	−.49*	−.92*
N	1,223	1,221	1,118	1,104	1,113
Increases (quintile 2):					
Mean	17.95*	19.22*	17.37*	−.67*	−1.84*
Median	17.47*	18.73*	17.09*	−.17*	−1.13*
N	1,660	1,666	1,504	1,477	1,499
Increases (quintile 3):					
Mean	17.32*	18.80*	16.85*	−.63*	−2.15*
Median	16.62*	18.26*	16.90*	−.03	−1.37*
N	1,265	1,270	1,116	1,091	1,112
Increases (quintile 4):					
Mean	17.20*	19.03*	17.18*	−.09	−1.82*
Median	16.12*	18.30*	16.94*	.18	−1.04*
N	775	787	687	664	683
Increases (quintile 5):					
Mean	15.25*	18.21*	15.76*	.37***	−2.35*
Median	13.85*	17.12*	14.42*	.66*	−1.09*
N	1,103	1,126	1,004	969	1,000
Decreases (all):					
Mean	14.16*	10.61*	11.83*	−2.42*	1.01*
Median	12.71*	9.54*	10.87*	−1.21*	.81*
N	1,292	1,312	1,187	1,156	1,183

NOTE.—This table reports the level of return on assets (ROA) based on operating income before depreciation (Compustat annual item no. 13) for a sample of firms that change their dividends over the period 1967–93. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles. Column "*Ld* − *Lg*" is the average level of ROA during years +1 to +3 minus the average level during years −3 to −1. Column "*Ld* − 0" is the average level of ROA during years +1 to +3 minus the level during year 0. The number of dividend announcements is represented by *N*. The significance levels of the means (medians) are based on a two-tailed *t*-test (two-tailed Wilcoxon rank test).

* Significant at the 1% level.

** Significant at the 5% level.

*** Significant at the 10% level.

14% to 16%, but the actual ROA temporarily overshoots the permanent level in year 0 and then declines.

To ensure that the findings in table 2 are not driven by this effect, we also examine the changes in the level of ROA directly. The results are reported in table 3 and figure 1. In the case of dividend increases, the average ROA during years −3 to −1, year 0, and years +1 to +3 are 17.24%, 18.79%, and 16.91%, respectively. The average ROA during years +1 to +3 is actually lower (not higher) than the average ROA during years −1 to −3. Thus, the profitability level of dividend-increasing firms is not any higher in the years after the dividend is paid (as illustrated in fig. 1) and, if anything, seems to have declined permanently from the past levels.

For dividend-decreasing firms, the picture is more complex. While ROA changes are positive in the period after the dividend reduction, the level of ROA

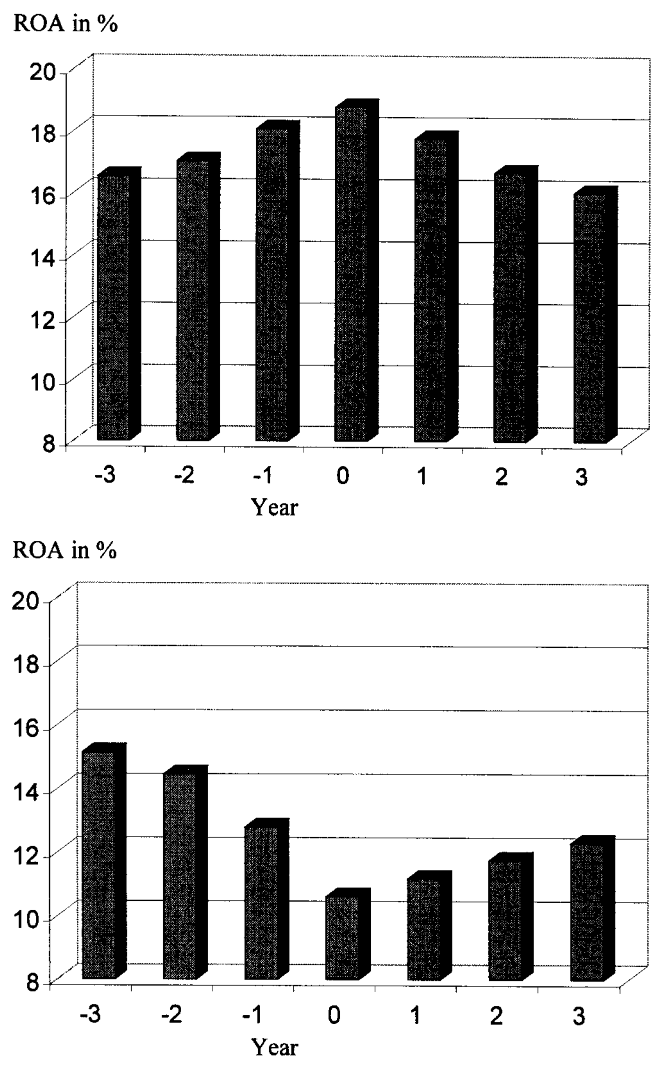

FIG. 1.—Level of return of assets. Top, Dividend increases. Bottom, Dividend decreases. This figure depicts the level of return on assets (ROA) based on operating income before depreciation (Compustat annual item no. 13) for a sample of firms that change their dividends over the period 1967–93. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles.

is much lower in the years after the dividend decline compared to the period before. Specifically, the average ROA of 11.83% during years +1 to +3, while higher than the ROA of 10.61% in year 0, is still lower than the average ROA of 14.16% during years −1 to −3. While the dividend-decreasing firms seem to be recovering from a recent slump, the data suggest that the recovery does not rise to the level of prior years.

C. Dividend Payout Ratios

Table 4 reports the pattern of dividend payout ratios around dividend changes, which provides further insights into the interaction between current dividend changes and future earnings changes. The dividend payout ratio is defined as the ratio of annual dividends on common shares to annual earnings (see eq. [8]). If cash flow signaling models are correct, the payout ratio of a dividend-increasing firm should increase temporarily at first and then decline gradually over time as earnings start catching up with the increased dividends. For a dividend-decreasing firm, on the other hand, the payout ratio should decline first and then increase gradually as earnings decrease.

The results in panel A of table 4 indicate that for dividend-increasing firms, the dividend payout ratio increases during the 3-year period after a dividend increase. The mean payout ratio for the dividend-increasing firm increases from 33.84% during years −3 to −1 to 42% during years +1 to +3. Dividend-decreasing firms, on the other hand, experience a temporary increase in the dividend payout ratio in year 0, and then see their dividend payout ratio decline in future years. The mean payout ratio of the dividend-decreasing firm increases from 59.40% in years −3 to −1 to 77.26% in year 0 and then declines to 52% during years +1 to +3. The results based on medians and matching firms (adjusted) are similar.

These findings suggest that firms that increase dividends experience a permanent increase in their dividend payout ratios. On the other hand, firms seem to decrease their dividends in response to recent earnings distress. The pattern of change in dividend payout ratios from year −3 to +3 (year by year) is further highlighted in figure 2, which provides a visual representation of the results in table 4. Overall, the results in tables 2, 3, and 4 clearly show that firms that increase dividends experience a decline in their profitability.

D. Changes in Risk Characteristics

Do firms that increase dividends become less risky? And conversely, do firms that decrease dividends become more risky? To answer these questions, we measure changes in the systematic risk of equity using the Fama and French (1993) three-factor model. Let t^* be the month of the dividend announcement. Then for each firm announcing an increase or decrease in dividends, the fol-

TABLE 4 Dividend Payout Ratio

	Unadjusted					Adjusted				
	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0
A. Dividend increases:										
Mean	33.84*	30.33*	42.03*	8.72*	11.70*	3.25*	2.27*	5.45*	9.26	4.44*
Median	28.12*	26.05*	33.22*	4.41*	4.76*	3.25*	5.00*	5.23*	.85*	2.44*
N	5,747	6,093	4,915	4,584	4,882	4,467	5,009	3,093	2,616	2,968
B. Dividend decreases:										
Mean	59.40*	77.26*	52.01*	−4.40**	−12.82*	16.64*	30.45*	8.85*	−6.53**	−16.71*
Median	51.43*	58.38*	42.27*	−3.81*	−3.69*	9.92*	16.33*	5.27*	−3.32*	−3.65*
N	1,163	1,013	875	803	770	917	810	600	529	510

NOTE.—This table reports the dividend payout ratio for a sample of firms that change their dividends over the period 1967–93. The dividend payout ratio is defined as common dividends (Compustat annual item no. 21) divided by the earnings before extraordinary items (Compustat annual item no. 18). Firms with negative earnings before extraordinary items are excluded from the sample. The industry and performance-adjusted payout ratio is equal to the unadjusted payout ratio minus the payout ratio of a matching firm with the same two-digit SIC code as the dividend-changing firm and the closest average change in ROA during years −3 to −1 to that of the dividend-changing firm. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles. The significance levels of the means (medians) are based on a two-tailed *t*-test (two-tailed Wilcoxon rank test).

* Significant at the 1% level.

** Significant at the 5% level.

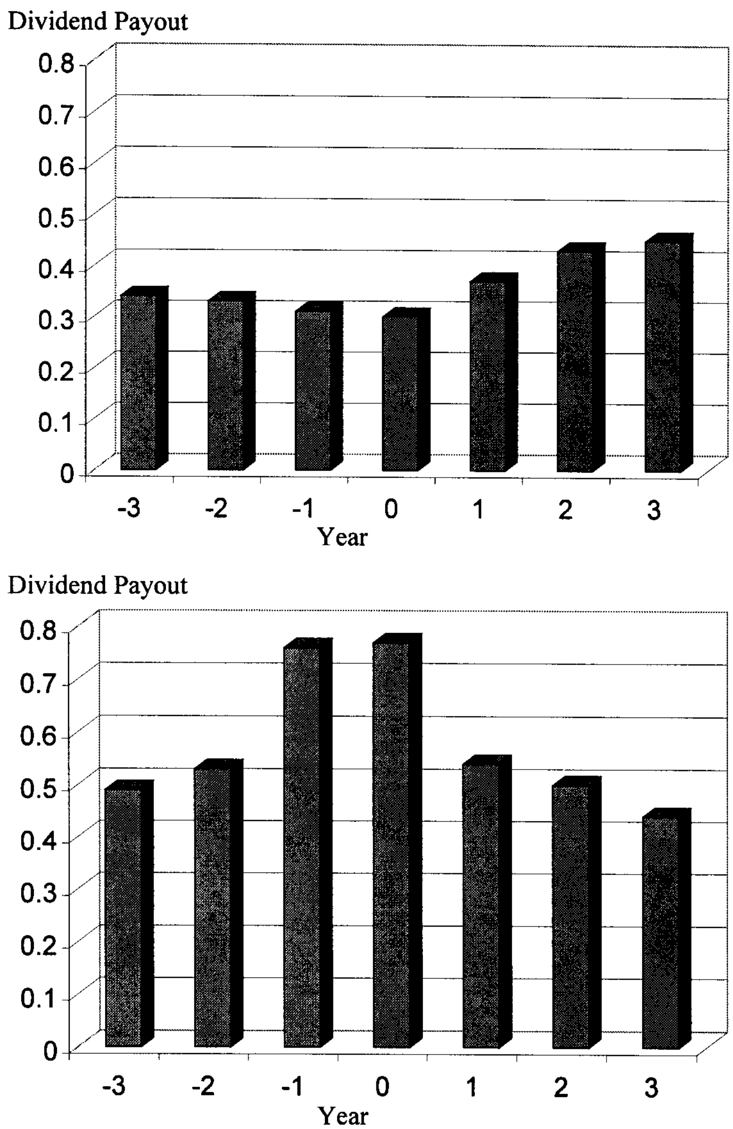

FIG. 2.—Dividend payout ratio. Top, Dividend increases. Bottom, Dividend decreases. This figure depicts the dividend payout ratio for a sample of firms that change their dividends over the period 1967–93. The dividend payout ratio is defined as common dividends (Compustat annual item no. 21) divided by the earnings before extraordinary items (Compustat annual item no. 18). Firms with negative earnings before extraordinary items are excluded from the sample. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles.

lowing monthly three-factor regression is estimated for months $t^* - 36$ to $t^* + 36$ (73 monthly observations) around the dividend announcement:

$$r_{it} - r_{ft} = \alpha_{-i} + \alpha_{\Delta i} D_t + b_{-i}(r_{mt} - r_{ft}) + b_{\Delta i} D_t (r_{mt} - r_{ft}) + s_{-i}\text{SMB}_t + s_{\Delta i} D_t \text{SMB}_t + h_{-i}\text{HML}_t + h_{\Delta i} D_t \text{HML}_t + e_t, \quad (9)$$

where D_t is a dummy variable that is equal to one for $t \geq t^*$, and zero otherwise, r_{it} is the monthly stock return for firm i, r_{mt} is the monthly return on the NYSE-AMEX-NASDAQ value-weighted market portfolio, and r_{ft} is the monthly return on a 1-month T-bill obtained from CRSP. Small minus big (SMB) is the difference between the return on a portfolio of small stocks and a portfolio of large stocks and is a proxy of small firm risk; high minus low (HML) is the difference between the returns on a portfolio of high book-to-market stocks and a portfolio of low book-to-market stocks interpreted by Fama and French (1993) as a proxy of earnings distress risk.[16] Variables b_{-i}, s_{-i}, and h_{-i} are the factor loadings (betas) of firm i with respect to $(r_{mt} - r_{ft})$, SMB, and HML during the 3 years prior to the dividend announcement and, therefore, represent the systematic risk of the firm before the dividend announcement. Variables $b_{\Delta i}$, $s_{\Delta i}$, and $h_{\Delta i}$ are changes in factor loadings and represent the change in systematic risk after the dividend announcement. Variable α_{-i} represents the risk-adjusted abnormal return, or alpha, of firm i before the dividend announcement, and $\alpha_{\Delta i}$ is the change in abnormal return after the dividend announcement.

Table 5 summarizes the results on risk characteristics. Panel A provides alphas and betas for the 3 years prior to the dividend change announcement. Panel B presents changes in factor loadings after the dividend change announcement. Panel C presents the adjusted change in betas defined as the unadjusted change minus the change in betas for a matching firm. The matching firm is a nondividend-changing firm with size and book-to-market ratio between 90% and 110% of the size and book-to-market ratio of the dividend-changing firm at the end of year -1 and stock returns closest to that of the dividend-changing firm during the year prior to the announcement of the dividend change. This matching strategy allows us to control for any change in factor loadings unrelated to the dividend change.

As indicated in panel A of the table, the dividend-increasing firms have an average market beta that is slightly above one (1.09), and dividend-decreasing firms have an average market beta that is slightly below one (0.93). Also, their loadings on the SMB factor are similar—0.588 and 0.544, respectively. The average HML beta of dividend-increasing firms during the 3 years prior to the dividend increase is close to zero (0.12). This suggests that stocks of dividend-increasing firms do not behave like value or glamour stocks. The average HML beta of dividend-decreasing firms is almost three times higher (0.32), suggesting that they do behave like value stocks prior to the dividend decrease. Panel A also shows that there are interesting variations in prean-

16. For details on how the risk factors are constructed, see Fama and French (1993).

TABLE 5 **Changes in Risk Characteristics**

	Dividend Increases	Dividend Increases Quintile 1	Dividend Increases Quintile 2	Dividend Increases Quintile 3	Dividend Increases Quintile 4	Dividend Increases Quintile 5	Dividend Decreases
A. Risk characteristics before dividend changes:							
α_{-i} (alpha):							
Mean	.008*	.006*	.008*	.009*	.010*	.009*	−.006*
Median	.007*	.005*	.007*	.008*	.009*	.007*	−.007*
b_{-i} (market beta)							
Mean	1.095*	1.037*	1.065*	1.133*	1.126*	1.142*	.929*
Median	1.080*	1.027*	1.054*	1.125*	1.123*	1.116*	.887*
s_{-i} (small firm beta):							
Mean	.588*	.364	.497*	.686*	.692*	.799*	.554*
Median	.540*	.287	.463*	.663*	.624*	.722*	.464*
h_{-i} (B/M beta):							
Mean	.120*	.052	.098*	.092*	.128*	.256*	.324*
Median	.116*	.017	.094*	.100*	.091*	.309*	.382*
N	5,339	1,082	1,524	1,099	667	967	1,174
B. Unadjusted changes in risk characteristics:							
$b_{\Delta i}$ (Δ in market beta):							
Mean	−.078*	−.063*	−.066*	−.091*	−.094*	−.089*	.123*
Median	−.077*	−.054*	−.077*	−.071*	−.091*	−.104*	.116*
$s_{\Delta i}$ (Δ in small firm beta):							
Mean	−.095*	−.041	−.067*	−.124*	−.111*	−.153*	.121*
Median	−.081*	−.019	−.058*	−.122*	−.122*	−.130*	.085*

$h_{\Delta i}$ (Δ in B/M beta):							
Mean	−.056*	.007	−.043***	−.052	−.139*	−.092**	.173*
Median	−.042*	.029	−.070***	−.035	−.174*	−.027***	.124*
N	5,339	1,082	1,524	1,099	667	967	1,174
C. Adjusted changes in risk characteristics:							
$b_{\Delta i}$ (Δ in market beta):							
Mean	−.084*	−.082*	−.045	−.129*	−.058	−.093**	.136*
Median	−.070*	−.071*	−.036	−.072*	−.099	−.067**	.135*
$s_{\Delta i}$ (Δ in small firm beta):							
Mean	−.113*	−.101**	−.119**	−.163*	−.132***	−.051	.063
Median	−.111*	−.098**	−.099**	−.174*	−.105***	−.104	.011
$h_{\Delta i}$ (Δ in B/M beta):							
Mean	−.169*	−.152*	−.162*	−.188*	−.171**	−.175*	.158*
Median	−.145*	−.180*	−.112*	−.167*	−.077**	−.089**	.108*
N	3,504	921	683	783	441	676	721

NOTE.—This table reports the cross-sectional mean and median values of the estimated coefficients of the following regression model:

$$r_{it} - r_{ft} = \alpha_{-i} + \alpha_{\Delta i} D_t + b_{-i}(r_{mt} - r_{ft}) + b_{\Delta i} D_t (r_{mt} - r_{ft}) + s_{-i}\text{SMB}_t + s_{\Delta i} D_t \text{SMB}_t + h_{-i}\text{HML}_t + h_{\Delta i} D_t \text{HML}_t + e_t,$$

where r_{it} is the monthly return on stock i, r_{ft} is the monthly return on 1-month U.S. Treasury bills, r_{mt} is the monthly return on the NYSE/AMEX/NASDAQ value-weighted index, SMB_t is the difference between the monthly return on a portfolio of small firms and the monthly return on a portfolio of large firms, HML_t is the difference between the monthly return on a portfolio of high book-to-market stocks and the monthly return on a portfolio of low book-to-market stocks, and D_t is a dummy variable that is equal to one if $t \geq t^*$, where t^* is the month in which the dividend change was announced. A window of 73 months (−36 to +36) was used to estimate the parameters of the regression model. The variables b_{-i}, s_{-i}, and h_{-i} are the factor loadings (betas) of firm i during the 3 years prior to the dividend announcement, and $b_{\Delta i}$, $s_{\Delta i}$, and $h_{\Delta i}$ are the difference between the factor loadings after the dividend announcement and the factor loadings before the dividend announcement. The variable α_{-i} is the abnormal return or Jensen's alpha of firm i before the dividend announcement, and $\alpha_{\Delta i}$ is the change in abnormal return after the dividend announcement. The adjusted regression coefficient is equal to the unadjusted coefficient minus the regression coefficient of a matching firm with market value of equity and book-to-market ratio between 90% and 110% of the market value and the book-to-market ratio of the dividend-changing firm at the end of year −1, respectively, and the closest stock price performance to that of the dividend-changing firm during the year prior to the announcement of the dividend change. Each cross-sectional sample of regression coefficients is winsorized at the first and ninety-ninth percentiles. The significance levels of the means (medians) are based on a two-tailed t-test (two-tailed Wilcoxon rank test).

* Significant at the 1% level.

** Significant at the 5% level.

*** Significant at the 10% level.

nouncement factor loadings across quintiles of dividend-increasing firms; specifically, firms announcing larger dividend increases tend to have higher market, SMB, and HML betas. In other words, firms announcing larger dividend increases tend to be riskier.

The evidence in panel A also shows that dividend-increasing firms earned significant positive alphas (mean of 0.8% a month), and dividend-decreasing firms earned significant negative alphas (mean of −0.6% per month) during the 3 years prior to the dividend announcement. Our findings concerning the predividend announcement drift extend the results of Michaely, Thaler, and Womack (1995) of a similar, but more pronounced, trend before dividend initiations and omissions. Firms that increase dividends have been doing well (positive alpha), and firms that reduce their dividends have not been doing well in the years before the dividend change.

The results in panel B show that for the entire sample of dividend increases, the market, SMB, and HML betas decline significantly. Among the sample of dividend-increasing firms, those firms announcing larger dividend increases also seem to experience larger declines in factor loadings. For the entire sample of dividend increases, the mean market beta declines by 0.078, the mean SMB beta declines by 0.095, and the mean HML beta declines by 0.056.

To gauge the economic significance of the decline in risk, we compute the impact on risk premium. The average monthly returns for the market, SMB, and HML factors during 1963 to 1994 are 0.43%, 0.27%, and 0.45%, respectively (see Fama and French 1997). Using these numbers as estimates of unconditional risk premiums associated with these factors, we can compute the decline in risk premium for dividend-increasing firms. The decline in risk premium for dividend-increasing firms is $0.078 \times 0.43 + 0.095 \times 0.27 + 0.056 \times 0.45$, which is equal to 0.085% per month or about 1% per annum. A decline in annual risk premium of 1% is economically quite significant and can result in a fairly significant increase in the market value of equity. There is also significant cross-sectional variation in the decline across different dividend-increasing firms. For the quintile of largest dividend increases the decline in annual risk premium is 1.45%, and for the quintile of smallest dividend increases the decline in risk premium is only 0.42%.

The potential impact of such a change on prices can be illustrated using the simple Gordon growth model. The average stock price in our sample is $29.60, and the average market reaction to the dividend announcement is 1.34%, implying a postannouncement price of $30. The average dividend per share in our sample is $1.10, and the average increase in dividend is 30%. Thus, on average, dividends increase from $1.10 a share to $1.40 a share. Finally, the information in table 2 indicates that the discount rate is 13.2% in the period before the dividend announcement (using a 5% riskless rate) and is 12.2% afterward. Using this information, we can calculate the implied growth rate before and after the change in dividend. The implied growth rate before the dividend change is 9.48% and is 7.48% after the dividend change. Thus, the market may react positively to a dividend-increase announcement when it implies a 1% reduction in the discount rate despite the decline in growth. Interestingly, in table 3 we show that for the dividend-increasing sample, the average change in ROA (as a proxy for change in earnings) declines by 1.91%.

Dividend-decreasing firms, in contrast, experience significant increases in market, SMB, and HML betas. For the entire sample of dividend decreases, the mean market beta increases by 0.123, the mean SMB beta increases by 0.121, and the mean HML beta increases by 0.173.[17] This translates to an increase in risk premium of $(0.123 \times 0.43 + 0.121 \times 0.27 + 0.173 \times 0.45)$ 0.163% per month, or approximately 2% per year. Thus, while dividend-increasing firms experience a decrease in annual risk premium of around 1%, dividend-decreasing firms experience an increase in annual risk premium of around 2%. This shows that there are economically significant differences in the way risk premiums change after a dividend increase and a dividend decrease.

The adjusted beta change results in panel C are similar to those in panel B and ensure that the risk changes reported in panel B are not the result of some mean reversion in betas that is independent of dividend changes since it controls for beta changes of similar firms. In spite of the reduction in sample size caused by the matching procedure, the results in panel C are economically and statistically significant.

Finally, to understand better when the beta changes might have taken place, we have computed beta changes using a window of 36 months (18 months on either side) around the dividend announcement. The results are similar to what we report in table 5, implying that, even during a shorter time period around the dividend changes, one can detect a change in betas. We have also repeated our tests after omitting the last 6 months prior to the dividend announcement in computing factor loadings. The results regarding risk changes are even more pronounced.

E. Changes in Bond Ratings

If there is a permanent shift in a firm's risk following a (large) dividend change, this change in risk should manifest itself not only through a change in the risk of the equity but also through a change in the risk of the firm's debt, as measured by a change in debt ratings. The prediction is that the debt ratings of firms that increase dividends should improve, while the debt ratings of firms that decrease their dividends should worsen.

Table 6 presents raw and industry (two-digit SIC code) adjusted changes in Standard & Poor's (S&P) senior debt ratings for dividend-increasing and dividend-decreasing firms (the bond rating data are from Compustat and are available since 1985). As expected, bond ratings decline around dividend decreases and improve around dividend increases. Most of the change takes

17. Since the sample of dividend decreases is only one-fifth of the sample of dividend increases, we do not further divide the sample into portfolios. Nevertheless, we have repeated our tests by dividing all dividend decreases into two groups, high and low, and we find that firms announcing the largest dividend decrease experience the largest risk increase.

TABLE 6 **Changes in S&P Senior Debt Ratings**

	Unadjusted					Adjusted				
	−1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0	−1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0
A. Dividend increases:										
Mean	8.30*	8.18*	8.05*	−.17*	−.002	−3.07*	−3.10*	−2.66*	−.20*	−.06
N	616	697	740	537	620	691	691	733	528	611
B. Dividend decreases:										
Mean	9.54*	10.39*	10.48*	.88*	.18	−1.04*	−.91*	−.28	.77*	.11
N	134	162	157	116	141	134	162	157	116	141

NOTE.—This table reports changes in S&P senior debt ratings for a sample of firms that change their dividends over the period 1985–93. The letter bond ratings are converted into numeric ratings as follows: AAA = 3, AA+ = 4, AA = 5, AA− = 6, A+ = 7, A = 8, A− = 9, BBB+ = 10, BBB = 11, BBB− = 12, BB+ = 13, BB = 14, BB− = 15, B+ = 16, B = 17, B− = 18, CCC+ = 19, CCC = 20, CCC− = 21, CC = 22, C = 23, CI = 24, D = 25. The mean numeric ratings from years −1 to + 3 around the dividend announcement year are reported for each dividend change portfolio. Column "*Ld* − *Lg*" represents the difference between average ratings during years +1 to +3 and year −1. Column "*Ld* − 0" represents the difference between the average ratings in years +1 to +3 and year 0. The significance levels of the means are based on a two-tailed *t*-test. The data on bond ratings are available in Compustat only since 1985. The industry-adjusted bond rating is equal to the unadjusted bond rating minus the median bond rating of all the firms with the same two-digit SIC code as the dividend-changing firm.

* Significant at the 1% level.

place between year –1 and year +1. In addition, bond ratings improve the most for firms with the largest dividend increases and the least for firms with the smallest dividend increase (not reported in the article).[18] These results support the findings in table 5.

F. Changes in Financial Leverage

We interpreted the results in subsections IIID and IIIE as evidence of a change in the firm's underlying business risk. However, since prices of dividend-increasing firms tend to rise prior to a dividend increase (declining market leverage), and the prices of dividend-decreasing firms tend to fall before a dividend decrease (increasing market leverage), it is possible that the changes reported are merely the result of changing financial leverage and not changing business risk. To explore this issue further, we report debt-to-capital ratios (defined as the sum of book values of interest-bearing, short-term and long-term debt to the sum of interest-bearing, short-term and long-term debt and the market value of equity) for dividend-changing firms in table 7.

The unadjusted results indicate a small but statistically significant decline in the leverage ratio for dividend-increasing firms and a small but statistically significant increase in the leverage ratio for dividend-decreasing firms. The adjusted results are similar. Can these small leverage changes explain the changes in systematic risk reported in table 5? We answer this question by computing the expected change in risk premium solely due to changes in financial leverage. To do this, we use the expression relating leverage and cost of equity under corporate taxes derived by Miller and Modigliani (1961).[19] Assuming an effective corporate tax rate of 39% and a before-tax debt risk premium of 2%, the decrease in annual risk premium for dividend-increasing firms solely due to a decrease in leverage ratio (based on the numbers in tables 5 and 7) should be only 0.12% (from 8.2% to 8.08%). In comparison, the actual decline in risk premium for dividend-increasing firms was 1%. For dividend-decreasing firms, the increase in annual risk premium should be only 0.38% (from 8.34% to 8.72%). In comparison, the actual increase in risk premium was around 2%. These results clearly indicate that the changes in betas reported in table 5 are the result of a fundamental change in the business risk of the firm and not just the result of changes in financial leverage.

18. Interestingly, this result contradicts the wealth expropriation hypothesis (e.g., Handjinicolaou and Kalay 1984) as a possible explanation as to why firms pay dividends.

19. The calculation involves three steps. In the first step, we compute the levered equity risk premium based on the betas that existed prior to the dividend change reported in table 5, panel A. In the second step, we unlever this risk premium using the average leverage ratio for the 3 years prior to the dividend change announcement. In the third step, we relever the unlevered risk premium using the average leverage ratio during the 3 years after the dividend change announcement. The difference between the number obtained in the third step and the number obtained in the first step gives the change due to leverage alone.

TABLE 7 Level of Debt-to-Total Capital Ratio

	Unadjusted					Adjusted				
	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0
A. Dividend increases:										
Mean	30.22*	26.75*	28.19*	−2.14*	1.02*	−1.03***	−5.08*	−4.54*	−3.84*	−20
Median	27.93*	22.97*	25.23*	−1.74*	1.07*	−.38***	−4.22*	−4.59*	−3.45*	−.41
N	4,569	4,916	4,283	3,791	4,137	1,756	1,915	1,627	1,427	1,562
B. Dividend decreases:										
Mean	36.12*	40.85*	40.50*	4.37*	−.60	−.31	2.53***	.83	1.09	−3.16*
Median	36.78*	41.74*	41.35*	3.56*	−.50**	−.79	3.14**	1.19	1.61	−2.46*
N	788	1,000	918	664	855	306	348	278	227	264

NOTE.—This table reports the debt-to-total capital ratio for a sample of firms that change their dividends over the period 1967–93. The debt-to-total capital ratio is defined as the book value of total long-term debt (Compustat annual item no. 9) plus the book value of total short-term debt (Compustat annual item no. 44) divided by the total capital of the firm (book value of total long- and short-term debt plus the market value of equity). The adjusted debt-to-total capital ratio is equal to the unadjusted debt-to-total capital ratio minus the ratio of a matching firm with market value of equity and book-to-market ratio between 90% and 110% of the market value and the book-to-market ratio of the dividend-changing firm at the end of year −1, respectively, and the closest stock price performance to that of the dividend-changing firm during the year prior to the announcement of the dividend change. Column "*Ld* − *Lg*" is the average level of the debt-to-total capital ratio during years +1 to +3 minus the average level during years −3 to −1. Column "*Ld* − 0" is the average level of the debt-to-total capital ratio during years +1 to +3 minus the average level during year 0. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles. The significance levels of the means (medians) are based on a two-tailed *t*-test (two-tailed Wilcoxon rank test).

* Significant at the 1% level.

** Significant at the 5% level.

*** Significant at the 10% level.

G. Multivariate Regression of Dividend Changes on Profitability and Risk Changes

Our findings on risk and profitability presented in tables 2–7 focused on the univariate relationships between dividend changes and future changes in profitability or systematic risk. Thus, it is necessary to see if the relationship between dividend changes and risk changes holds up after controlling for changes in profitability. To do this, we examine the relationship between dividend changes, changes in profitability and changes in systematic risk in a multivariate regression framework. Given our previous findings, we expect large dividend changes to be followed by a large decline in systematic risk and a large decline in return on assets. This gives rise to the following regression:

$$\text{DIVCHG}_i = a + b\Delta\text{ROA}_{i,0} + c\Delta\text{ROA}(3)_i + d\Delta\text{RISK}_i + e_i, \qquad (10)$$

where

DIVCHG_i = the percentage change in quarterly cash dividend payment;

$\Delta\text{ROA}_{i,0}$ = the change in raw or adjusted after-tax return on assets for year 0;

$\Delta\text{ROA}(3)_i = (\Delta\text{ROA}_3 + \Delta\text{ROA}_2 + \Delta\text{ROA}_1)/3 - (\Delta\text{ROA}_{-3} + \Delta\text{ROA}_{-2} + \Delta\text{ROA}_{-1})/3$. This is a measure of the abnormal or unexpected change in profitability during the 3 years after the dividend change;

ΔRISK_i = the change in risk premium of the firm after the announcement of the dividend change. This is computed by multiplying the change in betas with the corresponding risk premium.[20]

The regressions are estimated in two different ways: (*a*) with raw unadjusted changes in return on assets and risk premium and (*b*) with matching firm-adjusted changes in return on assets and risk premium (recall that the matching firms for risk premium changes are chosen based on size, B/M, and past momentum). The regression combines dividend increases and decreases to gain the most power in terms of number of observations.

The results in table 8 confirm that there is a positive relationship between dividend changes and current changes in profitability ($\Delta\text{ROA}_{i,0}$) (see also Benartzi et al. 1997). Thus, dividend changes seem to be a response to changes in current profitability. In addition, table 8 reports two new findings: (*a*) a statistically significant negative relationship between dividend changes and future changes in profitability and (*b*) a statistically significant negative relationship between dividend changes and future changes in the firm's equity risk premium. The slope coefficients corresponding to future changes in ROA and changes in risk premium are both negative and statistically significant.

20. We have also experimented with an alternate measure of risk changes. The alternate measure is obtained by first ranking the change in market, SMB, and HML betas individually in ascending order and summing the beta ranks to obtain an ordinal measure of systematic risk. We have also used the market beta alone as one risk measure and a combination of market and the SMB betas as another risk measure. The results using these alternate measures are similar and are available from the authors on request.

TABLE 8 Cross-Sectional Regression of the Dividend Changes on Changes in Profitability and Risk

	Dependent Variable: DIVCHG	
Regression Coefficients	Unadjusted	Adjusted
a	13.43*	16.33*
	(26.84)	(23.85)
b	187.62*	52.25*
	(15.22)	(4.99)
c	−236.21*	−76.69*
	(−16.32)	(−3.95)
d	−42.91*	−25.63*
	(−6.88)	(−4.29)
Adjusted R^2 (%)	10.78	2.30
N	6,091	3,205

NOTE.—This table reports the estimated coefficients of the following regression model: $DIVCHG_i = a + b\Delta ROA_{i,0} + c\Delta ROA(3)_i + d\Delta RISK_i + e_i$, where DIVCHG is the percentage change in the cash dividend payment, $\Delta ROA_{i,0}$ is the annual change in return on assets during the year of the announcement of the cash dividend change, $\Delta ROA(3)_i$ is defined as $(\Delta ROA_3 + \Delta ROA_2 + \Delta ROA_1)/3 - (\Delta ROA_{-3} + \Delta ROA_{-2} + \Delta ROA_{-1})/3$ and is a measure of the abnormal or unexpected change in return on assets during the 3 years after the dividend change, and $\Delta RISK_i$ is the change in the cost of capital of the firm after the announcement of the dividend change. The regression combines dividend increases and decreases. The first column, "Unadjusted," reports the estimated coefficients of the regression model using the unadjusted annual change in return on assets and the unadjusted change in the cost of capital. The second column, "Adjusted," reports the estimated coefficients of the regression model using the industry and performance-adjusted annual change in return on assets (see definition in table 2) and the adjusted change in cost of capital (see definition in table 5). The significance levels of the estimated coefficients are based on a two-tailed *t*-test. White heteroskedasticity corrected *t*-statistics are reported in parentheses.
* Significant at the 1% level.

The adjusted results are similar. Overall, the results in table 8 confirm the univariate results reported in tables 2 and 5.

H. Capital Expenditures and Excess Cash

Finally, we examine the capital expenditures and cash balances of dividend-changing firms. Examining these variables would allow us to see even more clearly whether the evidence is consistent with the maturity and free cash flow hypotheses. The free cash flow hypothesis would suggest that dividend-increasing firms ought to decrease or at least not increase their capital expenditures. In addition, we should expect to see their cash balances (from the balance sheet) decline since they have chosen to pay out their excess cash.

Table 9 presents the findings. Panel A provides results on capital expenditures, and panel B provides results on cash and short-term investments. The results in panel A indicate that capital expenditures of both dividend-increasing and dividend-decreasing firms stay more or less the same between year 0 and year 3. However, when we examine the changes in capital expenditures between years 1 and 3, we find that the dividend-increasing firms significantly reduce their capital expenditures over the next 3 years, while dividend-decreasing firms begin to increase their capital expenditures. (These results are illustrated in fig. 3.) The results in panel B show that the cash levels of dividend-increasing firms significantly decrease after the dividend increase. In contrast, the cash levels of dividend-decreasing firms significantly increase after year 0. Overall, these re-

TABLE 9 **Capital Expenditures and Cash and Short-Term Investments**

	Unadjusted					Adjusted				
	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0	−3 to −1	0	+1 to +3	*Ld* − *Lg*	*Ld* − 0
	A. Capital Expenditures									
Dividend increases:										
Mean	7.43*	7.80*	7.89*	.39*	−.04	.39*	.59*	.55*	.15***	.03
Median	6.31*	6.49*	6.87*	.32*	−.13*	.31*	.57*	.47*	.05**	−.04
N	5,648	5,790	5,186	4,946	5,142	5,381	5,260	4,009	3,789	3,960
Dividend decreases:										
Mean	7.73*	6.80*	6.52*	−1.27	−.44*	.05	−.22	−.59*	−.51**	−.42**
Median	6.85*	5.61*	5.43*	−.91	−.03**	.000005	−.05	−.29*	−.23*	−.09**
N	1,102	1,169	1,055	976	1,041	1,007	1,046	832	743	813
	B. Cash and Short-Term Investments									
Dividend increases:										
Mean	9.43*	9.56*	8.69*	−.67*	−.71*	.25***	.41**	−.15	−.27***	−.43*
Median	6.62*	6.29*	5.91*	−.61*	−.24*	.15*	.33*	.05	−.03**	−.09*
N	5,987	6,069	5,472	5,305	5,442	5,820	5,562	4,295	4,228	4,274
Dividend decreases:										
Mean	7.76*	6.83*	7.36*	−.37**	.51*	−1.10*	−1.88*	−1.13*	−.31	.69*
Median	4.85*	3.86*	4.64*	−.13**	.30*	−.31*	−.42*	−.03*	.09	.30*
N	1,200	1,246	1,131	1,072	1,123	1,157	1,138	913	876	906

NOTE.—This table reports the level in capital expenditures (Compustat item no. 128) relative to total assets (Compustat item no. 6) and the level of cash and short-term investments (Compustat annual item no. 1) relative to total assets for a sample of firms that change their dividends over the period 1967–93. The adjusted annual level in capital expenditures (cash) is equal to the unadjusted level minus the level of a matching firm with the same two-digit SIC code as the dividend-changing firm and the closest average change in ROA during years −3 to −1 to that of the dividend-changing firm. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles. Column "*Ld* − *Lg*" is the average level of capital expenditures (cash) during years +1 to +3 minus the average level during years −3 to −1. Column "*Ld* − 0" is the average level of capital expenditures (cash) during years +1 to +3 minus the average level during year 0. The significance levels of the means (medians) are based on a two-tailed *t*-test (two-tailed Wilcoxon rank test).

* Significant at the 1% level.

** Significant at the 5% level.

*** Significant at the 10% level.

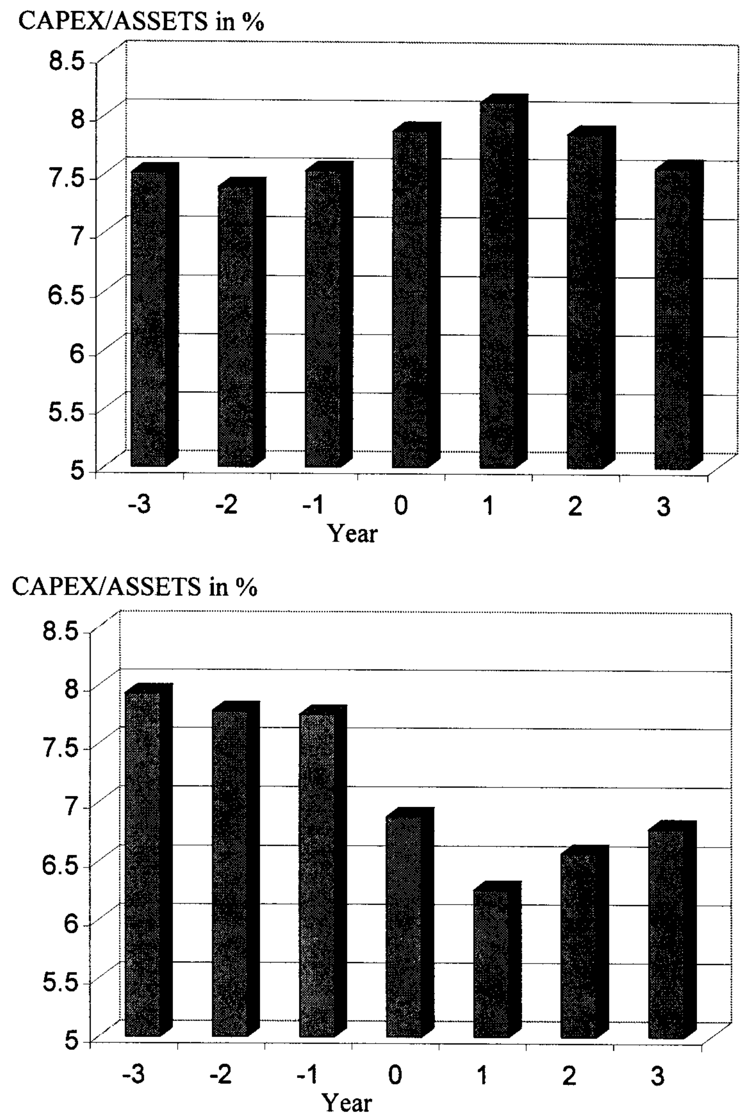

FIG. 3.—Capital expenditures. Top, Dividend increases. Bottom, Dividend decreases. This figure depicts the level in capital expenditures (Compustat item no. 128) relative to total assets (Compustat item no. 6) for a sample of firms that change their dividends over the period 1967–93. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and ninety-ninth percentiles.

sults are consistent with the idea that dividend-increasing firms have less investment needs and hence more free cash flows. Consequently, dividend-increasing firms pay out dividends to reduce their excess cash and to reduce overinvestment.

IV. Information Content of Dividend Changes

If market participants at least partially recognize the relationship between current dividend change and future changes in risk and profitability, then this should be reflected in the initial market reaction. Specifically, in Section IIID we argued, using the Gordon growth model, that the stock price could increase after a dividend-increase announcement due to the decline in systematic risk in spite of the decline in profitability. We examine this issue more formally in this section.

A. Abnormal Returns (CAR) around Dividend Announcements and Changes in Risk and ROA

To explore this issue, we regress the announcement-period abnormal stock returns (CAR) on unexpected changes in future ROA and changes in systematic risk. This gives rise to the following regression in which the first two terms on the right-hand side represent firm-specific news about future cash flows or earnings and the last term represents news about systematic risk:

$$\mathrm{CAR}_i = a + b\Delta\mathrm{ROA}_{i,0} + c\Delta\mathrm{ROA}(3)_i + d\Delta\mathrm{RISK}_i + e_i, \qquad (11)$$

where the terms on the right-hand side of equation (11) are defined in the same manner as in equation (10) and CAR_i represents the cumulative abnormal return relative to the value-weighted market index from day -1 to $+1$ surrounding the dividend announcement.

The results from this regression are reported in table 10. We find a strong positive relationship between price reaction to dividend changes (CAR) and the current year (year 0) change in return on assets and a strong negative relationship between CAR and future changes in return on assets. In addition, there is a strong negative relationship between CAR and future changes in systematic risk and risk premium. Thus, a more positive price reaction (to dividend increases) is associated with a larger decline in future profitability and a larger decline in systematic risk.

We have conducted several additional tests (not reported in the article) to examine the robustness of the results reported in table 10 (and table 8). First, we estimate regression (11) with dummy variables for dividend increases and decreases designed to capture different sensitivities to changes in risk and return on assets. The results show that the sensitivities for dividend decreases are larger in magnitude than those for dividend increases. Second, in regression (11) we used realized changes in ROA as a proxy for expected change in ROA. We have also estimated regression (11) using expected changes in after-

TABLE 10 Cross-Sectional Regression of the Cumulative Abnormal Return on Changes in Profitability and Risk

Regression Coefficients	Dependent Variable: CAR	
	Unadjusted	Adjusted
a	.21*	.47*
	(2.99)	(4.96)
b	18.48*	5.86*
	(9.81)	(3.86)
c	−17.79*	−6.31**
	(−8.22)	(−2.17)
d	−4.53*	−4.01*
	(−5.10)	(−4.81)
Adjusted R^2 (%)	4.92	1.81
N	6,091	3,205

NOTE.—This table reports the estimated coefficients of the following regression model: $CAR_i = a + b\Delta ROA_{i,0} + c\Delta ROA(3)_i + d\Delta RISK_i + e_i$, where CAR_i is the 3-day cumulative abnormal return in percent with respect to the NYSE/AMEX value-weighted index around the dividend announcement; $\Delta ROA_{i,0}$, $\Delta ROA(3)_i$, and $\Delta RISK_i$ are defined in table 8. The first column, "Unadjusted," reports the estimated coefficients of the regression model using the unadjusted annual change in return on assets and the unadjusted change in the cost of capital. The second column, "Adjusted," reports the estimated coefficients of the regression model using the industry- and performance-adjusted annual change in return on assets (see definition in table 2), and the adjusted change in cost of capital (see definition in table 5). The significance levels of the estimated coefficients are based on a two-tailed *t*-test. White heteroskedasticity corrected *t*-statistics are reported in parentheses.

* Significant at the 1% level.

** Significant at the 5% level.

tax ROA (net income divided by total assets) based on 2-year ahead consensus analyst earnings forecasts. This reduces the sample size to about 1,700 dividend announcements due to limitations in the availability of analyst forecasts. Nevertheless, the results are similar to those in table 10. Finally, we have estimated regression (11) by dropping subsequent dividend changes by the same firm, and the results are the same. We have also conducted all these robustness tests for the results in table 8, and the results are qualitatively similar.

The negative relation between CAR and future risk changes suggests that the greater the expectations of a decline in the systematic risk of the stock (and, therefore, the risk premium or the cost of capital of the stock), the more positive is the price reaction. This is intuitive and not surprising: when the cost of capital declines, we would expect firm value to increase. However, the negative relation between CAR and future changes in profitability suggests that, controlling for changes in risk, the bigger the expected decline in profitability, the more positive should be the price reaction (for dividend decreases, the converse holds). How can this be explained?

One reason for the initial positive price reaction (in addition to risk reductions) may be an expected decrease in the agency costs of free cash flows. If a firm has excess cash, the managers can either pay it out or invest the excess cash in negative net present value (NPV) projects. When there is

TABLE 11 Postdividend Drift

Dividend Changes	Adjusted Ex Post Alpha	Adjusted Ex Post Buy-and-Hold Return
Increases:		
Mean	8.28*	17.44*
Median	6.84*	12.28*
N	3,504	3,287
Decreases:		
Mean	−1.08	5.95
Median	−.36	3.14
N	721	677

NOTE.—This table reports the adjusted ex post alpha and the adjusted ex post buy-and-hold return in percent for the 3 years after the announcement of the dividend change for a sample of firms that change their dividends over the period 1967–93. The adjusted ex post alpha is the 3-year ex post risk-adjusted abnormal return in percent (regression intercept multiplied by 36) for the 3 years after the announcement of the dividend change minus the ex post alpha of a matching firm with market value of equity and book-to-market ratio between 90% and 110% of the market value and the book-to market ratio of the dividend-changing firm at the end of year −1, respectively, and the closest stock price performance to that of the dividend-changing firm during the year prior to the announcement of the dividend change. Alpha is computed from the three-factor model described in table 5. The adjusted buy-and-hold return is equal to the unadjusted buy-and-hold return minus the return of a matching firm with market value of equity and book-to-market ratio between 90% and 110% of the market value and the book-to-market ratio of the dividend-changing firm at the end of year −1, respectively, and the closest stock price performance to that of the dividend-changing firm during the year prior to the announcement of the dividend change. The significance levels of the means (medians) are based on a two-tailed *t*-test (two-tailed Wilcoxon rank test).

* Significant at the 1% level.

uncertainty about the management's actions, investors may rationally interpret the dividend payment as good news that managers are not going to waste their resources. In general, this is more likely to happen for firms with fewer investment opportunities. This is precisely what Lang and Litzenberger (1989) find using the market-to-book ratio as a proxy for investment opportunities.

What are the implications of these results for dividend decreases? In general, firms tend to decrease dividends not because they want to increase their discretionary investments, but more because they have suffered an extreme earnings distress. In other words, decreasing dividends may not be entirely discretionary. Nevertheless, investors may interpret a decrease in dividends as bad news because they are not sure managers would use the additional resources wisely. Thus, all the arguments put forth to explain the initial price reaction to dividend increases apply to dividend decreases, too. Finally, an increase in systematic risk, all else equal, should result in a declining stock price, which may explain at least part of the initial negative price reaction (recall the discussion in Sec. IIID based on the Gordon growth model calculations).

B. Post–Dividend Announcement Drift and Risk and ROA Changes

Benartzi, Michaely, and Thaler (1997) find that there is a fairly significant long-run price drift after a dividend increase or a decrease. The results in table 11 confirm these findings. The third column of table 11 reports ex post 3-year abnormal returns (monthly abnormal return times 36) computed from the three-factor regression referred to as adjusted ex post alpha. The adjusted ex post alpha is the difference between the ex post intercept from the three-factor regression (see table 5) for the dividend-changing firm and a corresponding intercept for a matching firm with similar size, B/M ratio, and stock price momentum. The adjusted ex post alpha is similar to CAR computed over a 36-month period following the dividend announcement (the CAR results are similar and hence are not reported). The last column in table 11 reports buy-and-hold abnormal returns (BHAR) for the same time period. The BHAR is equal to the 36-month buy-and-hold return for the dividend-increasing firm minus the 36-month buy-and-hold return for the matching firm.

The results indicate that there is an economically and statistically significant positive drift (median alpha of 6.84% and median BHAR of 12.28%) after dividend-increase announcements and a statistically insignificant negative drift (median alpha of –0.36% and median BHAR of 3.14%) after dividend-decrease announcements.[21] We extend Benartzi, Michaely, and Thaler's (1997) results by examining the relation between declining profitability, risk, and the post–dividend announcement drift. A priori, it is possible that either because of behavioral biases, or because of model uncertainty (as in Brav and Heaton in press), prices may not immediately impound the news of risk changes.[22] Thus, this analysis is likely to provide additional insights into how investors respond in the long term to the information in dividend changes about future cash flows and risk. We estimate the following multiple regression:

$$\alpha_i = a + b\Delta \text{ROA}_{i,0} + c\Delta \text{ROA}(3)_i + d\Delta \text{RISK}_i + e_i, \qquad (12)$$

where α_i is the adjusted ex post alpha for the 3-year period following the dividend announcement and is obtained from regression equation (9).[23] All other variables are defined as in equation (10). We use the Fama-MacBeth procedure to estimate the cross-sectional regression in equation (12). In the first stage, we estimate regression (12) each year using all the dividend announcements in that year. In the second stage, we compute time-series means and *t*-statistics of the cross-sectional regression coefficients. The *t*-statistics are adjusted for autocorrelation in the slope coefficients using the Hansen-Hodrick correction.

The unadjusted and the adjusted results are provided in table 12. In this regression, the slope coefficient corresponding to the future changes in ROA ($\Delta \text{ROA}(3)_i$) is positive, while the slope coefficient corresponding to risk changes is negative (contrast this with the negative coefficient on change in ROA obtained in table 10). The positive slope corresponding to changes in

21. We also examined the long-term performance of the more extreme dividend changes. We find that the adjusted ex post buy-and-hold return is 14.96% for the firms with the largest dividend increases (quintile 5) and –22.34% for the firms with the largest (quintile 5) dividend decreases (these abnormal returns are statistically significant).

22. One issue that is related to the drift phenomenon is the notion that, when investors face greater uncertainty, there is more room for "less than perfectly efficient" prices. (See, e.g., Shleifer and Vishny 1997; Brav and Heaton, in press.) We slice the sample into two groups—low-volatility events and high-volatility events (volatility is measured in the year before the event). We find that low-volatility stocks have lower drift than high-volatility stocks for all dividend quintiles.

23. We use ex post alpha as the dependent variable because the distribution of alpha (being the average) is less skewed than buy-and-hold-abnormal returns. Using BHAR as the dependent variable provides similar results.

TABLE 12 Cross-Sectional Regression of the Ex Post 3-Year Alpha (Abnormal Return) on Changes in Profitability and Risk

	Dependent Variable (α)	
Regression Coefficients	Unadjusted	Adjusted
a	.002*	.002*
	(26.73)	(15.05)
b	.054*	.027*
	(56.54)	(14.04)
c	.093*	.100*
	(62.39)	(34.30)
d	−.050*	−.041*
	(31.47)	(16.45)
N	27	27

NOTE.—This table reports the average estimated coefficients of the cross-sectional regression of the ex post 3-year alpha (abnormal return) on changes in profitability and risk. First, the annual average coefficients of the following cross-sectional regression are estimated year by year: $\alpha_i = a + b\Delta\text{ROAI}_{i,0} + c\Delta\text{ROAI}(3)_i + d\Delta\text{RISK}_i + e_i$. Then, averages for each time-series coefficient are estimated. The standard deviations for these averages are estimated using the Hansen and Hodrick standard error correction method. The variable α_i is the 3-year ex post risk-adjusted abnormal return in percent for the 3 years after the announcement of the dividend change. The α is computed from the three-factor model described in table 5; $\Delta\text{ROA}_{i,0}$, $\Delta\text{ROA}(3)_i$, and ΔRISK_i are defined in table 8. The regression combines dividend increases and decreases. The first column, "Unadjusted," reports the estimated coefficients of the regression model using the unadjusted alpha, the unadjusted annual change in return on assets, and the unadjusted change in the cost of capital. The second column, "Adjusted," reports the estimated coefficients of the regression model using the adjusted alpha (see definition in table 11), the industry and performance-adjusted annual change in return on assets (see definition in table 2), and the adjusted change in cost of capital (see definition in table 5). The significance levels of the estimated coefficients are based on a two-tailed *t*-test. White heteroskedasticity corrected Wald-statistics are reported in parentheses.

* Significant at the 1% level.

ROA suggests that, controlling for changes in risk, the larger the decline in profitability, the smaller the post–dividend announcement drift. The negative slope coefficient corresponding to risk changes suggests that, the larger the decline in risk, conditional on changes in return on assets, the more positive is the long-term drift. However, we know that the overall drift is positive and negative after dividend increases and decreases, respectively. This implies that the risk effect dominates the profitability effect.

V. Discussion of Results and Conclusion

The results firmly reject the implications of the cash flow signaling models. Not only do profits not increase after a dividend increase, they, in fact, decrease. Similarly, profits of dividend-decreasing firms show a tendency to recover rather than decline further. For dividend-increasing firms, we find that their systematic risk significantly declines around the decision to increase dividends. This decline in risk results in an economically significant decline in their cost of capital. We show that this decline in the cost of capital can account for the positive price reaction to the dividend-increase announcement, even when the dividend change conveys information about a decline in the firm's growth prospects.

Our results indicate that dividend payout ratios of dividend-increasing firms do increase permanently, suggesting that these firms are able to maintain their higher dividends, consistent with Lintner's (1956) theory of dividend smoothing. According to Lintner, firms increase dividends only when they are sure they can sustain the higher dividends—that is, when they have long-run target payout ratios in mind. Since Lintner does not discuss systematic risk or the impact of dividend changes on prices, it is hard to explain this portion of our findings in the context of his model.

Jensen's (1986) free cash flow hypothesis also fares better. Evidence of declining ROA, cash levels, and stable or declining capital expenditures is consistent with the free cash flow hypothesis. However, the free cash flow hypothesis, too, has no clear predictions about changes in risk. Thus, the free cash flow hypothesis cannot also be a complete explanation of our findings.

Therefore, we propose an alternate explanation for our findings. We refer to this explanation as the *maturity hypothesis*. According to this explanation, dividend increases and other cash payouts are an integral feature of the process a firm undergoes as it moves from growth phase to a more mature phase. Typically, in a growth phase, a firm has many positive NPV projects available, it earns large economic profits, has high capital expenditures, low free cash flows, and experiences rapid growth in its earnings. As the firm continues to grow, competitors enter the industry, cannibalize the firm's market share, and reduce the firm's economic profits. In this transition phase, the firm's investment opportunity set starts shrinking, its growth begins to slow, capital expenditures decline, and the firm starts generating larger amounts of free cash flows. Ultimately, the firm enters a mature phase in which the return on investments is close to the cost of capital and free cash flows are high.

For simplicity of exposition, the market value of a firm can be broken down into the value from assets in place and the value from future growth opportunities or growth options. As a growth firm becomes mature, it has fewer options to grow, and assets in place play a bigger role in determining its value, which leads to a decline in systematic risk.[24] A decline in the number of growth options available to the firm also means a decline in the number of high-return investment opportunities available to the firm. Simply put, the firm does not have as many positive NPV projects as it used to have. Consequently, the firm's return on investment (return on equity or return on assets) declines and so do its economic profits. A decline in return on investment, all else equal, should reduce the earnings growth rate of the firm.

As the investment opportunities decline, the need for resources for new investments should also decline. This, in turn, would lead to a decline in the level or growth of capital expenditures and an increase in the firm's free cash

24. Growth options are riskier than their underlying assets. As the number of growth options in the firm decline relative to assets in place, *s* firm's overall systematic risk should decline. Additionally, the options that are remaining become simpler over time, i.e., the number of compound options decline as well, which (because simple options are less risky than compound options) also leads to a decline in systematic risk over time. For a thorough development of this idea, see Berk, Green, and Naik (1999).

flows. Thus, in our story it is the mature firm that generates large free cash flows. Abstracting from agency conflicts, a firm is likely to pay out these free cash flows in the form of dividends or stock repurchases. Thus, according to the maturity hypothesis, an increase in dividends is informative about a shrinking investment opportunity set, declining systematic risk, declining return on assets, and profit growth.

However, the potential for the management to overinvest is very high when a firm is going through a change in its life cycle. For instance, managers may continue to invest in less profitable projects in order to increase the resources under their control (see Jensen 1986) despite the decline in the firm's investment opportunity set. Therefore, an increase in dividends may not only convey information about changes in the firm's fundamentals but also about the management's commitment not to overinvest. Thus, the free cash flow hypothesis becomes a significant element of the maturity hypothesis. The maturity hypothesis specifies which firms are likely to generate large free cash flows and face agency conflicts. Thus, the maturity hypothesis fills in the pieces providing more content to the free cash flow hypothesis.

We believe the notion of maturity and its effect on dividend policy present a promising avenue for future research. It is beyond the scope of this article to develop the theoretical underpinning of the hypothesis described above. However, the empirical results we present may facilitate such efforts in the future.

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