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Costly Dividend Signaling:
The Case of Loss Firms with Negative Cash Flows

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Abstract

We examine the dividend-signaling hypothesis in a sample of firms for which dividend increases are particularly costly, namely loss firms with negative cash flows. When compared to loss firms with positive cash flows, we find the predictive power of dividend increases for future return on assets to be greater for loss firms with negative cash flows, consistent with the predictive power of the dividend signal being stronger when its cost is higher. Our results provide support for the dividend-signaling hypothesis and have broader implications since loss firms comprise a large and increasing share of publicly-traded firms.

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Whether firms signal future prospects through dividend changes has been a source of debate and research in the corporate finance literature since the early papers by Lintner (1956) and Miller and Modigliani (1961). Despite considerable research, the debate over the empirical validity of the dividend-signaling hypothesis remains alive in the literature. Nissim and Ziv (2001) present evidence consistent with the dividend-signaling hypothesis by showing dividend increases (but not decreases) relate to future profitability. However, two recent papers come to different conclusions. Grullon et al. (2003) argue the results in Nissim and Ziv (2001) follow from a misspecification of the earnings expectations model used to predict expected earnings. They find the evidence supporting the dividend-signaling hypothesis disappears when the earnings expectations model accounts for non-linear patterns in the behavior of earnings.[1] In a more general review of dividend policy, Skinner (2003) concludes structural changes in dividend policy and the nature of corporate earnings over time rule out signaling, at least in recent decades. He finds dividends have become too smooth and earnings too volatile for dividend changes to be an informative signal for future earnings changes.

Although not conclusive, this recent empirical evidence appears to be moving towards rejecting the dividend-signaling hypothesis.[2] In this paper, we contribute to the debate with a different approach to test the dividend-signaling hypothesis. Instead of examining dividend behavior for all firms in the market, we examine the dividend-signaling hypothesis in a setting where use of dividends to signal is particularly costly to the firm.

Spence (1973) argues the cost of sending an economic signal determines its informativeness, therefore we test for dividend signaling in a sample of firms that

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increase their dividend payment (i.e., cash outflow) while experiencing current losses caused by negative cash flows.[3] We argue that, since investors can readily observe the current loss and its components, management will need to send a strong and credible signal to convince market participants that performance will improve. We assume that increasing cash dividends at a time the firm has a negative cash flow constitutes a strong and costly signal of future performance for two reasons. First, the increase in current cash dividends will immediately affect the liquidity of the firm. Second, an increase in the cash dividend implies a strong commitment to maintain the higher level of dividends in the future, given previous studies document a reluctance of managers to cut dividends (e.g., Lintner 1956 and Brav et al. 2003).

We test our hypothesis by comparing the predictive power of dividend increases between loss firms with positive and negative cash flow components for future performance. We collect a sample of loss observations from 1970-2001 and test whether a dividend increase provides incremental information in predicting firms' return on assets beyond that contained in current earnings and a number of control variables.

Our main results show that, conditioning on cash flows, the signaling power of dividend increases for loss firms exists only for negative cash flow firms, consistent with the hypothesis that the costlier the signal is the more information it contains. We verify our main results in additional analyses focusing on subsamples of firms with multiple losses for which increased dividend payments are increasingly costly, and on augmented specifications of our basic model. Although some results are consistent with a loss being sufficient for a dividend increase to improve forecasts of future returns irrespective of the sign of the cash flow, all robustness analyses demonstrate the predictive power of

dividend increases is *larger* for loss firms with a negative cash flow than for loss firms with a positive cash flow.

Our study extends the dividend signaling literature by identifying a particular segment of firms for which we hypothesize the decision to increase dividends is particularly costly. Consistent with Spence's criterion for informative signals, we find dividends help to predict a firm's future performance when the dividend signal is costly. We also extend previous research on the relation between losses and dividends by focusing on the particular quality of losses that renders the dividend signal costly and credible, namely the cash flow component of the loss.

In the next section, we discuss related research and motivate our study. In section II we provide descriptive statistics of the sample and present our empirical model. Sections III and IV contain our main results and the results of robustness analyses. We conclude in a final section.

I. Background and motivation

To test the dividend-signaling hypothesis, we evaluate the predictive power of an increase in cash dividends for future firm performance in a sample of firms that report current losses. We argue the cost of the dividend signal will determine its informativeness and distinguish between losses with a negative versus a positive cash flow component to capture the differential cost of the dividend increase across loss firms.

We are not the first to investigate the relation between dividends and losses. Like DeAngelo et al. (1992) [hereafter, DDS], we focus on loss firms to study the dividend-signaling hypothesis, arguing that dividends will have information content when current

earnings are an unreliable indicator of future profitability, and that losses provide such a special context. In a sample of 167 firms over the period 1980-1985, DDS show a loss is a necessary, but not sufficient, condition for a firm to decrease dividends. They find firms that decrease dividends experience more severe and more persistent losses than firms that do not. Further, unusual income items (e.g., special items) are a larger factor in the earnings of loss firms that do not reduce dividends than of the firms that do. Focusing explicitly on dividend signaling, they find dividend decreases provide incremental information to predict future earnings, although their forecasting power diminishes in the presence of unusual income items.

Using a larger sample over a long time period, Skinner (2003) finds that when firms paying large dividends experience a loss, the loss is more likely caused by special items, and more likely to reverse than a loss reported by a firm that does not pay large dividends.[4] In related work, Joos and Plesko (2003) examine a large sample of loss firms, and the timing of loss reversals. They show the losses of firms that continue to pay dividends are more likely to reverse than those of non-dividend paying firms, and that eliminating a dividend is associated with a decrease in the likelihood the loss will reverse in the immediate future.[5]

We extend this line of research by comparing whether increases in cash dividends by loss firms signal future performance better when negative cash flows rather than negative accruals drive the loss. Whereas previous research focuses specifically on the role of special items when studying the relation between dividends and losses, we differentiate between losses with a positive and negative cash flow component to capture the relative cost of the decision to increase dividend cash outflows. The evidence in Joos

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and Plesko (2003) showing losses have become more persistent in recent years, often due to persistent negative cash flows, emphasizes the potential cost of an increase in cash dividends for loss firms.[6]

The most recent papers on the dividend-signaling hypothesis find a reduced signaling role for dividends over time, consistent with findings that firms have changed their dividend-paying behavior (see Skinner 2003).[7] In light of the evidence of the reduced signaling role of dividends in a general cross-sectional time-series context, we complement the literature by focusing on a narrower setting that provides a powerful test of the dividend-signaling hypothesis.

II. Sample construction and descriptive statistics

Our sample consists of firm-year observations from *Compustat*'s Industrial and Research Annual Data Bases for the years 1971-2000. Consistent with Hayn (1995) we define our earnings variable as income (loss) before extraordinary items and discontinued operations or *IB* (annual *Compustat* data item #18). We define two main variables to capture dividend payments by the firm. We define *DIVCF* as the total dollar amount of cash dividends paid by the firm (annual *Compustat* data item #21).[8] We focus on (changes in) the total amount paid rather than dividends per share to be consistent with our view that the *total* dividend cash outflow establishes the cost to a firm already faced with both a loss and a negative cash flow in a particular year. Since it is possible that the dividend cash outflow in a particular year increase without dividends per share being affected if the firm's number of outstanding shares changes, we define a second variable to measure dividends paid per share (*DIVPS* or annual *Compustat* data item #21 scaled by

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data item #25).

Table I presents descriptive information for the sample. Panel A shows our initial sample contains 206,420 firm-year observations: 146,394 profit observations and 60,026 loss observations (29.08% of the total). The panel further shows a relation between dividend payments and loss occurrence: consistent with the evidence in Skinner (2003) we find dividend-paying firms are less likely to incur losses than non-dividend-paying firms. Focusing first on the dividend payments of our firm-year observations in the year prior to the current observation, we observe 117,618 firm-year observations with no dividends and 88,802 firm-year observations with cash dividends. Of the firms that pay no dividends 44.43% incur a current loss; by contrast, of the dividend paying firms only 8.74% incur a current loss. The contrast between dividend-paying and non-dividend-paying firms becomes sharper when we focus on the contemporaneous relation between dividend payments and firm profitability: of the firm-year observations *not* paying a dividend, 45.90% have a contemporaneous loss, compared to only 6.69% of firms currently paying dividends.

Panel B provides a description of dividend changes occurring in our sample. In the full sample the majority of firms never change their dividend payments: measured as total cash outflow (or per share) 56.49% (54.40%) of firm-year observations do not change dividends in a given year, 33.00% (28.85%) increase dividends, and 10.51% (16.75%) decrease dividends. The percentages change significantly when we partition the sample between profit and loss firm-year observations: profitable firms increase dividends payments far more often than loss firms. By contrast, the large majority of loss firms do not change their dividend payments (86.98% or 86.04% depending on whether

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we measure dividends as total cash outflow or per share). The high percentage reflects the fact that loss firms are less likely to pay dividends, and that only a small fraction of loss firms that pay dividends increase dividend payments (4.20% or 3.80% depending on how we measure the dividend variable).

Panel C in Table I cross-tabulates our two measures of dividend changes. The diagonal percentages in panel C show that in the vast majority of cases both proxies reflect the same direction of dividend change. However, changes in the number of shares outstanding, with or without a constant dividend per share, can lead to non-zero off-diagonal percentages. For example, we observe that in 20.54% of cases firm's total cash dividend payments increase in a particular year, yet the dividend per share variable shows a dividend decrease. Such a combination is the result of an increase in the number of shares in the same year (e.g., as a result of equity issuances or stock option exercises). The two variables therefore complement each other as proxies for dividend decisions by management. While we focus primarily on the dollar value of dividend payments, since it best captures the amount of cash the firm is using, we present results using both variables to illustrate the signaling role of dividend increases.

In Table II, we present evidence for our main variables of interest. Since we hypothesize that the sign of the cash flow component of negative earnings will determine the relative cost of a dividend increase we present our descriptive statistics for a sample of loss observations partitioned by the sign of the cash flow component of the losses. We define the cash flow component of earnings (*CFO*) as cash flow from operations, measured as net income (annual *Compustat* data item # 172) less accruals. We measure accruals as (*ΔCurrent Assets* (data item #4) - *ΔCash* (data item #1) - *ΔCurrent Liabilities*

(data item #5) + *ΔDebt in Current Liabilities* (data item #34) + *Depreciation and Amortizations* (data item #14).

Panel A of Table II shows the mean, standard deviation, and median for four variables of interest. First, we define *Size* as market value of the firm (stock price times the number of outstanding shares, or annual *Compustat* data item #199*data item #25). Second, we define *ROA* as earnings before extra-ordinary items and discontinued operations (or *IB* as defined before) scaled by lagged total assets (*TA,* annual *Compustat* data item #6). Third, we define *CFO* as before. Finally, we include *SPI*, or special items (annual *Compustat* data item #17) scaled by lagged assets (TA_{t-1}), in the Panel since previous research singles out *SPI* as the specific component of losses related to both the quality of losses (i.e., degree of permanence) and the dividend-paying behavior of firms (Skinner 2003).

Panel A reports significant differences between the means and medians of the two subsamples (based on two-sided *t-tests* and two-sided Wilcoxon tests for the mean and median) as a function of the sign of their cash flow component. Generally speaking, loss observations with a *positive* cash flow are larger and exhibit stronger profitability (smaller losses) than loss observations with a negative cash flow component. Positive cash flow loss firms on average also report less negative *SPI*, with both types of loss firms having median *SPI* of zero though. All differences between means and medians are statistically significant.

Panel B of Table II provides descriptive statistics on the incidence of dividend increases in the sample of loss observations as a function of the sign of the cash flow component of earnings. We define *ΔDIVCF_UP* (*ΔDIVPS_UP*) as an indicator variable

that takes the value of 1 if the change in dividend cash outflow (dividend payout per share) is positive, and zero otherwise, with *DIVCF* and *DIVPS* as defined before. Panel B shows a significantly smaller proportion of loss observations with a negative cash flow component increases dividends, consistent with a dividend increase being costly: regardless of the dividend variable used, the percentage of positive *CFO* loss firms increasing their dividends is more than twice the percentage of negative *CFO* loss firms.

Table II provides evidence consistent with loss observations being different as a function of the sign of the cash flow component of the loss: a negative cash flow component suggests a greater deterioration in profitability and a lower incidence of dividend increases. In Table III, we formally test the relation between current profitability, the sign of current cash flows, and (changes in) dividend payments in the sample of loss observations. Specifically, we estimate a logistic regression to evaluate the relation of profitability and its components to the decision to increase current dividends. Focusing on our two dividend variables we estimate the following four specifications:

$$Prob\ (\Delta DIVCF\_UP) = a_0 + a_1 ROA_t + a_2 CFONEG_t + a_3\ ROA_t * CFONEG_t + a_4\ LSize_t + \varepsilon_1 \qquad (1)$$

$$Prob\ (\Delta DIVPS\_UP) = b_0 + b_1 ROA_t + b_2 CFONEG_t + b_3\ ROA_t * CFONEG_t + b_4\ LSize_t + \varepsilon_2 \qquad (2)$$

where *ΔDIVCF_UP, ΔDIVPS_UP, ROA* are as defined before; *CFONEG* is an indicator variable equal to one if the firm reports a negative cash flow, and zero otherwise; *ROA*CFONEG* is the interaction between *ROA* and *CFONEG*. Besides our main

variables of interest, *ROA*, *CFONEG*, and the interaction between both variables, we include a control variable for the size of the firm in each specification since Hayn (1995) and Joos and Plesko (2003) relate the size of the firm to the persistence of the loss and therefore the potential cost of a dividend increase. Our size variable is *LSize*, the log of the market value of the firm.

Table III reports the results of estimating models (1) and (2) using the method detailed by Fama and Macbeth (1973). In both models the coefficient on *ROA* is positive and highly significant, consistent with a relation between higher profitability and dividend increases. However, the negative coefficient on *CFONEG* indicates that, on average, loss firms with negative cash flows are less likely to increase their dividend. Further, the negative and significant coefficient on *ROA*CFONEG* shows that the relation between higher profitability and dividend increases in the full sample is smaller for firms with a negative cash flow. The size control variable has a positive and significant coefficient, suggesting that larger firms are more inclined to increase dividends in the current loss year regardless of the sign of the cash flow.[9]

In sum, the analyses in Tables I through III suggest a positive relation between a firm's profitability and its propensity to increase dividends. Focusing on loss observations in particular, we find the presence of a negative cash flow component of the loss reduces the probability of a dividend increase, consistent with negative cash flows from operations increasing the cost of a dividend increase.

III. Do dividend increases forecast future profitability?

To examine whether costly dividend increases constitute strong signals of future profitability we estimate an earnings forecasting model in our sample of loss observations. Since we argue that increases in dividend outflows are more costly when cash flows are negative, we predict the decision to increase dividends is a stronger predictor of future profitability for negative cash flow loss firms than for positive cash flow loss firms. We consider two forecast horizons, one and three years, and focus on future accounting profitability by estimating the following parsimonious models: [10]

$$AROA_{t+\tau} = \alpha_0 + \alpha_1 \, CFONEG_t + \alpha_2 \, ROA_t + \alpha_3 \, \Delta DIVCF\_UP_t +$$
$$\alpha_4 \, \Delta DIVCF\_UP*CFONEG_t + \alpha_5 \, SPI_t + \alpha_6 \, LSize_t + \varepsilon_3 \quad \text{(3a)}$$

$$AROA_{t+\tau} = \beta_0 + \beta_1 \, CFONEG_t + \beta_2 \, ROA_t + \beta_3 \, \Delta DIVPS\_UP_t +$$
$$\beta_4 \, \Delta DIVPS\_UP*CFONEG_t + \beta_5 \, SPI_t + \beta_6 \, LSize_t + \varepsilon_3 \quad \text{(3b)}$$

We define future profitability as average future *ROA* over the forecast horizon: $AROA_{t+\tau} = (\Sigma_{t+\tau} \, ROA_{t+\tau}/\tau$, where $\tau=1$ or 3) and estimate models (3a) and (3b). The first specification (3a) focuses on increases in *DIVCF*, and the second (3b) on increases in *DIVPS*. *ROA, SPI, CFONEG, LSize* are defined as before. Our main variables of interest in model (3) are dividend increases (*ΔDIVCF_UP* or *ΔDIVPS_UP*), and dividend increases interacted with the negative cash flow indicator variable *CFONEG*. If our prediction that the decision to increase dividends is a stronger predictor of future profitability for negative cash flow loss firms than for positive cash flow loss firms, α_4 and β_4 will both be positive and significant.

We include controls for current profitability *(ROA),* special items, and size. We include special items (*SPI*) for the reason mentioned earlier, namely that previous

research relates *SPI* to both the quality of losses (i.e., degree of permanence) and the dividend-paying behavior of firms (Skinner 2003). We include *LSize* to control for potentially omitted variables such as risk or growth of the firm. We estimate both specifications using the Fama-MacBeth methodology.

Table IV presents the results of the estimation of equations (3a)–(3b). All four estimation results (columns (1) through (4)), focusing on different dividend measures and forecast horizons, show the same result for the dividend increase variables: the coefficients α_3 and β_3 on the dividend increase variables are not significant, indicating that a dividend increase for loss firms with a *positive* cash flow component does not signal future profitability controlling for other factors in the model. By contrast, the coefficients α_4 and β_4 on the dividend increase variable interacted with *CFONEG* are positive and significant in all specifications. In untabulated analysis, we also find the sum of $\alpha_3+\alpha_4$ and $\beta_3+\beta_4$ are positive and statistically significant in all specifications. The evidence is consistent with dividend increases signaling future profitability, even after controlling for other factors, when the cash flow component of losses is negative. This finding supports the hypothesis that dividend increases constitute an informative signal when the cost of the signal is relatively high.

Table IV also shows the coefficients on *CFONEG* (α_1 or β_1) are negative and significant in all four specifications, consistent with losses with negative cash flows signaling persistent profitability problems (see also Joos and Plesko 2003). By contrast, the coefficients on *ROA* (α_2 or β_2) are positive and highly significant in all specifications, consistent with the previous findings on the serial correlation and mean reversion of *ROA* (e.g., Sloan 1996). The coefficients on *SPI* (α_5 or β_5) are negative in all four

specifications, but the level of significance varies depending on the forecast horizon: the coefficients are marginally significant in the one-year horizon models (columns (1) and (3)), but highly significant over the three-year horizon (columns (2) and (4)), suggesting special items affect firm profitability more over the longer horizon, and are less informative over the shorter horizon. Finally, size predicts future profitability only one year ahead (columns (1) and (3)), but not three years ahead (columns (2) and (4)).

In summary, the results for both dividend variables and both forecast horizons are consistent with a dividend increase providing information on the future performance of loss firms only when current cash flows are negative. We interpret the results to indicate the usefulness of a dividend increase to signal future firm performance is directly related to the expected cost of the dividend increase.

IV. Robustness analyses

We carry out three (unreported) analyses to test the sensitivity and robustness of our findings. In our first analysis, we focus on a subsample of firms with more than one sequential loss, omitting observations for which the current loss is preceded by a profitable year. We assume that for these firms the cost to increase dividends should be greater than for firms experiencing a first loss.[11] We find changes in dividends vary as a function of whether a loss is the first loss (i.e., the prior year's earnings were positive) or whether the loss is one in a sequence (a repeat loss): 10.38% (9.08%) of first loss observations increase dividend cash outflows (dividend cash outflows per share) versus 1.44% (1.27%) of repeat loss observations. This finding is consistent with a string of losses revealing continuing profitability problems, making it more difficult for the firm to

increase dividend payments. The proportion of repeat losses with negative cash flows (74.90%) is also larger than the corresponding proportion of first losses with negative cash flows (58.60%). Repeat losses with negative cash flows also exhibit lower profitability than those with a positive cash flow component.[12]

The descriptive evidence suggests the decision to increase dividends when a firm faces repeat losses constitutes a powerful signal regardless of the sign of the cash flow. The existence of such a strong signal for all multiple loss firms could diminish the signaling value of a dividend increase for loss firms with negative cash flows. We re-estimate the prediction tests in the sample of repeat loss observations and observe that, consistent with our conjecture that increasing dividends when facing repeat losses is costly even for positive *CFO* firms, the coefficients α_3 and β_3 become significant (at the 10% level) in the one-year models but not in the three-year models. More important though, consistent with our previous results, the coefficients α_4 and β_4 in (3a) and (3b) remain positive and significant in all specifications. All other results remain qualitatively the same.

In a second analysis, we include additional control variables in (3a) and (3b) to capture the level of liquidity and recent growth of the firm. We include cash and short-term securities scaled by assets (annual *Compustat* data item #1 scaled by data item #6) as a proxy for liquidity and the log of $Sales_t/Sales_{t-1}$ (where *Sales* is annual *Compustat* data item #12) as a proxy for growth. When we include both variables in the models, we find the coefficient on liquidity is insignificant in all specifications, while the coefficient on the growth proxy is positive and significant (at the 5% level) in all specifications. As in the previous robustness test, the coefficients α_3 and β_3 become significant at the 5%

level in the one-year horizon models (corresponding to columns (1) and (3) in Table IV), but remain insignificant in the three-year horizon models. Throughout, the coefficients α_4 and β_4 remain positive and significant in all specifications, reinforcing the stronger predictive role for future profitability of dividend increases when the cash flow component of losses is negative. All other results remain qualitatively the same.

In a final test, we re-estimate (3a) and (3b) in separate samples of loss observations determined by the sign of cash flows. That is, rather than incorporating *CFONEG* and the interaction term, we estimate a simplified version of (3a) and (3b) in separate samples, allowing the coefficients on *ROA*, *SPI*, and *LSize* to vary in both samples. The procedure allows us to evaluate whether the coefficients on the dividend increase variable and on the interaction term in Models (3a) and (3b) capture differential forecasting power of the other variables included in the equation with 'fixed' coefficients. Our estimations show that the coefficients α_2 and β_2 on *ROA* vary as a function of the sign of the cash flow component of losses; the coefficients on *SPI* and *LSize* however are not different across the subsamples. The coefficient on the dividend increase variable is significant at the 5% level in all specifications, indicating that dividend increases signal future profitability irrespective of the sign of the cash flow component of the loss when we estimate the models in separate subsamples. Most importantly though, in support of our prediction and previous results, the magnitude of the coefficient on the dividend increase variable remains significantly larger in the subsample of negative *CFO* loss firms than in the subsample of positive *CFO* losses.

Summarizing, the results of the additional analyses in subsamples of loss firms or for different specifications of Models (3a) and (3b) are all consistent with dividend

increases by loss firms being more informative about future profitability when the cash flow component of the loss is negative than when it is positive. We interpret our results to indicate that the more costly a dividend signal is, the more informative the dividend is about the firm's future performance.

V. Conclusion

This paper provides new evidence on the role of dividends in signaling firms' future performance. We examine whether firms that report a current loss and have a negative cash flow signal future performance of the firm through costly increases in cash dividends. We distinguish between losses determined by negative cash flows versus negative accruals to capture the cost of a current dividend increase. We argue that increasing dividend payments when the firm is already losing money constitutes a strong signal of future performance for two reasons. First, the increase in current cash dividends affects the current liquidity of the firm. Second, the increase in cash dividends implies a strong commitment to an increased level of dividend cash outflows in the future since previous research documents a high reluctance of managers to cut dividends.

The evidence in the paper strongly supports the hypothesis that costly dividend increases by loss firms with negative cash flows consistently predict future measures of performance better than dividend increases by other loss firms. While recent empirical results have discounted the role of dividends as a signaling mechanism in large cross-sectional samples (Benartzi et al. 1997, Grullon et al. 2003, Skinner 2003), our results suggest costly dividend increases are informative for a narrow group of firms. For negative cash flow loss firms, the use of cash to pay a dividend, rather than to reinvest in

the ongoing operations of the firm, suggests management judges the prospects of the firm to be good, even though current earnings are not.

Our focus on loss firms has broader implications as research shows that loss firms comprise a large and increasing share of publicly-traded firms (e.g., Hayn 1995, Joos and Plesko 2003, Skinner 2003). Therefore, an increasingly larger set of managers is confronted with reporting negative earnings that are generally much less informative about future performance of the firm. As a result, they face the need to rely on additional mechanisms beyond reported profitability measures to provide investors with information about the firm's prospects.

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[1] Earlier work by Benartzi et al. (1997) discusses how previous empirical work provides evidence the market treats changes in dividends as newsworthy (see Aharony and Swary 1980, Asquith and Mullins 1983). They also point out it is not clear that dividend changes signal future earnings changes, as the hypothesis predicts. The authors conclude changes in dividends summarize information about the past, namely past earnings increases, rather than the future, i.e., upcoming earnings increases.

[2] Other examples of studies that fail to find evidence or find evidence that is mixed on the question whether dividend changes map into future earnings changes are Watts (1973), Healy and Palepu (1988), DeAngelo et al. (1992).

[3] Previous research proposes costs associated with dividend payments, for example Miller and Rock (1985) argue the signaling cost of dividends is forgone investment. However, we know of no research that studies the power of the dividend signal as a function of the relative level of the cost.

[4] Skinner defines large dividend-paying firms as firms whose dividend is in the top quartile of dividends paid in each decade.

[5] Note the results in Joos and Plesko (2003) and Skinner (2003) are at odds with the finding in Benartzi et al. (1997) "that dividend cuts reliably signal an *increase* in future earnings." (p. 1031-1032, emphasis in the original).

[6] DDS report that dividend reductions occur less often when the losses include an accrual for special items, but do not differentiate whether the underlying loss is driven by accruals or cash flows. Further, the results of Benartzi et al. (1997) suggest that if dividends have any signaling power, it is through a reduction, rather than an increase.

[7] The findings of Fama and French (2001) who report a decrease in the proportion of dividend-paying firms in the US over time and DDS (2003) who show a large increase in the concentration of dividend payments over time also underline the changes in dividend-paying behavior of US firms.

[8] We winsorize all variables of interest at the 1st and 99th percentile.

[9] In unreported analyses, we estimate additional specifications of models (1) and (2). Specifically, we also include Special Items in one of the specifications and find that they obtain a significant negative coefficient, whereas the other results remain qualitatively unchanged. Similarly, we include an indicator variable to distinguish between first and repeat losses and find a positive coefficient on this variable, with all other results remaining qualitatively unchanged. Finally, we also estimate a version of models (1) and (2) that includes a control variable for the dividend policy of the firm since unreported analysis shows the incidence of dividend increases relates to whether the firm previously paid a dividend or not: we include an indicator variable that takes on the value of one if the firm pays a dividend (i.e., annual *Compustat* data item #21 is larger than zero), and zero otherwise and find the results do not change qualitatively.

[10] We also estimate two-year horizon models with results similar to the one and three-year horizon models. Also, consistent with previous research we focus on the prediction of an accounting variable only (e.g., Nissim and Ziv 2001). Benartzi et al. (1997) furthermore point out that the relation between dividend increases and future accounting variables or future returns is distinct: whereas they find no evidence of a relation between dividend changes and future earnings changes, they observe positive excess returns for the three years following a dividend increase.

[11] Joos and Plesko (2003) document that the probability of a loss firm returning to profitability is higher for firms incurring a first loss than for firms with repeat losses.

[12] We also compare the descriptive statistics in Table II to descriptive statistics for repeat losses and find the repeat loss observations generally exhibit significantly lower profitability than the total group of loss firms.

TABLE I
Sample Information

Our initial sample consists of firm-year observations from *Compustat*'s Industrial and Research Annual Data Bases for the years 1971-2000. We define our earnings variable as income (loss) before extraordinary items and discontinued operations or *IB* (annual *Compustat* data item #18). We define *ΔDIVCF* as the change in total dollar amount of dividends paid by the firm (annual *Compustat* data item #21). We define *ΔDIVPS* as the change in total dollar amount of dividends paid by the firm per share (annual *Compustat* data item #21/ annual *Compustat* data item #25).

Panel A: Full Sample: Profit vs. Loss Observations

	$IB_t > 0$		$IB_t \leq 0$		TOTAL
	N	%	N	%	
Full Sample	146,394	70.92%	60,026	29.08%	206,420
Profit vs. Loss and Past Dividends					
$Div_{t-1} = 0$	65,356	55.57%	52,262	44.43%	117,618
$Div_{t-1} > 0$	81,038	91.26%	7,764	8.74%	88,802
Profit and Loss and Current Dividends					
$Div_t = 0$	63,771	54.10%	54,105	45.90%	117,876
$Div_t > 0$	82,623	93.31%	5,921	6.69%	88,544

Panel B: Sign of Dividend Change

	Decrease		No Change		Increase		TOTAL
	N	%	N	%	N	%	
Full Sample							
ΔDIVCF	21,694	10.51%	116,614	56.49%	68,112	33.00%	206,420
ΔDIVPS	31,113	16.75%	101,020	54.40%	53,579	28.85%	185,712
Profitable Firms ($IB_t \geq 0$)							
ΔDIVCF	16,400	11.20%	64,403	43.99%	65,591	44.80%	146,394
ΔDIVPS	25,783	19.35%	55,896	41.94%	51,586	38.71%	133,265
Loss Firms ($IB_t < 0$)							
ΔDIVCF	5,294	8.82%	52,211	86.98%	2,521	4.20%	60,026
ΔDIVPS	5,330	10.16%	45,124	86.04%	1,993	3.80%	52,447

Panel C: Cross-Tabulation of ΔDIVCF and ΔDIVPS

		ΔDIVPS		
		Decrease	No Change	Increase
ΔDIVCF	Decrease	86.93%	0.06%	13.02%
	No Change	0.81%	98.83%	0.36%
	Increase	20.54%	0.04%	79.42%

TABLE II
Loss Firm Sample: Descriptive Statistics

Our initial sample consists of firm-year observations from *Compustat*'s Industrial and Research Annual Data Bases for the years 1971-2000. The table shows descriptive statistics for loss firm-year observations (N=60,026). *Size* is market value (price or annual *Compustat* data item #199* number of outstanding shares or data item #25). $ROA_t = IB_t/TA_{t-1}$, where we define our earnings variable as income (loss) before extraordinary items and discontinued operations or *IB* (annual *Compustat* data item #18). We define the cash flow component of earnings or *CFO* as cash flow from operations scaled by lagged assets where we measure cash flow from operations as net income (annual *Compustat* data item # 172) – accruals. Accruals is (*ΔCurrent Assets* (data item #4) - *ΔCash* (data item #1) - *ΔCurrent Liabilities* (data item #5) + *ΔDebt in Current Liabilities* (data item #34) + *Depreciation and Amortizations* (data item #14). *SPI* is special items (annual *Compustat* data item #17) scaled by lagged assets (TA_{t-1}). The table reports tests of differences between the means and medians of the two subsamples determined by the sign of the *CFO* variable (two-sided *t-tests* and two-sided Wilcoxon tests for the mean and median). *ΔDIVCF_UP* (*ΔDIVPS_UP*) is an indicator variable that takes the value of 1 if the change in dividend cash outflow (dividend payout per share), and zero otherwise, where dividends are annual *Compustat* data item #21 and number of outstanding shares is annual *Compustat* data item #25.

Panel A: Descriptive Statistics

Variable	CFO≥0 (N=18,121) Mean St. Dev. Median	CFO<0 (N=41,905) Mean St. Dev. Median	Test for Differences (*p*-values)
Size	451.915	191.483	0.001
	3,758.894	1,721.395	
	17.905	15.714	0.001
ROA	-0.091	-0.415	0.001
	0.197	0.678	
	-0.045	-0.195	0.001
CFO	0.095	-0.885	0.001
	0.110	2.405	
	0.061	-0.212	0.001
SPI	-0.234	-0.333	0.001
	2.433	2.810	
	0.000	0.000	0.001

Panel B: Dividend Increase variables

Variable	CFO≥0 (N=18,121) Proportion (%)	CFO<0 (N=41,905) Proportion (%)	χ^2 test *p*-values
ΔDIVCF_UP	6.61%	3.20%	0.001
ΔDIVPS_UP	5.92%	2.82%	0.001

TABLE III
Logistic Regression Model of Probability of Dividend Increase

The table contains the results of a logistic regression with as independent variable an indicator variable that takes the value of 1 if the company increases its dividends (measured as a total cash flow (*DIVCF*) or cash flow per share (*DIVPS*)) and zero otherwise.

$$Prob\ (\Delta DIVCF\_UP) = a_0 + a_1 ROA_t + a_2 CFONEG_t + a_3\ ROA_t*CFONEG_t + a_4 LSize_t + \varepsilon_1 \qquad (1)$$
$$Prob\ (\Delta DIVPS\_UP) = b_0 + b_1 ROA_t + b_2 CFONEG_t + b_3\ ROA_t*CFONEG_t + b_4 LSize_t + \varepsilon_2 \qquad (2)$$

$\Delta DIVCF\_UP$ ($\Delta DIVPS\_UP$) is an indicator variable that takes the value of 1 if the change in dividend cash outflow (dividend payout per share), and zero otherwise, where dividends are annual *Compustat* data item #21 and number of outstanding shares is annual *Compustat* data item #25. $ROA_t = IB_t/TA_{t-1}$, where *IB* is income (loss) before extraordinary items and discontinued operations (annual *Compustat* data item #18) and *TA* is total assets (annual *Compustat* data item #6); *CFONEG* is an indicator variable that takes on the value of one if the firm reports a negative cash flow *(CFO)*, and zero otherwise; *ROA*CFONEG* is the interaction variable between *ROA* and *CFONEG*; *LSize* is log(market value of the firm) where we define market value as closing price (annual *Compustat* data item #199) times shares outstanding (annual *Compustat* data item #25) at fiscal-year end. Our initial sample consists of firm-year observations from *Compustat*'s Industrial and Research Annual Data Bases for the years 1971-2000, and we carry out our analysis in a subsample of 60,026 loss firm-year observations. We report the results of the logistic regressions, estimated using the Fama-Macbeth (1973) procedure (N=30).

	Prob(ΔDIVCF_UP) Model (1) Estimate (t-stat)	*Prob(ΔDIVPs_UP)* Model (2) Estimate (t-stat)
Intercept$_t$	-3.868 (-30.961)	-3.533 (-30.542)
ROA$_t$	14.451 (3.666)	13.859 (6.125)
CFONEG$_t$	-0.391 (-2.674)	-0.412 (-4.143)
ROA$_t$*CFONEG$_t$	-8.020 (-1.971)	-6.444 (-3.107)
LSize$_t$	0.524 (24.849)	0.443 (20.376)
Avg. Perc. Conc.	79.50%	80.38%
Avg. No. Obs.	1,562	1,410

Table IV
Prediction Tests

The table reports the results of the OLS regressions, estimated using the Fama-Macbeth methodology:

$$AROA_{t+\tau} = \alpha_0 + \alpha_1 CFONEG_t + \alpha_2 ROA_t + \alpha_3 \Delta DIVCF\_UP_t + \alpha_4 \Delta DIVCF\_UP*CFONEG_t + \alpha_5 SPI_t$$
$$+ \alpha_6 LSize_t + \varepsilon_{3a} \qquad (3a)$$
$$AROA_{t+\tau} = \beta_0 + \beta_1 CFONEG_t + \beta_2 ROA_t + \beta_3 \Delta DIVPS\_UP_t + \beta_4 \Delta DIVPS\_UP*CFONEG_t + \beta_5 SPI_t$$
$$+ \beta_6 LSize_t + \varepsilon_{3b} \qquad (3b)$$

where average future *ROA* over the forecast horizon is $AROA_{t+\tau}=(\Sigma_{t+\tau} ROA_{t+\tau}/\tau)$ where $ROA_t = IB_t/TA_{t-1}$, *IB* is annual *Compustat* data item #18, *TA* is total assets or annual *Compustat* data item #6 ($\tau=1$ or 3); *CFONEG* is an indicator variable that takes the value of 1 if *CFO* is negative, and zero otherwise; we measure *CFO*, or cash flow from operations as net income (annual *Compustat* data item # 172) – accruals. We measure accruals or *ACC* as (*ΔCurrent Assets* (data item #4) - *ΔCash* (data item #1) - *ΔCurrent Liabilities* (data item #5) + *ΔDebt in Current Liabilities* (data item #34) + *Depreciation and Amortizations* (data item #14); *SPI* is special items (annual *Compustat* data item #17) scaled by lagged assets (TA_{t-1}); *ΔDIVCF_UP* (*ΔDIVPS_UP*) is an indicator variable that takes the value of 1 if the change in dividend cash outflow (dividend payout per share), and zero otherwise, where dividends are annual *Compustat* data item #21 and number of outstanding shares is annual *Compustat* data item #25; *LSize* is log(market value of the firm) where we define market value as closing price (annual *Compustat* data item #199) times shares outstanding (annual *Compustat* data item #25) at fiscal-year end. Our initial sample consists of firm-year observations from *Compustat*'s Industrial and Research Annual Data Bases for the years 1971-2000, and we carry out the analysis reported in the table in a sample consisting of 60,026 loss firm-year observations for which we can compute all variables of interest.

Variable	Coeff.	Sign?	Model 3a: ΔDIVCF_UP		Model 3b: ΔDIVPS_UP	
			$AROA_{t+1}$ Coeff. t-stat (1)	$AROA_{t+3}$ Coeff. t-stat (2)	$AROA_{t+1}$ Coeff. t-stat (3)	$AROA_{t+3}$ Coeff. t-stat (4)
Intercept$_t$	α_0 (β_0)		-0.056 -2.675	-0.026 -1.414	-0.042 -2.590	-0.019 -1.187
CFONEG$_t$	α_1 (β_1)		-0.047 -2.896	-0.044 -2.513	-0.033 -2.170	-0.035 -2.126
ROA$_t$	α_2 (β_2)		0.706 19.002	0.604 16.386	0.751 20.402	0.631 14.814
ΔDIV_UP$_t$	α_3 (β_3)		0.005 0.503	0.011 1.051	0.007 0.942	0.009 0.930
ΔDIV_UP$_t$ *CFONEG$_t$*	α_4 (β_4)	+	0.066 3.162	0.061 3.054	0.050 2.694	0.052 2.886
SPI$_t$	α_5 (β_5)		-0.281 -1.873	-0.339 -3.493	-0.245 -1.584	-0.329 -3.128
LSize$_t$	α_6 (β_6)		0.010 2.311	0.005 1.254	0.009 2.379	0.005 1.247
Avg. R^2			0.196	0.188	0.192	0.183
Avg. No. Obs.			1,323	986	1,197	890