Do Dividends Matter More in Declining Markets?

by

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Abstract

We find dividends do matter to shareholders, but more in declining markets than advancing ones. Dividend-paying stocks outperform non-dividend-paying stocks by 1% to 1.5% more per month in declining markets than in advancing markets. These results are economically and statistically significant and robust to many risk adjustments and across SIC codes. In addition, we find an asymmetric response to dividend changes based on market conditions: dividend increases matter more in declining markets than advancing ones. Other tests suggest that a credible communication explanation is more consistent with these results than a prospect theory explanation. We also find that it is the existence of dividends, and not the dividend yield, that drives returns' asymmetric behavior relative to market movements.

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Abstract

We find dividends do matter to shareholders, but more in declining markets than advancing ones. Dividend-paying stocks outperform non-dividend-paying stocks by 1% to 1.5% more per month in declining markets than in advancing markets. These results are economically and statistically significant and robust to many risk adjustments and across SIC codes. In addition, we find an asymmetric response to dividend changes based on market conditions: dividend increases matter more in declining markets than advancing ones. Other tests suggest that a credible communication explanation is more consistent with these results than a prospect theory explanation. We also find that it is the existence of dividends, and not the dividend yield, that drives returns' asymmetric behavior relative to market movements.

Do Dividends Matter More in Declining Markets?

Ever since Miller and Modigliani (1961) suggested dividends were irrelevant, academics and practitioners have argued whether dividends matter. For example, depending on their tax bracket, some shareholders may prefer high-dividend-paying stocks while others may prefer non-dividend-paying stocks. Anecdotal evidence also suggests shareholders' preferences for dividend-paying stocks over non-dividend-paying stocks vary over time, depending on the state of the market, i.e., advancing and declining markets.[1]

Two possible explanations suggest why dividends might matter: credible communication and prospect theory. One benefit of dividends may be their ability to communicate information credibly. The term "credible communication" includes either a signal about future earnings or the communication of a commitment that managers will not waste cash flow.[2] Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) argue that dividends may signal managers' private information on future earnings. Since the probability and costs of financial distress generally rise in declining economies, even maintaining dividend payments is more likely to be binding. Thus, the information conveyed by each payment is more valuable. A similar credible communication argument can be made for the free cash flow hypothesis developed by Easterbrook (1984) and Jensen (1986), which suggests that through the "bonding" of the commitment to pay dividends, managers can credibly communicate that they will not invest in negative net present value projects. Avoiding these projects should be most valuable when the market is declining, since the probability that the bonding will be binding increases as the state of the economy decreases. In either case, the information provided by dividends may be even more valuable in declining markets. Jagannathan and Wang (2005) note that when future projections of the economy are

[1] For example, in 2000, Fidelity began advertising a mutual fund that consisted of only dividend-paying stocks. In the ad, an advisor informs his client that this fund can help diversity his portfolio and moderate losses in declining markets. Also in 2000, Standard & Poor's predicted a revived interest in dividends, stating "market weakness may boost interest in dividends as investors begin to see the value of a 'bird in the hand.'"

[2] As noted in Allen and Michaely (2004), empirical tests of the signaling versus free cash flow hypothesis fail to pick an overwhelming winner.

poor or uncertain, shareholders are more likely to review their investments. Given shareholders desire information on their firm's financial health and future prospects most in declining markets, a policy of paying dividends during declining markets may convey more information than it does during advancing markets, and therefore be valued more highly in declining markets than advancing ones.

Dividends may also matter due to prospect theory. Prospect theory, developed by Kahneman and Tversky (1979), indicates that people respond differently to certain versus probable gains and losses, and that they care more about losses than they do to gains. To the extent that dividends are viewed as a certain return, shareholders may move from non-dividend-paying to dividend-paying firms when they predict future uncertainty or economic downturns, particularly if they are downside risk-averse. Such responses are similar to the "flight to quality" tendency that is seen during market declines documented by Connolly, Stivers, and Sun (2004). Recent work by Grinblatt and Han (2005) suggest that if investors focus on a reference point, whether an investor has capital gains or losses affects their behavior and thus the return series due to prospect theory, the "disposition effect" of Shefrin and Statman (1985), and the "mental accounting" of Thaler (1980). Overall market movements will affect capital gains and losses and absolute deviations from a reference point, inducing differences in valuations, behavior, and returns.[3] As part of the returns of dividend-paying stocks is from dividends which are independent of these movements, this effect would be mitigated in dividend-paying firms but not in non-dividend-paying firms.

Using S&P 500 returns from January 1970 to December 2000 as a proxy for market conditions, we examine the returns of dividend-paying and non-dividend-paying firms in both advancing and declining markets. We find that dividend-paying firms outperform non-dividend-paying firms by more in declining markets than they do in advancing markets, implying that dividends do matter more in declining markets. Our results show an outperformance of 1% to 1.5% each month and this difference is statistically and

[3] Overall declining markets will be more likely to cause or increase capital losses, particularly if the reference point was set prior to the decline. In fact, declining markets may cause stock prices to fall below the reference point, converting capital gains into capital losses, right where the S-shaped prospect theory value function changes from concave to convex . Rising markets would have the opposite effect.

economically significant. We note that by creation we are not testing a tradable strategy; instead, we are examining contemporaneous changes to examine differences in shareholder responses to different conditions. The lack of tradability may be one reason why this difference is persistent across time and stock characteristics.

The asymmetric shareholder preference for dividend-paying stocks in declining markets is robust to a variety of adjustments for risk, including the CAPM, size and book-to-market quartiles, the Fama-French (1993) three-factor model, and Fama-MacBeth (1973) style time-varying regressions. We also use various controls for size, volume, time period, alternative definitions of advancing and declining markets, exchange listing, volatility, and magnitude of the market advance or decline; the results continue to hold. We also control for industry and find that these results hold across almost all industries. Interestingly, the only industry for which we find the opposite result is for the FIRE (Finance, Insurance, and Real Estate) industries, whose members have balance sheets that mirror the other industries in our sample (FIRE assets are other industries liabilities, and vice versa).

While dividend changes have been examined by Pettit (1972), Aharony and Swary (1980), and Grullon, Michaely, and Swaminathan (2002), dividend changes have not previously been examined based on the direction of market movements. We therefore examine the effects of dividend increases, decreases, and maintenance of a dividend (i.e., no change) conditional on the direction of the market. We find that the market reacts more positively to dividend increases in declining markets than in advancing markets, and that the market reacts more positively to the maintenance of dividend payments in declining markets than in advancing markets. In addition, we also show that even during the months when the dividend-paying firms do not pay a dividend, dividend-paying stocks outperform non-dividend-paying stocks by more in declining markets than in advancing markets. Thus, our results are not driven by the receipt of the cash dividend.

Our general results are consistent with both credible communication and prospect theory explanations. However, several tests indicate that the credible communication explanation is more likely.

First, while we find that the different market reactions in advancing and declining markets are due to the dividend-paying or non-dividend-paying nature of the stock, this reaction does not vary with dividend yield. While prospect theory suggests that a larger amount of cash should matter more, credible communication focuses more on the ability to communicate information through the commitment to pay a dividend and not the dividend level. Second, although our results hold for all stocks, the results are more pronounced for smaller stocks, even after all risk adjustments. Prospect theory does not suggest a preference across larger and smaller stocks, but credible communication indicates that the lower the overall information environment for a stock (e.g., a small stock), the more valuable it is for a firm to communicate information. Third, we find that dividend-paying stocks continue to outperform non-dividend-paying stocks more in declining markets than in advancing markets even after controlling for volume and that the results are more pronounced for stocks with greater liquidity. Again, prospect theory would not suggest any preference for high or low volume stocks, while credible communication predicts that the value of the information communicated is greater for firms with more dispersion in investors' beliefs. Collectively, these results provide more support for a credible communication explanation than one involving prospect theory.

The paper is organized as follows. In Section I, we expand on how dividend payments relate to market movements and discuss some unique characteristics of dividend payments. We also provide testable empirical predictions. Section II presents our data and method. Section III describes our major empirical results. In Section IV we examine both the credible communication and prospect theory to see which is a more likely explanation. Section V provides robustness checks, and Section VI concludes.

I. Market Movements, Dividends, and Empirical Predictions

A. Market Movements

Although there are several reasons why investors might prefer dividend-paying stocks in declining markets, traditional asset pricing models such as the Sharpe (1964) – Lintner (1965) CAPM or the Fama-

French (1992, 1993) models do not account for state-specific investor preferences. However, previous research suggests that investors may have asymmetric preferences; for example, papers as early as Markowitz (1952, 1959) noted that investors care about downside risk differentially. In addition, an increasing body of work examines asymmetric responses of returns to market movements.[4]

We concentrate on dividend payments because dividends have a variety of special features that lend themselves nicely to studying investors' preferences in declining markets. While Grullon and Michaely (2002) suggest examining the total payout of a firm, dividends have a variety of unique features not shared by repurchases.[5] First, Brennan and Thakor (1990) suggest that repurchases are more beneficial for informed investors while dividend payments benefit all investors equally. Second, Cook, Krigman, and Leach (2004) note that the timing of share repurchases is uncertain, including if and when they are completed. Howe, He and Kao (1992) also indicate that repurchases are discretionary and are not always observable by investors, thus limiting their credible communication ability. In contrast, the timing and completion of dividend payments is transparent: dividends are announced and then paid on a certain date. It is immediately clear to shareholders whether or not this obligation has been met in part or in full.

Unlike repurchase programs, dividend payments are regularly scheduled. Investors know in advance when to expect the next dividend payment. In contrast, investors in non-dividend-paying firms do not know when they will receive credible information about their investment. Thus, the value of dividend-paying stocks should be highest in those states of the world where communicating information has the most value, i.e., in declining markets when there is either increased uncertainty or the future outlook has become less rosy. If investors value the knowledge that they will receive credible information from the firm, they may prefer dividend-paying stocks to non-dividend-paying stocks even in the months when the dividend-paying stock does not pay a dividend. To the extent that repurchases are beneficial in declining

[4] See for example, DeBondt and Thaler (1987), Goldstein and Nelling (1999), Ang and Chen (2002), Hong, Tu, and Zhou (2003), and Ang, Chen, and Xing (2004).

[5] While investors in non-dividend-paying firms could mimic this cash flow by selling stock, they would be doing so at depressed prices (given the market downturn) and incur potentially non-trivial transaction costs (a guaranteed loss).

markets, not considering repurchases will only bias us against finding significant results. For example, if repurchases are beneficial, they would mitigate our results on non-dividend-paying stocks, since, by definition, non-dividend-paying stocks can only increase payout through share repurchases. If repurchases are highly correlated with dividend payments, our results will still hold.

B. Empirical implications

To investigate whether investors differentially prefer dividend-paying stocks in declining markets, we begin by examining three empirical predictions that should hold under either credible communication or prospect theory. First, we test whether dividend-paying stocks are more likely to outperform non-dividend-paying stocks in declining markets than in advancing markets. Under either prospect theory or credible communication, our result should hold overall. In addition, we would expect to see larger differences between dividend and non-dividend paying stocks the more the market declines under either prospect theory or credible communication. Under prospect theory, the losses are larger; under the credible communication explanation, things are looking worse and the signal is more valuable. Alternatively, according to traditional asset pricing models, we should find no differences. Second, a firm's ability to maintain a dividend should cause a favorable response during a declining market but not during an advancing market. The increase of a dividend should also matter more in declining markets than advancing markets for prospect theory or credible communication. Alternatively, for traditional asset pricing models, we should find no difference. Third, investors should prefer dividend-paying stocks to non-dividend-paying stocks even during those months between dividend payments during which no dividend is paid. Both prospect theory and the preference for credible communication indicate that it is not the receipt of a cash payment, but the knowledge that such payments are coming, that matters. Alternative explanations (such as tax explanations) require cash payments.[6] Therefore, if these explanations are correct, our results would not hold in non-dividend-paying months for dividend-paying stocks.

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[6] Previous arguments that dividends are tax-disadvantaged to selling stock may no longer hold since a great deal of stock is held in tax-deferred accounts and the 2003 tax law eliminated the tax benefits of capital gains over dividend payments.

Next, we determine if the credible communication explanation is more likely than prospect theory to drive these results. First, although dividend-paying stocks outperform non-dividend-paying stocks in declining markets, this result should not vary with the amount paid. Prospect theory implies that investors prefer more cash to less in declining markets, while credible communication suggest that investors are concerned with just the existence of a dividend, not its level. Therefore, if prospect theory is the driving explanation, our results should vary significantly with dividend yield and should not vary significantly with dividend yield if credible communication explanation is more correct.

Second, in declining markets, small dividend-paying stocks should outperform small non-dividend-paying stocks more than will large dividend-paying stocks outperform large non-dividend-paying stocks. Prospect theory does not differentiate across stock types; but credible communication implies that the value of the ability to communicate credibly is more valuable for firms for which there is less information. As a result, smaller stocks should show more pronounced effects under the credible communication explanation.

Third, the relative difference between dividend-paying and non-dividend-paying stocks in advancing and declining markets may be highest for more liquid, high volume stocks. Prospect theory does not suggest that result will vary with liquidity. However, since more liquid stock may have more investor dispersion, credible communication suggests that these results should vary with liquidity.

II. Data and Method

We use the Center for Research in Security Prices (CRSP) monthly master file to identify a sample of dividend-paying and non-dividend-paying firms. We examine all NYSE, AMEX, and Nasdaq listed stocks with data in CRSP over the 31-year period from January 1970 to December 2000. For each firm, we collect its monthly return, market capitalization, and share volume data from CRSP. We also collect data on the firm's book value of equity and SIC code from Compustat. Since requiring Compustat data

reduced the sample by 40 percent, we use the CRSP-only sample as often as possible and use the CRSP-Compustat sample when needed.

We identify dividend-paying stocks by comparing the CRSP total return to the CRSP return that does not include dividends. If the returns are different, we consider that the firm has paid a dividend in that month, and consider the difference to be the dividend. Although this method might result in calculating negative dividends, we retain these likely errors to avoid introducing any bias by correcting errors on only one side. Next, we use the distribution code in CRSP to determine if the dividend is a special, or an annual, semi-annual, quarterly, or monthly. Since we are concerned with the credible communication aspect of dividends, we examine only quarterly-dividend-paying stocks. Choosing quarterly-dividend-paying stocks increases the frequency of the possibility of signal observations and decreases the length of time between potential signals. We consider all firms that pay dividends other than quarterly dividends as non-dividend-paying firms. In this way, to the extent that non-quarterly dividends are at all positive, we bias our results against finding any results for quarterly-dividend-paying firms.[7]

For each month we classify firms as either dividend paying or non-dividend paying. While Litzenberger and Ramaswamy (1979, 1980, and 1982) define a dividend-paying stock-month as only the month in which the firm pays a dividend, we follow Black and Scholes (1974) and Kalay and Michaely (2000) by defining a stock as a dividend paying stock if that a firm has paid dividends in the past and is expected to continue paying on a regular basis. We therefore classify a known regular quarterly-dividend payer, such as General Electric or IBM, as a dividend-paying stock for all 12 months, not just for the four months of the year a dividend is paid.

If a firm does not pay a dividend and then begins to do so, we classify it as a non-dividend-paying firm until the month after the dividend is paid. That is, if a firm lists on January 1989 but does not pay a

[7] To ensure that these rules did not affect our results, we reran our tests using alternate definitions of dividend-paying stocks. For example, we also included all regularly scheduled dividend payments (monthly, quarterly, and yearly) when classifying firms as dividend-paying. As another alternative classification method, we dropped all non-quarterly-dividend payments from the sample so non-dividend-paying firms *never* paid any type of cash dividend. Results are qualitatively similar and available on request.

quarterly dividend until June 1992, we classify the firm as a non-dividend-paying firm from January 1989 through June 1992 and reclassify it as a dividend-paying firm as of July 1992. In this way, we can attribute any positive return in the stock price that is due to the initiation of a dividend to the non-dividend-paying stock group, thus biasing our results against finding outperformance by dividend-paying stocks. We continue this classification as a dividend-paying stock until the firm stops paying a dividend, the firm is delisted, or the sample period ends.

If a firm pays a dividend and then stops paying a dividend, we classify it as a dividend-paying firm until the month after the scheduled quarterly-dividend payment. That is, if a firm lists in January 1989 and begins paying a quarterly-dividend as of June 1992 but does not pay the September 1994 dividend, then we classify the firm as a non-dividend-paying firm through June 1992, a dividend-paying firm from July 1992 to September 1994 (the month of the expected quarterly-dividend), and a non-dividend-paying firm from October 1994 until it is either delisted, pays a dividend, or the sample period ends. Thus, we can attribute any negative surprise due to the nonpayment of a dividend to the dividend-paying group, further biasing our results against finding outperformance by dividend-paying stocks.

To look at those periods when dividend payments should be most valuable, we use declining markets as a proxy for those times when investors should more highly value dividend payment. Similar to Goldstein and Nelling (1999), we collect the S&P 500 returns for each month from CRSP and classify an advancing market as a month during which the monthly return on the S&P 500 was positive, while a declining market is one where the S&P 500 posted a negative monthly return. While most of the analyses in this paper use this definition for advancing and declining markets, in the robustness section we examine alternative definitions of advancing and declining markets, such as bull and bear markets, and find substantively similar results.

Overall, our sample includes 20,315 NYSE, Amex and Nasdaq listed firms for the 372 calendar months from January 1970 to December 2000. We classify each firm as either dividend-paying or non-dividend-paying for every month of the sample period in which data are available. We develop a total of

2,161,688 firm months in our time period, of which 1,392,422 are non-dividend-paying firm months and 769,266 are dividend-paying firm months.

Table 1 describes the dividend- and non-dividend-paying firm months in our sample. Panel A provides averages across all observations for all 372 calendar months in our sample. Panels B and C provide averages for those observations that occur in the 217 months in our sample when the S&P 500 has a positive return ("advancing markets") and the 155 months where it does not ("declining markets"). Panel A indicates that the average market capitalization of firms during the months when they were classified as dividend-paying is almost five times that of firms classified as non-dividend-paying. This larger size is due to having twice as many shares outstanding and an average price about 2.5 times that of the non-dividend-paying firms. Trading volume is similar for dividend-paying firms and non-dividend-paying firms. Betas for non-dividend-paying firms are slightly larger than those of dividend-paying firms.

These general results in Panel A are similar for both advancing and declining markets, as indicated by Panels B and C, indicating that the relative relationships between dividend-paying and non-dividend-paying do not vary significantly with overall market movements.

III. Empirical Results

A. Overall

To investigate how investor preferences for dividends vary across market conditions, we examine the returns of dividend-paying and non-dividend-paying stocks in advancing and declining markets separately. In addition to showing results for all markets, Table 2 presents evidence for the 217 months in our sample when the S&P 500 has a positive return ("advancing markets") and the 155 months where it does not ("declining markets").

Panel A indicates that we find that dividend-paying firms significantly outperform non-dividend-paying firms by 0.37% per month across all the months in our sample. [8] This difference is statistically significant at the 1% level for the Student t-test, the Wilcoxon sign-rank test, and the Kruskal-Wallis test. In addition, dividend-paying firms significantly outperform non-dividend-paying firms at the 1% level in both advancing and declining markets.

The magnitude of the difference, however, depends on the state of the market. Although dividend-paying firms return only 0.16% more than non-dividend-paying firms during advancing markets, they provide 0.90% more than non-dividend-paying firms during declining markets. Using a difference-of-differences test, we find that dividend-paying stocks outperform non-dividend-paying stocks by 0.74% more in declining markets than in advancing markets, and that this difference is significant at the 1% level. This result is as indicated by credible communication or prospect theory.

We note that the difference of differences that we use in this paper is the difference of non-dividend-paying stocks minus dividend-paying stocks in advancing markets minus the difference of non-dividend-paying stocks minus dividend-paying stocks in declining markets. A positive number for this test indicates that dividend-paying stocks outperform non-dividend-paying stocks by more in declining markets than in advancing markets. Due to the nature of the data (unequal number of observations across all four potential categories), throughout the paper we use only parametric methods to test the significance of the difference of difference test.

To verify that our overall result is not driven by one particular subperiod, Panel B examines three separate decade sub-periods: January 1970 to December 1979, January 1980 to December 1989, and January 1990 to December 2000. The differences-of-differences tests for all three subperiods indicate that dividend-paying stocks significantly outperform non-dividend-paying stocks by more in declining markets than in advancing markets at the 1% level. The difference-of-difference results are consistent both overall

[8] One possible explanation for this overall preference for cash dividends may be the theory of self-control, developed by Thaler and Shefrin (1981). As discussed in Shefrin and Statman (1984), investors may want to consume dividend payments so to keep from consuming their long-run wealth (i.e., consuming capital). However, the theory of self-control seems unlikely to explain differential investor preferences based on market movements.

and in each of the three subperiods. This finding supports the first major empirical prediction, that investors differentially prefer dividend-paying stocks over non-dividend-paying stocks more in declining markets than in rising markets.

B. Fama-French Three-Factor Model Results

Similar to Ang, Chen, and Xing (2004), to adjust for risk we first use the three-factor model developed by Fama and French (1993) to estimate abnormal returns for monthly portfolios.[9] This model controls for the non-independence of returns over market sensitivity, size, and book-to-market effects. We estimate a Fama-French three-factor model as follows:

$$r_{it} - r_{Ft} = \alpha_{it} + b_{it} RMRF_i + s_{it} SMB_i + h_{it} HML_i + \varepsilon_{it} \qquad (1)$$

where $r_{it} - r_{Ft}$ is the return on a equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury bill (T-bill) return in month t is the monthly return on three-month T-bill RMRF is the excess return on a value-weighted aggregate market proxy, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks, and HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks.

For each month we calculate the excess return on an equally weighted portfolio composed of either all dividend-paying firms or all non-dividend-paying firms. We then regress this portfolio return on the factors in equation (1) and examine the differences in coefficients. We do this first over the entire time period. We then separate the time period into just months where the return from the S&P 500 is greater

[9] We thank Ken French for providing the data.

than zero (advancing months) and months where the return from the S&P 500 is zero or less (declining months). We expect more of a difference between dividend and non-dividend paying portfolios for declining months than for advancing months if investors prefer dividend-paying firms in declining markets.

1. Econometric issues and weighting methodology

To perform these analyses and those that follow, we equally weight the firms' returns in portfolios. There are several factors in favor of equally weighting portfolios. First, we are examining the responses of dividend and non-dividend portfolios to advancing and declining markets. Since the S&P 500 index is itself a value-weighted portfolio, the value-weighted dividend and non-dividend portfolios will be very highly correlated with the variable that conditions on the advancing and declining market, namely, the S&P 500 index.[10] Many of the same stocks will determine the return characteristics of both the portfolios and the index that divides our sample. This effect will be particularly exacerbated for the value-weighted dividend portfolio, given the structure of the S&P 500 index, which will further complicate comparisons across the dividend and non-dividend portfolios.

A second issue related to the use of equally weighted portfolios relates to whether an investor can trade on this information. Given that the state of the market is fixed during any one month, investors cannot trade on this information; it is a state of the world for all stocks. Therefore, we are not analyzing a trading strategy. However, as Cooper, Gutierrez, and Marcum (2005) note, while the Fama-French three factor model works reasonably well in sample, it does not perform as well out-of-sample, and therefore may not be appropriate for the use of trading strategies.[11] As we do not wish to test a trading strategy but instead the cross-sectional dispersion of characteristics of dividend and non-dividend paying stocks across market movements, this is not a problem. Furthermore, even if it were possible to trade on the

[10] We also changed the definition of advancing/declining markets so as to base them on whether the CRSP equally weighted index had positive returns or not. The results provide even more support to our prediction that dividend-paying stocks outperform non-dividend-paying stocks in declining markets.

[11] Cooper, Gutierrez, and Marcum (2005) use a sample from July 1974 to December 1997, a time period that is contained in, but covers most of, our sample period.

contemporaneous state of the market, transaction costs would make it prohibitively expensive for investors to move from an all dividend-paying portfolio to an all non-dividend-paying portfolio based on the state of the market.

Fama (1998) notes that the weighting structure of the portfolio should determined by the underlying question. Because the question under investigation in this study is more a question about the particular nature of an individual stock – does it or does it not pay a dividend? – and not particularly about a portfolio, Fama implies that equal weighting is appropriate. Equally weighted portfolios allow us to study the individual characteristics of a stock by treating each stock similarly, while value-weighted portfolios can be primarily driven by a limited number of stocks. Ang and Chen (2002) also note that as asymmetric results decrease with size, value-weighted portfolios would tend to understate the magnitude of the results for the average stock. Results from equally weighted portfolios therefore better represent the "average" stock.

2. Fama-French overall results

We first verify for our sample that the Fama-French (1993) three-factor model provides consistent results with prior research. Panel A of Table 3 indicates that the coefficients on the Fama-French three-factors show that the data load properly on the factors, do not have significant alphas, and have very high adjusted R^2 of around 90% for both the non-dividend-paying and dividend-paying portfolios. This result suggests that the basic Fama-French model works well with this data. In addition, although the factor loadings are significantly different from each other, contrary to the hypotheses in Brennan (1970) or the empirical results in Black and Scholes (1974), Litzenberger and Ramaswamy (1979, 1980, 1982), and Blume (1980), we do not find differences between dividend-paying and non-dividend-paying stocks overall in terms of alpha outperformance.

3. Fama-French results for advancing and declining markets

Panel B of Table 3 presents the results for the Fama-French (1993) model given in equation (1) for advancing markets, while Panel C presents results for declining markets. In general, we find that the return-generating process is different for dividend-paying stocks than for non-dividend-paying stocks, and

that the state of the market impacts the portfolio returns. Panel B indicates that in advancing markets the alphas for both the dividend-paying and non-dividend-paying portfolios are not significantly different from zero or significantly different from each other (a difference of only 0.0005). However, Panel C indicates that in declining markets the non-dividend-paying portfolio is negative, significantly different from zero, and significantly lower than that for the dividend-paying portfolio, with a difference of -0.0081. Therefore, the difference in differences of the alphas between dividend-paying and non-dividend-paying stocks across advancing and declining markets is 0.0086. Again, the dividend-paying stocks outperform the non-dividend paying stocks by 86 basis points more per month in declining markets than in advancing markets.

4. Modified Fama-French results

We also estimate a modified Fama-French three-factor model as follows:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}\text{RMRF}_t + s_{iT}\text{SMB}_t + h_{iT}\text{HML}_t + d_{iT}\text{DOWN}_t + \varepsilon_{it} \quad (1)$$

where $r_{it} - r_{Ft}$ is the return on a equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury bill (T-bill) return in month t is the monthly return on three-month T-bill RMRF is the excess return on a value-weighted aggregate market proxy, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks, HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks, DOWN is a dummy variable that takes the value one if the market is declining and zero if the market is advancing, and ε_{it} is the error.

Panel D of Table 3 presents the results for the modified Fama-French (1993) model given in equation (1). In general, we find that the return-generating process is different for dividend-paying stocks than for non-dividend-paying stocks, and that the state of the market impacts the portfolio returns. We find that the coefficient on the DOWN market dummy variable (-1.34%) is negative and significant for non-dividend-paying firms, indicating that non-dividend-paying firms have a different return-generating function in declining markets. However, the coefficient on the DOWN market dummy variable (-0.29%)

for dividend-paying firms is not significantly different from zero. More importantly, the coefficient on the DOWN dummy variable is significantly more negative for non-dividend-paying firms than it is for dividend-paying firms. Overall, the difference in the DOWN dummy variable for dividend-paying and non-dividend-paying firms is -0.0105, or about 1% per month, and this difference is statistically significant, providing similar results to those provided in Panels B and C and again indicating that dividend-paying firms outperform non-dividend-paying firms by more in declining than advancing markets.

C. Fama-MacBeth (1973) Style Regressions

Similar to Grinblatt and Han (2005), we examine Fama-MacBeth (1973) style regressions to determine if dividend-paying stocks outperform non-dividend-paying stocks in declining markets. We run the regressions cross-sectionally each month for every firm as in Fama and MacBeth (1973). Specifically, we estimate the following:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it} \quad (2)$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t.

Table 4 reviews the basic results of these regressions. The results in Panel A for the overall regressions reports that at the 1% level, the coefficient for DIV is significantly greater in declining market months (0.3759) than in advancing market months (0.3608), indicating that in declining markets dividend-paying firms outperform non-dividend-paying firms by approximately 1.5% each month more than in advancing months. This shows that investors value dividend-paying firms more in declining markets and more so than in advancing markets.

An interesting question is whether these results vary with the magnitude of the movement in the market. We therefore divide the sample into months with large (greater than 5%) and small (between 0% and 5%) movements in the SP500 for both advancing and declining markets. The results in Panels B are revealing. The magnitude of the coefficient for DIV monotonically increases as the SP500 return decreases. The coefficient for large positive changes (0.3523) is smaller than the coefficient on DIV for large negative changes (0.3832). In addition, the differences in the coefficients for large and small changes are statistically significantly different from one another, so that even across these changes, these differences are not symmetric.[12] Therefore, the effect gets stronger the more the market declines, providing further evidence of increasing and asymmetric shareholder preference for dividend-paying stocks in declining markets.

Thus, the answer to our central question – Do investors prefer dividend-paying firms to non-dividend-paying firms in declining markets? – is yes, even after controlling for risk using the Fama-French factors or adjusting for risk using Fama-MacBeth style regressions. We also find that the effects become stronger the larger the decline.

D. Dividend Changes

While previous work on dividend changes, such as Pettit (1972), Aharony and Swary (1980), and Grullon, Michaely, and Swaminathan (2002), did not examine the effect of advancing and declining markets, the second main empirical prediction implied by both credible communication and prospect theory relates to whether dividend changes and dividend maintenance matter based on market conditions. From an asset pricing or dividend capture/tax clientele perspective, market responses to changes in or the

[12] This monotonic difference in the effect based on the magnitude of the market changes is consistent with the credible communication explanation that implies that the value of the information increases as the market decreases. The predictions from prospect theory are less clear. While it is reasonable that certain gains become more desirable as losses increase, Grinblatt and Han (2005) indicate that the slope of the S-shaped prospect theory value function switches from concave to convex at the reference point, implying that small changes may cause more of an effect than large ones, as the slope approaches linear far from the reference point (see, for example, Figure 1 in Grinblatt and Han (2005) on page 313). Section IV contains further differentiation between credible communication and prospect theory inferences.

maintenance of dividends are not a function of the state of the market. However, from a credible communication or prospect theory perspective, we would expect an asymmetric response. In declining markets investors' perceptions of future profits tend to be lower, while investors tend to have positive outlooks on future earnings during advancing markets.

Increasing dividends in declining markets therefore provides a much stronger indication about the future than a similar increase during an advancing market. Similarly, during a declining market, maintaining a dividend provides investors with reassuring information, while doing the same in advancing markets likely provides less additional information. Finally, decreasing dividends in declining markets may be expected by investors and thus convey less information than when firms decrease dividends in advancing markets when everything is supposedly going well.

Thus, we would expect in declining markets, dividend increases will have higher price reactions and dividend decreases will have less negative price reactions than comparable changes in advancing markets. Further, if maintaining a dividend provides information, then in declining markets firms that do not change their dividend payments should have higher abnormal returns than firms with no dividend change in advancing markets.

We test this empirical prediction by examining the market's reaction to dividend changes and no changes during advancing and declining markets. We obtain changes in quarterly-dividends from CRSP from 1970 to 2000. The only restrictions we place on the sample is that there must be five days of returns surrounding the announcement listed on CRSP, the dividend is paid on ordinary common shares of U.S.-incorporated companies, and the change is not a dividend initiation or omission. Our sample comprises 3,294 firms with 18,537 increases, 4,595 decreases, and 93,537 no changes. Following Brown and Warner (1980, 1985) we estimate the abnormal returns using a modified market model:

$$AR_i = r_i - r_m \tag{3}$$

where AR_i is the abnormal return for firm i, r_i is the return on firm i and r_m is the equally weighted market index return. To calculate the cumulative abnormal returns (CARs), we sum the ARs over the five-day

period (-2, 2) around the announcement date supplied by CRSP. We do not estimate market parameters based on a time period before each change because some firms have frequent dividend changes. Thus, there would be a high probability that previous changes would be included in the estimation period, which would make the beta estimates less meaningful.

Table 5 shows that price reactions to dividend increases are less in advancing markets (0.857%) than in declining markets (1.206%). This 0.349% difference is significant at the 5% level for the Student t-test and at the 1% level for the two nonparametric tests. In addition, dividend decreases have less negative returns if announced during declining markets (-0.324%) than during advancing markets (-0.375%). Although parametrically not different at normal significance levels, this 0.051% difference is statistically different for the two nonparametric tests at the 1% level. Further, firms that maintain their current dividend payments in declining markets experience significant, positive abnormal returns (0.17%), but firms that maintained their current dividend levels in advancing markets had no significant, abnormal returns (0.046%). The 0.124% difference in abnormal returns between firms that maintained their dividend in advancing and declining markets is significant at the 1% level for the parametric and nonparametric tests, indicating a much stronger and positive response for firms that just maintain their dividend in declining markets over the non-response for maintaining a dividend in declining markets. Thus, the differences-in-means between advancing and declining markets are statistically significant for three groupings (increases, decreases, and no changes).

Collectively, the results in Table 5 support the second main empirical prediction that investors respond differently to changes, or even to maintenance, of a dividend in advancing and declining markets. These results also reconfirm the earlier results that investors have asymmetric responses in advancing and declining markets.

E. Dividend-paying stocks during non-dividend-paying months

Kalay and Michaely (2000) note that time series variation in returns may be related to the actual dividend payment itself. Therefore, one possibility is that dividend-paying firms outperform non-

dividend-paying firms simply because of the return in the month the firm paid the dividend, and that in the remaining months when no dividend is paid, returns for dividend and non-dividend-paying firms are similar. Dividends may matter more in declining markets simply due to the cash payment itself. If this is true, then there may be no information in the fact that a firm continues to pay a dividend, but only value in the dividend payment itself when it is received. Similarly, any asset pricing strategy that involves dividend capture or tax clienteles should not have different results in non-dividend-paying months.

Alternatively, it could be that the knowledge that information that is credibly communicated (i.e., via the dividend payment) is in itself valued as well, so the results should still hold in non-dividend months. Under prospect theory, the knowledge that cash will be received should still be valued more in declining markets than in advancing markets, and not just the receipt of cash itself. Thus, the third main empirical prediction suggests that investors should still prefer dividend-paying stocks over non-dividend-paying stocks not only during those months in which the dividend is paid, but also in those months between dividend payments.

To verify that our results are not driven by the cash payment, we study the eight months of the year when dividend-paying stocks do not pay dividends. We eliminate the returns for dividend-paying firms in the month the dividend is paid and compare the returns of non-dividend-paying firms to the returns of dividend-paying firms in months with no dividend payments.

In Panel A of Table 6, we find that for advancing markets, dividend-paying and non-dividend-paying firms have the same average monthly return (3.72%), but in declining markets, dividend-paying firms (-3.03%) still significantly outperform non-dividend-paying firms (-2.36%), even when the dividend paying firms' returns exclude the dividend return. The 0.67% difference of differences is significant at the 1% level.

We also estimate the Fama-MacBeth (1973) model separately for advancing and declining markets and find in Panel B that again the coefficient on the dividend dummy is significantly larger in declining markets (0.2961) than in advancing markets (0.2795) even during months when these firms are not paying a dividend. Results in the Appendix note that similar results are found using the modified Fama-French

(1993) model in Panel D of Table 3, indicating that these results hold under alternative adjustments for risk. (See Appendix Table 1.) That is, dividend paying firms outperform non-dividend paying firms by over 1.5% more in declining markets than advancing markets. Thus, it is not the receipt of the cash itself that causes the asymmetric response by investors in advancing and declining markets.

Overall, the results in Tables 2, 3 and 4 support the first main empirical prediction, that investors differentially prefer dividend-paying stocks in declining markets as predicted by either the credible communication theory explanation or the prospect theory explanation. In addition, the results in Table 4 indicate that the effects are inversely proportional to market movements: the larger the decline, the stronger the effect. The results in Table 5 support the second main empirical prediction, that changes or maintenance of a dividend matter more in declining markets than advancing markets. The results in Table 6 show that these findings are not due to the cash payment itself and support the third main empirical prediction. Collectively, these results suggest that both credible communication and the prospect theory can provide an additional understanding of shareholders' behavior over and above the explanations in traditional symmetric asset pricing models that do not allow for such asymmetric responses.

IV. Credible Communication vs. Prospect Theory

Collectively, the previous results show that dividend-paying stocks outperform non-dividend-paying stocks in declining markets. We now examine whether prospect theory or a credible communication explanation is more likely to explain these results.

A. Dividend Yield

Previous tests focus only on whether or not firms pay dividends, not the magnitude of the dividend payments. We investigate if our results are sensitive to the size of the dividend yield. Prospect theory implies that investors prefer more cash to less in declining markets. If the previous results are due to prospect theory, these results should be stronger for high-dividend-yield stocks than for low-dividend-yield

stocks, and there should not be much of a difference between the low-dividend-yield and the non-dividend-paying stocks.

However, credible communication suggests that investors prefer just the existence of a dividend, not its level. If the additional value of the dividend in declining markets is due to the ability of dividends to credibly communicate information, it should matter more that the firm pays a dividend at all, not the magnitude of the dividend itself. We are not suggesting that each individual dividend payment has great credible communication value, but that the regular payment of a dividend provides credible information as does increasing or decreasing a dividend. In addition, investors *know* when to expect this credible communication; the knowledge of *when* to expect the communication is also valued. Therefore, our results should vary significantly with dividend yield if prospect theory is the driving explanation, and should not vary significantly with dividend yield if credible communication prevails.

The results in Table 7 indicate that each quintile has different intercepts for the Fama-MacBeth (1973) regressions. Panel A indicates that in advancing markets, the alphas monotonically decrease as the dividend yield increases, indicating that higher yields actually produce lower returns in advancing markets. However, Panel B indicates that for declining markets, the relation between dividend yield and return is not monotonic. In fact, while there is a large difference in alphas between the lowest dividend yield group and second quintile dividend yield group, there is little difference in alphas between the second, third, fourth, and highest dividend yield groups. While the F-test of all five quintiles indicates that they are different from one another, the F-test of all but the lowest dividend group indicates that there is no difference based on dividend-yield. This result indicates that the asymmetric response of non-dividend-paying and dividend-paying stocks to declining markets is not related to dividend yield, but rather to the existence of dividend payments themselves, as increasing dividend yield reduces performance in advancing markets and, beyond the lowest dividend yield group, is seemingly unrelated to performance in declining markets.

As a further test, Panel C examines the difference between the non-dividend-paying stocks and stocks in the quintile with the lowest dividend yield. The coefficients on the DIV dummy variable are

significantly different for declining (0.1074) and advancing (0.1013) markets, indicating that the differences between dividend-paying and non-dividend paying stocks in advancing and declining markets exist even when only the lowest yielding stocks are considered; it is not solely due to stocks with high dividend yields. Results in the Appendix note that similar results are found using a modified Fama-French (1993) model discussed in the robustness section, indicating that these results hold under alternative adjustments for risk. (See Appendix Table2.) Collectively, these results suggest that it is the payment, not the level of the payment, which drives dividend-paying firms to outperform non-dividend-paying firms in declining markets. In addition, the results in the Appendix Table 2 indicate a much larger difference between the non-dividend-paying and low-dividend-yield stocks than among the dividend-paying stocks themselves. These findings imply there is more support for the credible communication hypothesis than for the prospect theory or tax clientele/dividend capture hypotheses.

B. Liquidity Results

A number of papers, such as Amihud and Mendelson (1986) and Brennan and Subrahmanyam (1996), indicate that returns may be inversely related to liquidity. For example, Datar, Naik, and Radcliffe (1998) and Piqueria (2004) find that trading activity is related to stock returns. Chordia, Roll, and Subrahmanyam (2001) and Van Ness, Van Ness, and Warr (2004) note that liquidity varies more in declining markets than it does in advancing markets. The ability to switch in and out of stocks based on market conditions may be a function of overall liquidity. Since it is easier to move in and out of more liquid stocks, we would expect to see less of a difference in advancing and declining markets for less liquid stocks than we would for highly liquid stocks. In addition, to the extent that non-dividend-paying stocks are less desirable in declining markets, we might expect a bigger difference between advancing and declining markets in highly liquid non-dividend paying stocks than in most dividend-paying stocks.

Liquidity may also be a proxy for a divergence of opinion among investors. Frankel and Froot (1990) find that dispersion Granger-causes volume, and Harris and Raviv (1993) suggest that trading

volume is higher for firms with more information.[13] Kandel and Pearson (1995) also suggest that volume may be caused by differences of opinion. Although prospect theory does not suggest that there should be any difference across volume grouping for investors to prefer dividend-paying stocks over non-dividend-paying stocks, credible communication does suggest that the relative difference between dividend-paying and non-dividend-paying stocks in advancing and declining markets may be highest for high volume stocks, since high volume stocks may have more investor dispersion, thus requiring more credible communication.

We divide the sample into quintiles based on yearly trading volume in shares. We then examine the results in each volume quintile for dividend-paying and non-dividend-paying stocks in advancing and declining markets. The results in Table 8 indicate that the basic results hold. In each of the volume quintiles except the lowest volume stocks (where the results are insignificant), dividend-paying stocks outperform non-dividend-paying stocks by more in declining markets than in advancing markets at the 1% level, supporting our main findings.

Further investigation shows that the magnitude of the difference between the coefficients for the DIV variable between advancing and declining markets increases monotonically as the volume quintile increases for the four lowest volume groups, with only a slight drop off at the highest volume group. (Again, for ease of exposition, the differences in the DIV dummy variable between the declining markets and advancing markets is calculated and is in italics if significant.) While the lowest volume group has an insignificant difference of 0.0027, the second highest and highest groups have differences of 0.0262 and 0.0257, both of which are significant at the 1% level. Results in the Appendix note that similar results are found using a modified Fama-French (1993) model discussed in the robustness section, indicating that these results hold under alternative adjustments for risk. (See Appendix Table 3.) Overall, these results indicate that the credible communication explanation is more likely than a prospect theory explanation.

[13] See also Varian (1985) and Shalen (1993) for a discussion of differences in opinion, volume and prices.

Collectively, the results presented in Tables 7 and 8 indicate that the credible communication explanation is more consistent with the results than prospect theory. Thus, dividend-paying stocks outperform non-dividend-paying stocks by more in declining markets than they do in advancing markets since the information provided is more valuable in those declining markets.

V. Robustness Checks:

To verify further that the previous results hold under a variety of specifications, we check other potential risk adjustments, small stock biases, alternative definitions of advancing and declining markets, expected market volatility, exchange listings, and industry effects.

A. Industry Effects

Finally, to make sure that the overall results are not being driven by a particular industry, we examine the data for industry effects to see if and how our results vary by industry. To segment our sample into industries, we use SIC data from Compustat to divide our sample into ten broad industry groupings.

Table 9 provides the results by industry. We find that dividend paying stocks outperform non-dividend paying stocks by more in declining markets than in advancing markets for seven of the ten industries at the 5% level (over 82% of the sample), and six of the ten industries at the 1% level (over 75% of the sample). We find no statistical difference for firms in the agriculture, forestry, and fishing industries, or for firms involved with public administration. However, these two industry groupings collectively account for just over 1% of the sample.

Interestingly, we find the reverse results for the finance, insurance, and real estate (FIRE) firms which comprise 16.6% of our sample. For these financial firms, dividend paying firms outperform non-dividend paying firms by more in advancing markets than in declining markets; this result is statistically

significant at the 1% level. It is interesting that the FIRE firms are the only industry segment for which we find the opposite results, in that their balance sheets are the reverse of those of the other firms in our sample; their assets are other firms' liabilities, and vice versa. In addition, these firms tend to be very interest rate sensitive and highly regulated. In addition, In any case, the inclusion of financial firms in the overall sample bias against our finding our results.

B. CAPM Results

We examine the abnormal return for each firm *i* using the capital asset pricing model to determine expected returns. We estimate:

$$\text{Abnormal Return}_i = \text{ActualReturn}_i - \left(r_F - \beta_i \left(r_M - r_F\right)\right) \tag{3}$$

where Actual Return$_i$ is the return for firm *i* for that month, r_F is the three-month Treasury bill for that month, r_M is the return on the CRSP equally weighted portfolio, and β_i is the beta for stock *i* give by CRSP.

We then compare the abnormal returns for dividend-paying and non-dividend-paying stocks for all markets, advancing markets, and declining markets. We report the results here instead of in a table for brevity. Although non-dividend-paying firms outperform dividend-paying firms in advancing markets by 0.19%, in declining markets dividend-paying firms perform significantly better (i.e., have significantly less negative returns) than do non-dividend-paying firms by 0.6%, more than four times as much. As a result, the difference of differences of 0.79% is highly significant, indicating that the relative abnormal returns for dividend-paying stocks over non-dividend-paying stocks are larger in declining markets than in advancing markets.

The CAPM risk-adjusted results are consistent with the results found earlier in Table 2 and 3: dividend-paying stocks outperform non-dividend paying stocks by more in declining markets than in advancing markets.

C. Size and Market-to-Book Results

Fama and French (1992) suggest that book-to-market and size are important determinants of returns and Christie (1990) finds that size is an important factor in examining the returns of dividend-paying and non-dividend-paying stocks. Therefore, we test whether our results are robust to segmentation by book-to-market and size by replication the original Fama and French (1992) method. We divide our samples of dividend-paying and non-dividend-paying stocks into four market capitalization quartiles and then further divide those quartiles into four book-to-market quartiles. Thus, we create a total of 16 subgroups for each of the dividend-paying and non-dividend-paying stocks. The end result is 32 portfolios: 16 portfolios of dividend-paying stocks based on book-to-market and size quartiles, and 16 portfolios for non-dividend-paying stocks.[14] We then calculate the average excess return (return of a firm in month *t* over the three-month Treasury bill rate in month *t*) for each portfolio.

Table 10 presents the excess return characteristics for the portfolios formed on size and book-to-market. Panel A shows that non-dividend-paying stocks outperform dividend-paying stocks for the lower book-to-market groups across all markets. The opposite is true for the higher book-to-market quartiles. Panel B shows that in advancing markets the non-dividend-paying stocks outperform the dividend-paying stocks for low book-to-market quartiles. However, for the higher book-to-market groups, size becomes a factor and only the smaller stocks in the higher book-to-market quartiles have a significant difference. Panel C shows that during declining markets, dividend-paying stocks do better than non-dividend-paying stocks for all book-to-market categories, but only for the smaller stocks. Thus, the results are strongest for low book-to-market small stocks. In Panel D we study the differences of differences and find reasonably strong support for dividend-paying stocks outperforming non-dividend-paying stocks by more in declining markets than in advancing markets. Thus, the results in Table 10 support the overall suggestion that in declining markets investors prefer dividend-paying stocks to non-dividend-paying stocks more than they prefer dividend-paying stocks in advancing markets.

[14] For the sake of brevity, we present the quartile results. We also quintile the data to be consistent with previous tables and find similar results.

These results also provide more support for the credible communication hypothesis over prospect theory. Table 10 shows that the results are weakest for the largest stocks, particularly those with medium to high book-to-market values, and strongest for small stocks and lower book-to-market values. Firms with smaller, low book-to-market (i.e., high market-to-book) are likely to provide less information than will larger, high book-to-market firms. As a result, the value of the receipt of a signal may be stronger for these firms, particularly when the general economy looks less favorable.

This result also provides further support for the credible communication explanation. DeAngelo, DeAngelo, and Skinner (2004) argue that the degree of information asymmetry is likely to be negative related to firm size. As a result, smaller stocks should show more pronounced effects under the credible communication explanation, because smaller stocks tend to have less information available for investors. Less information makes the ability of dividends to communicate information credibly more valuable for these stocks. Therefore, these results are consistent with a credible communication explanation.

To determine if the results in Table 10 are driven by differences in size and book-to-market values for dividend-paying versus non-dividend-paying stocks *within* each individual size and book-to-market subgrouping, we checked the median size and book-to-market values for each group in the 16 groupings. The results, not reported here for brevity, indicate that only for the smallest firms are there significant differences between the median size of dividend-paying and non-dividend-paying firms (dividend-paying firms are significantly larger than non-dividend-paying firms). There are no significant differences in median book-to-market ratios for dividend-paying and non-dividend-paying firms across the 16 groups.

D. Size Results

As the previous table indicated that size could be an issue, we estimated the Fama-MacBeth model for firms quintiled on size to capture non-linear effects of size not already captured by the Ln(Mktcap) variable in the Fama-MacBeth regression. This test also allows us to control for the size issues raised by Christie (1990). As indicated in Table 11, we find that the coefficients for the DIV dummy variable for advancing and declining markets are significantly different from zero at the 1% level for all quintiles. In

each case, dividend paying stocks perform better than non-dividend-paying stocks by more in declining markets than they do in advancing markets, and these differences are statistically significant at the 1% level. Results in the Appendix note that similar results are found using a modified Fama-French (1993) model discussed in the robustness section, indicating that these results hold under alternative adjustments for risk. (See Appendix Table 4.)

E. Alternative Definitions of Advancing and Declining Markets

To determine if the definition of advancing and declining markets affects the results, we run two tests. The first, not shown here, redefines an advancing market month as a month with a positive excess return, i.e., a month in which the S&P 500 return exceeds the risk-free rate for that month, and a declining market month as a month with a negative excess return, similar to the definitions used in Ang and Chen (2002). Again, we find that dividend-paying firms outperform non-dividend-paying firms by more in declining markets than in advancing markets.[15]

Another way to define advancing and declining markets is to use the concept of bull and bear markets. The bull and bear markets used in this analysis are as defined by Ned Davis Research. Overall, there are eight separate bull markets and eight bear markets in our sample, resulting in 259 months classified as bull months, and 113 months classified as bear months. Table 12 examines the univariate and modified Fama-MacBeth tests for bull and bear markets. The results support the results reported previously, that dividend-paying stocks outperform non-dividend-paying stocks by more in declining markets than in advancing markets. (We find similar results using a modified Fama-French model as shown in Appendix Table 5.) Collectively, these results indicate that it is not the definition of advancing and declining markets that is driving these results.

[15] For brevity, these results are not reported but available from the authors on request.

F. Exchange listing

To make sure we are not picking up just differences between markets, we separate firms based on their primary market listing (Nasdaq or NYSE-Amex) and examine the modified Fama-MacBeth model for dividend-paying and non-dividend-paying firms on each market separately. Results in Panel A and Panel B of Table 13 indicate that exchange listings do not impact our results. Panel A shows that for NYSE-Amex stocks, the coefficient on the DIV variable for declining markets (0.5380) is larger than the coefficient the DIV variable for advancing markets (0.5341) and this difference is significant at the 1% level, indicating that NYSE dividend-paying firms outperform non-dividend paying firms by more in declining markets than in advancing markets. Panel B shows similar results for Nasdaq stocks. These results indicate that for both NYSE-Amex and Nasdaq firms, dividend-paying stocks outperform non-dividend-paying stocks in declining markets and these results are not dependant on the market on which the stock is listed.

Thus, neither Nasdaq nor NYSE-Amex firms are primarily driving the results. As a final check, we examine only the dividend-paying firms on both NYSE/Amex and Nasdaq and create a new dummy variable (NYSE) to indicate whether the stock is listed on the NYSE and examine the results in declining and advancing markets. We find no significant difference in the NYSE coefficients for across declining and advancing markets when examining dividend-paying stocks across markets, indicating similar responses across both markets to overall market movements. (Similar results for a modified Fama-French model may be found in Appendix Table 6.)

G. Expected Future Volatility

An alternative explanation of our results is that it is not the declining market to which investors are reacting, but to the increased uncertainty in the market. If declining and advancing markets are just a proxy for expected future volatility, the responses for dividend paying firms and non-dividend paying firms should vary with high and low volatility markets as they did for declining and advancing markets. However, volatility is a symmetric variable; our suggested explanations of prospect theory and the credible

communications theory suggest asymmetric effects based on direction. Therefore, if our suggested explanations are correct, we should not see any effect of segmentation on volatility as it does not consider the direction of the market asymmetrically.

We therefore test whether the overall volatility perceived in the market could be driving our results. We estimate market sentiment using the Chicago Board Options Exchange Volatility Index (VIX). For our sample period, this data is available only from 1986 onward. This index represents the implied volatility of an at-the-money option on the S&P 100 Index with 22 trading days to expiration. For each month we calculate the change in the VIX measure. We then compare this change to the average change for the previous year. If the monthly change is greater than the past year's average change, then we consider that in that month, the market is estimating that future volatility will be high. If the monthly change is less than or equal to the past year's average change, then we consider that the market is estimating that the future will have low volatility.

Panel A of Table 14 examines our modified Fama-MacBeth regressions from 1986 to 2000, but this time dividing the sample by low and high volatility markets in place of declining and advancing markets.[16] The coefficients on the DIV dummy indicate that dividend paying stocks outperform non-dividend paying stocks in both low expected future volatility markets (0.3298) and in markets with high expected future volatility (0.3110) at the 1% level; however, this difference of 0.0188 is not significant at even the 5% level. Segmenting months by expectations of future volatility does not provide the same results as segmenting months by declining or advancing markets. (Similar results may be found in Appendix Table 7 for a modified Fama-French model.) Therefore, our results for advancing and declining markets is capturing something beyond just expectations of future volatility, but instead the asymmetric effects suggested by prospect theory and the credible communication explanations.

[16] In addition to estimating this regression using data from 1986 through 2000, we also rerun this model by excluding data from 1986 and 1987. Connolly, Stivers, and Sun (2004) note that in October 1987, the VIX peaked at around 150%. In the subsample from 1988 through 2000, the VIX peak is about 50%. To verify that this particular time period is not skewing the results, we re-estimate the regression excluding data from 1986 and 1987; all results are similar to the results in Panel A, indicating that these results are not due to issues related to the October 1987 market crash and rebound.

VI. Conclusion

Although anecdotal and academic research claims that dividends are disappearing, we find evidence that investors are concerned with firms' dividend policies. Our results indicate that dividend-paying stocks outperform non-dividend-paying stocks by approximately 1.50% more in declining markets than in advancing markets. Further, these results hold when we control for risk (using CAPM, the Fama-French (1993) three-factor model, and Fama-MacBeth (1973) style regressions), different definitions of advancing and declining markets, size, liquidity, industry groups, and for different subperiods. We also find that these differences increase the more the market decreases. We also show that investors respond asymmetrically to dividend increases, decreases, and no changes, based on the state of the market, and that dividend-paying firms outperform non-dividend paying firms even in the months with no dividend payments.

Results indicate a larger difference between the non-dividend-paying and low-dividend-yield portfolios than among the dividend-paying portfolios themselves. This finding is more support of the credible communication hypothesis than either the prospect theory or the tax clientele/dividend capture hypothesis. Also, consistent with the credible communication hypothesis, we find that small dividend-paying firms and more-liquid dividend-paying firms outperform their non-dividend-paying counterparts in declining markets.

Similar to Baker and Wurgler (2004), we conclude shareholders are not indifferent to dividend policy. Instead, they value dividends most highly in the states of the world and for those stocks for which the communication provides the most value, i.e., in declining markets. Our overall results are consistent with either prospect theory or a credible communication explanation. However, further examination finds that shareholders value dividends in a manner consistent with the value they place on communication. Risky firms that most need to communicate credibly are thus differentially rewarded, particularly during times of economic uncertainty. Overall, shareholders in dividend-paying stocks do better than investors in non-dividend-paying stocks, particularly in market downturns.

References

Aharony, Joseph, and Itzhak Swary, 1980, "Quarterly Dividends and Earnings Announcements and Stockholders' Returns: An Empirical Analysis", *Journal of Finance* 35, 1-12.

Allen, Franklin, and Roni Michaely, 2004, "Payout Policy," *North-Holland Handbook of Economics*, G. Constantinides, M. Harris, and R. Stulz, Elsevier, forthcoming.

Amihud, Yakov, and Haim Mendelson, 1986, "Asset Pricing and the Bid-Ask Spread," *Journal of Financial Economics* 17, 223-249.

Ang, Andrew, and Joseph Chen, 2002, "Asymmetric Correlations in Equity Portfolios", *Journal of Financial Economics* 63, 443-494.

Ang, Andrew, Joseph Chen, and Yuhang Xing, 2004, "Downside Risk", working paper, Columbia University.

Baker, Malcolm, and Jeff Wurgler, 2004, "A Catering Theory of Dividends," *Journal of Finance* 59, 1125-1165.

Bhattacharya, Sudipto, 1979, "Imperfect Information, Dividend Policy, and 'The Bird in the Hand' Fallacy," *Bell Journal of Economics* 10, 259-270.

Black, Fisher, and Myron Scholes, 1974, "The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns," *Journal of Financial Economics* 1, 1-22.

Blume, Marshall. E., 1980, "Stock Returns and Dividend Yields: Some More Evidence," *Review of Economics and Statistics* 62, 567-577.

Brennan, Michael, 1970, "Taxes, Market Valuation, and Financial Policy," *National Tax Journal* 23, 417-429.

Brennan, Michael J., and Avanidhar Subrahmanyam, 1996, "Market microstructure and asset pricing: On the compensation for illiquidity in stock returns", *Journal of Financial Economics* 41, 441-464.

Brennan, Michael J., and Anjan Thakor, 1990, "Shareholder Preferences and Dividend Policy," *Journal of Finance* 45, 993-1019.

Brown, Stephen, and Jerold Warner, 1980, "Measuring Security Price Performance," *Journal of Financial Economics* 8, 205-258.

Brown, Stephen, and Jerold Warner, 1985, "Using Daily Stock Returns: The Case of Event Studies," *Journal of Financial Economics* 14, 3-32.

Christie, William, 1990, "Dividend Yield and Expected Returns: The zero-dividend puzzle," *Journal of Financial Economics* 28, 95-125.

Chordia, Tarun, Richard Roll, and Avanidhar Subrahmanyam, 2001, "Market Liquidity and Trading Activity", *Journal of Finance* 56, 501-530.

Connolly, Robert, Chris Stivers, and Licheng Sun, 2004, "Stock Market Uncertainty and the Stock-Bond Return Relation" forthcoming, *The Journal of Financial and Quantitative Analysis.*

Cook, Douglas O., Laurie Krigman, and J. Chris Leach, 2004, "On the Timing and Execution of Open Market Repurchases," *The Review of Financial Studies* 17 (2), 463-498.

Cooper, Michael, Roberto C. Gutierrez, Jr., and William Marcum, 2005, "On the Predictability of Stock Returns in Real Time," *Journal of Business* 78, 469-499

Datar, Vinay, Narayan Naik, and Robert Radcliffe, 1998, "Liquidity and stock returns: An alternative test", *Journal of Financial Markets* 1, 203-219.

DeAngelo, Harry, Linda DeAngelo, and Douglas J. Skinner, 2004, "Are Dividends Disappearing? Dividend Concentration and the Consolidation of Earnings," *Journal of Financial Economics* 72 (3), 425-456.

DeBondt, W., and R. Thaler, 1987, "Further Evidence on Investor Overreaction and Stock Market Seasonality," *Journal of Finance* 42, 557-581.

Easterbrook, Frank H., 1984, "Two Agency-Cost Explanations of Dividends," *American Economic Review* 74, 650-659.

Fama, Eugene F., 1998, "Market Efficiency, Long-Term Returns, and Behavioral Finance," *Journal of Financial Economics* 49 (3), 283-306.

Fama, Eugene F., and Kenneth R. French, 1992, "The Cross-Section of Expected Returns," *Journal of Finance* 47, 427-465

Fama, Eugene F., and Kenneth R. French, 1993, "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics* 33, 3-56.

Fama, Eugene F., and Kenneth R. French, 1996, "Multifactor Explanations of Asset Pricing Anomalies," *Journal of Finance* 51, 55-84.

Fama, Eugene F., and James D. MacBeth, 1973, "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy* 81, 607-636.

Frankel, Jeffrey A., and Kenneth A. Froot, 1990, "Chartists, Fundamentalists, and Trading in the Foreign Exchange Market", *American Economic Review* 80 (2), 181-185.

Goldstein, Michael A., and Edward F. Nelling, 1999, "REIT Return Behavior In Advancing and Declining Stock Markets," *Real Estate Finance* 15, 68-77.

Grinblatt, Mark, and Bing Han, 2005, "Prospect theory, mental accounting, and momentum," *Journal of Financial Economics* 78, 311-340.

Grullon, Gustavo, and Roni Michaely, 2002, "Dividends, Share Repurchases and the Substitution Hypothesis," *Journal of Finance* 57, 1649-1684.

Grullon, Gustavo, Roni Michaely, and Bhaskaran Swaminathan, 2002, "Are Dividend Changes a Sign of Firm Maturity?" *Journal of Business* 75, 387-424.

Harris, Milton, and Artur Raviv, 1993, "Differences of Opinion make a Horse Race," *Review of Financial Studies* 6, 473-506.

Hong, Yongmiao, Jun Tu, and Guofu Zhou, 2003, "Asymmetric Correlation of Stock Returns: Statistical Tests and Economic Evaluation," working paper, Washington University.

Howe, K., J. He, and G. Kao, 1992, "One-Time Cash Flow Announcements and Free Cash-Flow Theory: Share Repurchases and Special Dividends," *Journal of Finance* 47, 1963-1975

Jagannathan, Ravi, and Yong Wang, "Lazy Investors, Discretionary Consumption, and the Cross Section of Stock Returns," working paper, Northwestern University.

Jensen, Michael, 1986, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review* 76, 323-329.

John, Kose, and J. Williams, 1985, "Dividends, Dilution, and Taxes: A Signaling Equilibrium," *Journal of Finance* 40, 1053-1070.

Kahneman, D., and A. Tversky, 1979, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica*, 263-291.

Kalay, Avner, and Roni Michaely, 2000, "Dividends and Taxes: A Re-examination," *Financial Management* 29, 55-75.

Kandel, Eugene, and Neil D. Pearson, "Differential interpretation of public signals and trade in speculative markets", *Journal of Political Economy* 103, 831-872.

Lintner, John, 1965, "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets," *Review of Economics and Statistics* 47, 13-37.

Litzenberger, R., and K. Ramaswamy, 1979, "The Effects of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence," *Journal of Financial Economics* 7, 163-195.

Litzenberger, R., and K. Ramaswamy, 1980, "Dividends, Short Selling Restrictions, Tax Induced Investor Clientele and Market Equilibrium," *Journal of Finance* 35, 469-482.

Litzenberger, R., and K. Ramaswamy, 1982, "The Effects of Dividends on Common Stock Prices: Tax Effects or Information Effects," *Journal of Finance* 37, 429-443.

Markowitz, Harold, 1952, "The Utility of Wealth," *Journal of Political* Economy 60, 151-158.

Markowitz, Harold, 1959, *Portfolio Selection*. Yale University Press (New Haven).

Miller, Merton, and Kevin Rock, 1985, "Dividend Policy under Asymmetric Information," *Journal of Finance* 40, 1031-1051.

Piqueria, Natalia, 2004, "Trading Activity, Illiquidity Costs and Stock Returns", working paper, Princeton University.

Pettit, R. Richardson, 1972, "Dividend Announcements, Security Performance, and Capital Market Efficiency", *Journal of Finance* 27, 993- 1007.

Shalen, Catherine, 1993, "Volume, Volatility and the Dispersion of Beliefs," *Review of Financial Studies* 6, 405-434.

Sharpe, William F., 1964, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk, "*Journal of Finance* 19, 425-442.

Shefrin, Hersh, and Meir Statman, 1984, "Explaining Investor Preference for Cash Dividends," *Journal of Financial Economics* 13, 53-282.

Shefrin, Hersh, and Meir Statman, 1985, "The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence," *Journal of Finance* 40, 777-790.

Thaler, Richard, 1980, "Toward a Positive Theory of Consumer Choice," *Journal of Economic Behavior and Organization* 1, 39-60.

Thaler, Richard, and Hersh Shefrin, 1981, "An Economic Theory of Self-Control," *Journal of Political Economy* 89, 392-406.

Van Ness, Robert A., Bonnie F. Van Ness, and Richard S. Warr, 2004, "NASDAQ Trading and Trading Costs: 1993-2002", *Financial Review,* forthcoming.

Varian, Hal, 1985, "Divergence of Opinion in Complete Markets: A Note," *Journal of Finance* 40, 309-317.

Table 1
Summary Statistics

Summary statistics for 21,488 NYSE, Amex, and Nasdaq listed firms for the 372 calendar months from January 1970 to December 2000. There are 2,161,688 firm months of which 1,392,422 are non-dividend-paying firm months and 769,266 are dividend-paying firm months. Advancing markets are the 217 months in our sample when the S&P 500 has a positive return; declining markets are the 155 months in my sample when the S&P 500 does not have a positive return. All data are from CRSP. Monthly Volume is the average monthly trading volume, Price is the average end-of-the-month price per share, Market Cap is the average end-of-the-month market capitalization, Dividend per share is the average quarterly dividend per share, Beta is the average end-of-the-month CRSP estimate of beta, and Number of Obs is the total number of firm-months. The number of volume observations is less than other variables since some months no volume was reported on CRSP. Instead of throwing out that entire observation for the month when no volume was reported, we simply ignored those observations when computing the average monthly volume.

	Non-Dividend Paying	Dividend Paying
Panel A: All Markets (372 months)		
Monthly Volume	18,147	20,476
Price	$11.21	$25.30
Market Cap.	$288,530,530	$1,321,917,830
Dividend per share	None	$0.078
Beta	0.733	0.716
Number of Obs.	1,392,422	769,266
Panel B: Advancing markets (217 months)		
Monthly Volume	17,736	21,340
Price	$11.49	$26.20
Market Cap.	286,760,200	1,411,436,090
Dividend per share	None	$0.080
Beta	0.725	0.708
Number of Obs.	846,677	473,542
Panel C: Declining markets (155 months)		
Monthly Volume	18,833	19,183
Price	$10.80	$24.06
Market Cap.	291,171,220	1,175,653,940
Dividend per share	None	$0.076
Beta	0.744	0.728
Number of Obs.	545,745	295,724

Table 2
Average Return for Both Advancing and Declining markets

The table reports the average monthly return to dividend- and non-dividend-paying stocks for the 372 calendar months from January 1970 to December 2000. Advancing markets are the 217 months in our sample when the S&P 500 has a positive return; declining markets are the 155 months in our sample when the S&P 500 does not have a positive return. Difference of Differences is the difference of non-dividend-paying stocks minus dividend-paying stocks in advancing markets minus the difference of non-dividend-paying stocks minus dividend-paying stocks in declining markets.

	Non-Dividend-paying	Dividend-paying	Difference[a]
Panel A: All years			
All Markets	1.01%	1.38%	-0.37%^{**,w,k}
Advancing markets	3.72%	3.88%	-0.16%^{w,k}
Declining markets	-3.03%	-2.13%	-0.90%^{**,w,k}
Difference Of Differences			*0.74%***
Panel B: Subperiods			
1970s			
All Markets	1.07%	1.22%	-0.15%^{**,w,k}
Advancing markets	6.09%	5.26%	0.83%^{**,w,k}
Declining markets	-3.02%	-2.55%	-0.47%^{**,w,k}
Difference Of Differences			*1.30%***
1980s			
All Markets	0.84%	1.68%	-0.84%^{**,w,k}
Advancing markets	3.61%	4.26%	-0.65%^{**,w,k}
Declining markets	-3.26%	-2.03%	-1.23%^{**,w,k}
Difference Of Differences			*0.58%***
1990s			
All Markets	1.10%	1.23%	-0.13%^{**,w,k}
Advancing markets	3.19%	2.76%	0.43%^{**,w,k}
Declining markets	-2.87%	-1.70%	-1.17%^{*,w,k}
Difference Of Differences			*1.60%***

[a] Significance was tested using only parametric tests for the Differences of Differences.
* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level
^{w} indicates the Wilcoxon sign-rank test is significant at the 1% level
^{k} indicates the Kruskal-Wallis test is significant at the 1% level

Table 3
Fama-French Adjusted Returns with Advancing and Declining Separately

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take one of the following two forms:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + \varepsilon_{it}$$

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, and HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks for month t, and DOWN is an indicator variable that equals one if the market is declining and zero if the market is advancing. The data are from CRSP and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

	Intercept	RMRF	SMB	HML	DOWN	Adjusted R^2
Panel A: Traditional Fama-French						
Non-Dividend-paying	-0.0016	1.0054**	1.1211**	0.2761**		89.4%
Dividend-paying	0.0002	0.9680**	0.4163**	0.5122**		92.3%
Differences			**	**		
Panel B: Fama-French for Advancing markets only						
Non-Dividend-paying	0.0025	0.9648**	1.1271**	0.4243**		76.2%
Dividend-paying	0.0020	0.9461**	0.3696**	0.4961**		82.5%
Differences			**			
Panel C: Fama-French for Declining markets only						
Non-Dividend-paying	-0.0084**	0.8751**	0.9382**	-0.0158		86.7%
Dividend-paying	-0.0003	0.9388**	0.4912**	0.5242**		89.5%
Differences	**		**	**		
Panel D: Modified Fama-French for Advancing/Declining Markets						
Non-Dividend-paying	0.0042*	0.9210**	1.0580**	0.2641**	-0.0134**	89.8%
Dividend-paying	0.0015	0.9497**	0.4027**	0.5096**	-0.0029	92.3%
Differences			**	**	*-0.0105***	

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Table 4
Fama-MacBeth Returns

This table contains the average coefficients of monthly ordinary least squares of dividend-paying and non-dividend-paying firms. We run the regressions cross-sectionally each month for every firm, as in Fama and MacBeth (1972). The coefficients reported below are the average coefficients for each group. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. The data are from CRSP and Compustat and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less. Large Positive Movements are when the SP500 return for that month is in excess of +5%; Small Positive Movements are when the SP500 return for that month is between 0% and +5%. Small Negative Movements are when the SP500 declined and its return for that month is between 0% and -5%; Large Negative Movements are when the SP500 declined by more than 5%.

	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Panel A: Overall					
Declining markets	-0.0201	0.7803	4.1177	0.3817	0.3759
Advancing markets	0.0049	0.7563	4.3412	0.5219	0.3608
Differences	**	**	**	**	*0.0151***
Panel B: Size of Movement					
Advancing Markets					
Large Positive Movements	-0.0010	0.7359**	4.3892**	-0.5250**	0.3523**
Small Positive Movements	0.0017*	0.7534**	4.3038**	-0.5220**	0.3621**
Differences	**	**	**		*-0.0098***
Declining Markets					
Small Negative Movements	-0.0180*	0.7635**	4.1200**	-0.3940**	0.3725**
Large Negative Movements	-0.0510**	0.7956**	3.9685**	-0.2580**	0.3832**
Differences	**	**	**	**	*-0.0107***

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Table 5
Cumulative Abnormal Returns for Dividend Changes in Advancing and Declining markets

We calculate the cumulative abnormal returns (CARs) for the five days (-2, 2) around the announcement (day 0) of a dividend change. We use a modified market model to estimate abnormal returns

$$AR_i = r_i - r_m$$

where r_i is the return on firm i and r_m is the equally weighted market index return. We eliminate the usual estimation period due to the high probability of previous dividend changes for firms during the estimation period. We report the CARs for 18,537 increases, 4,595 decreases, and 93,537 no changes announced between 1970 to 2000 for 3,294 firms. Our reports cover all markets; advancing markets, when the S&P 500 index return is greater than zero; and declining markets, when the S&P 500 index return is zero or less.

Panel A: All Markets

Dividend Increase	Dividend Decrease	No Change
1.013%**	-0.360%**	0.102%**

Panel B: Advancing and Declining markets

	Advancing markets	Declining markets	Difference
Dividend Increase	0.857%**	1.206%**	-0.349%*,w,k
Dividend Decrease	-0.375%**	-0.324%*	-0.051%w,k
No Change	0.046%	0.170%**	-0.124%**,w,k

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level
w indicates the Wilcoxon sign-rank test is significant at the 1% level
k indicates the Kruskal-Wallis test is significant at the 1% level

Table 6
Average Return for Advancing and Declining Markets
for Dividend-Paying Stocks During Months with no Dividend Payments

Panel A of this table reports the average monthly return to dividend- and non-dividend-paying stocks from 1970 to 2000. We include dividend-paying stocks only for months during which a quarterly dividend-paying stock does *not* pay a dividend. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less. Overall, there are 217 advancing market months and 155 declining market months in our sample. Panel B reports the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. The data are from CRSP and Compustat and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

Panel A – Returns

	Advancing markets			Declining markets			
	Non-Dividend-paying	Dividend-paying	*Difference*	Non-Dividend-paying	Dividend-paying	*Difference*	*Diff. of Diff.*[a]
All Stocks	3.72%	3.72%	*0.00%*	-3.03%	-2.36%	*-0.67%*[**, w,k]	*0.67%*[**]

Panel B – Fama-MacBeth Regressions

	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Declining markets	-0.0260[**]	0.7877[**]	3.9576[**]	-0.3990[**]	0.2961[**]
Advancing markets	-0.0020	0.7640[**]	4.1697[**]	-0.5480[**]	0.2795[**]
Differences	[**]	[**]	[**]	[**]	*0.0166*[**]

[a] Significance was only tested using parametric tests for the Differences of Differences.
[*] indicates t-test is significant at the 5% level
[**] indicates t-test is significant at the 1% level
[w] indicates the Wilcoxon sign-rank test is significant at the 1% level
[k] indicates the Kruskal-Wallis test is significant at the 1% level

Table 7
Fama-MacBeth Adjusted Returns Partitioned by Dividend Yield

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. The data are from CRSP and Compustat and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less. We divide dividend-paying firms into quintiles based on their dividend yield.

	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Panel A: Dividend Yield Comparisons in Advancing Markets					
Lowest dividend yield	0.0185**	0.9622**	5.5944**	-0.7150**	
2	0.0160**	0.7965**	5.4397**	-0.4800**	
3	0.0151**	0.7204**	5.4950**	-0.3660**	
4	0.0122**	0.6356**	5.5198**	-0.2300**	
Highest dividend yield	0.0074**	0.4755**	5.3235**	-0.1960**	
F-test of all five	**	**	**	**	
F-test of highest 4	**				
Panel B: Dividend Yield Comparisons in Declining Markets					
Lowest dividend yield	-0.0180**	0.9946**	5.3208**	-0.6150**	
2	-0.0080	0.8236**	5.1451**	-0.3380**	
3	-0.0070	0.7423**	5.1565**	-0.2070**	
4	-0.0090*	0.6536**	5.1963****	-0.0690	
Highest dividend yield	-0.0070*	0.4953**	5.0322	-0.0460	
F-test of all five	**	**	**	**	
F-test of highest 4	not significant				
Panel C: Comparison of non-dividend-paying and lowest yielding stocks					
Declining markets	-0.0290**	0.8228**	3.6559**	-0.4720**	0.1074**
Advancing markets	-0.0060	0.7956**	3.8686**	-0.6140**	0.1013**
Differences	**	**	**	**	*0.0061***

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Table 8
Fama-MacBeth Risk Adjusted Returns by Volume Groups

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms by volume groups. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. The data are from CRSP and Compustat and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

		Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Lowest	Declining markets	-0.0270**	0.5759**	2.6611**	-0.0490	0.3443**
	Advancing markets	-0.0007	0.4926**	2.8156**	-0.1820*	0.3416**
	Differences	**	**	**	**	*0.0027*
2	Declining markets	-0.0360**	0.5942**	3.4279**	-0.2780*	0.3286**
	Advancing markets	-0.0050	0.5648**	3.5502**	-0.4080**	0.3094**
	Differences	**	**	**	**	*0.0192***
3	Declining markets	-0.0260**	0.7551**	4.0856**	-0.4560**	0.3437**
	Advancing markets	0.0161**	0.7240**	4.1758**	-0.5830**	0.3209**
	Differences	**	**	**	**	*0.0228***
4	Declining markets	-0.0160	0.9347**	4.8894**	-0.6010**	0.3800**
	Advancing markets	0.0374**	0.9110**	4.9729**	-0.7300**	0.3538**
	Differences	**	**	**	**	*0.0262***
Highest	Declining markets	0.0005	1.1425**	6.5395**	-0.7180**	0.5028**
	Advancing markets	0.0674**	1.1371**	6.6207**	-0.8320**	0.4771**
	Differences	**	*	**	**	*0.0257***

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Table 9
Fama-MacBeth Risk Adjusted Returns by Industry

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms by industry. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. The data are from CRSP and Compustat and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less. Industry is determined by SIC code as reported by Compustat.

2-digit SIC	Industry	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
00-09	*Agricultural, Forestry, Fishing*					
	Declining markets	-0.0090**	0.5747**	3.6842**	-0.3650	0.3409**
	Advancing markets	-0.0070**	0.5894**	4.0236**	-0.5840*	0.3612**
	Differences			**	**	*-0.0203*
	0.4% of total observations					
10-19	*Mining, Oil, Construction*					
	Declining markets	-0.0190*	0.7331**	3.8092**	-0.4070**	0.2227**
	Advancing markets	-0.0020*	0.6791**	3.9662**	-0.4650**	0.2167**
	Differences	**	**	**	**	*0.0060**
	6.5% of total observations					
20-29	*Food, Tobacco, Lumbar, Petroleum*					
	Declining markets	-0.0210	0.7905**	4.3721*	-0.4360**	0.4739**
	Advancing markets	0.0027*	0.7815**	4.6507**	-0.6390**	0.4418**
	Differences	**	**	**	**	*0.0321**
	15.3% of total observations					

30-39	*Manufacturing and Equipment*					
	Declining markets	-0.0240**	0.8960**	3.7195**	-0.3770*	0.3134**
	Advancing markets	0.0004**	0.8736**	4.0240**	-0.5340**	0.2885**
	Differences	**	**	**	**	*0.0249***
	28.5% of total observations					
40-49	*Transportation, Communication, Utilities*					
	Declining markets	-0.0200**	0.6820**	5.1140**	-0.3880**	0.5059**
	Advancing markets	0.0015**	0.6578**	5.3511**	-0.5180*	0.4949**
	Differences	**	**	**	**	*0.0110***
	8.6% of total observations					
50-59	*Wholesale and Retail Trade*					
	Declining markets	-0.0210**	0.7850**	3.7315**	-0.2090**	0.3462**
	Advancing markets	0.0026**	0.7688**	4.0373**	-0.3900**	0.3158**
	Differences	**	**	**	**	*0.0304***
	10.8% of total observations					
60-69	*Finance, Insurance, Real Estate*					
	Declining markets	-0.0140*	0.5852**	4.5517**	-0.2030**	0.5845**
	Advancing markets	0.0050**	0.5610**	4.6928**	-0.3140**	0.5922**
	Differences	**	**	**	**	*-0.0077***
	16.6% of total observations					
70-79	*Hotel, Repair, Recreation*					
	Declining markets	-0.0430**	0.8766**	3.9638**	-0.7040**	0.1660**
	Advancing markets	-0.0100**	0.8547**	4.1249**	-0.8650**	0.1514**
	Differences	**	**	**	**	*0.0146***
	9.4% of total observations					
80-89	*Health, Legal, Education*					
	Declining markets	-0.0370**	0.7940**	3.5546**	-0.6400**	0.1335**
	Advancing markets	-0.0140**	0.7803**	3.7565**	-0.7780**	0.1184**
	Differences	**	*	**	**	*0.0151***
	3.2% of total observations					

90-99	*Public Administration*					
	Declining markets	-0.0300**	0.7865**	2.9777**	-0.2890**	0.1474**
	Advancing markets	-0.0200**	0.7624**	3.1991**	-0.4750*	0.1453**
	Differences	**		**	**	*0.0021*
	0.7% of total observations					

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Table 10
Excess Returns for 16 Portfolios Based on Size and BE/ME

This table contains the excess returns for portfolios of dividend-paying and non-dividend-paying firms based on size and book-to-market of equity. Excess return, $r_{it} - r_{Ft}$, is the return for a firm in month t minus the three-month Treasury-bill return in month t. The data are from CRSP and Compustat and run from January 1980 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

	Book – to – market quartiles											
	Low			2			3			High		
Size	Non-Div.	Div.	Difference	Non-Div.	Div.	Difference	Non-Div.	Div.	Difference	Non-Div.	Div.	Difference
Panel A: All Markets												
Small	2.14%	2.29%	-0.15%^{w,k}	0.54%	1.43%	-0.89%^{**,w,k}	-0.20%	0.72%	-0.92%^{**,w,k}	-2.00%	-0.90%	-1.10%^{**,w,k}
2	3.48	2.01	1.47^{**,w,k}	1.33	1.23	0.10	0.26	0.42	-0.16^{w,k}	-1.20	-1.30	0.10
3	3.92	1.85	2.07^{**,w,k}	1.38	1.11	0.27	0.23	0.29	-0.06	-0.80	-1.20	0.40
Large	3.86	1.84	2.02^{**,w,k}	1.31	1.16	0.15	0.69	0.34	0.35^{w,k}	-0.40	-0.70	0.30
Panel B: Advancing markets												
Small	4.64	4.21	0.43^{**,w,k}	2.64	2.93	-0.29^{**,w,k}	1.71%	1.88%	-0.17^{w,k}	-0.16	0.59	-0.75^{**,w,k}
2	6.51	4.14	2.37^{**,w,k}	3.93	3.03	0.90^{**,w,k}	2.89%	2.23%	0.66^{**,w,k}	2.28	1.37	0.91^{**,w,k}
3	6.87	4.17	2.70^{**,w,k}	3.90	3.08	0.82^{**,w,k}	2.68%	2.43%	0.25	2.03	1.77	0.26
Large	7.15	4.11	3.04^{**,w,k}	3.74	3.36	0.38	2.60%	2.61%	-0.01	2.43	2.57	-0.14
Panel C: Declining markets												
Small	-2.28	-1.14	-1.14^{**,w,k}	-3.25	-1.29	-1.96^{**,w,k}	-3.69%	-1.42%	-2.27^{**,w,k}	-5.05	-3.37	-1.68^{**,w,k}
2	-2.25	-1.82	-0.43^{*,w,k}	-3.31	-2.02	-1.29^{**,w,k}	-4.36%	-2.57%	-1.79^{**,w,k}	-6.93	-5.30	-1.63^{**,w,k}
3	-1.98	-2.29	0.31	-2.98	-2.46	-0.52^{*,w,k}	-3.85%	-3.37%	-0.48	-5.45	-5.66	0.21
Large	-1.89	-2.39	0.50*	-2.79	-2.80	0.01	-2.11%	-3.50%	1.39^{**,w,k}	-4.76	-5.47	0.71
Panel D: Differences of Differences (Advancing – Declining)[a]												
			1.57**			*1.67***			*2.10***			*0.93***
			2.80**			*2.19***			*2.45***			*2.54***
			2.39**			*1.34***			*0.73**			*0.05*
			2.54**			*0.37*			*-1.40***			*-0.85*

[a] Significance was only tested using parametric tests for the Differences of Differences.
* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level
^{w} indicates the Wilcoxon sign-rank test is significant at the 1% level
^{k} indicates the Kruskal-Wallis test is significant at the 1% level

Table 11
Fama-MacBeth Risk Adjusted Returns by Size Groups

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms by size groups. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. The data are from CRSP and Compustat and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

		Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Smallest	Declining markets	-0.0350**	0.5180**	1.3759**	0.0096	0.0666**
	Advancing markets	-0.0180**	0.4936**	1.5579**	-0.1640*	0.0578**
	Differences	**	**	**	**	*0.0088***
2	Declining markets	-0.0260**	0.6534**	2.8108**	-0.2530**	0.2146**
	Advancing markets	-0.0100*	0.6226**	3.0318**	-0.4210**	0.2023**
	Differences	**	**	**	**	*0.0123***
3	Declining markets	-0.0130	0.7859**	3.8698**	-0.4090**	0.3478**
	Advancing markets	-0.0140*	0.7615**	4.1053**	-0.5620**	0.3240**
	Differences	*	**	**	**	*0.0238***
4	Declining markets	-0.0190**	0.8905**	5.0304**	-0.5200**	0.5172**
	Advancing markets	0.0165**	0.8691**	5.2636**	-0.6720**	0.4950**
	Differences	**	**	**	**	*0.0222***
Largest	Declining markets	-0.0120**	0.9951**	6.9612**	-0.6730**	0.7284**
	Advancing markets	0.0310**	0.9923**	7.2084**	0.7920**	0.7182**
	Differences	**		**	**	*0.0102***

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Table 12
Returns for both Bull and Bear Markets

Panel A of this table reports the average monthly return to dividend- and non-dividend-paying stocks in bull and bear markets from 1970 to 2000. Bull and bear markets are as defined by Ned Davis Research. Overall, there are 259 bull months and 113 bear months in our sample. We report average monthly returns for all stocks and for firms classified by their CRSP beta deciles. Panel B reports the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, β is the firm's beta measured for the prior year for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. The data are from CRSP and Compustat and run from January 1970 to December 2000.

Panel A: Univariate Results

Advancing markets			Declining markets			
Non-Dividend-paying	Dividend-paying	*Difference*	Non-Dividend-paying	Dividend-paying	*Difference*	*Difference of differences*[a]
2.09%	2.23%	*-0.14%*[**, w,k]	-2.37%	-0.53%	*-1.84%*[w, k]	*1.70%*[**]

Panel B: Fama-MacBeth Regressions

	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Declining markets	-0.0320[**]	0.8668[**]	3.8078[**]	-0.1680[**]	0.4213[**]
Advancing markets	-0.0020	0.7353[**]	4.3893[**]	-0.5610[**]	0.3502[**]
Differences	[**]	[**]	[**]	[**]	*0.0711*[**]

[a] Significance was only tested using parametric tests for the Differences of Differences.
[*] indicates t-test is significant at the 5% level
[**] indicates t-test is significant at the 1% level
[w] indicates the Wilcoxon sign-rank test is significant at the 1% level
[k] indicates the Kruskal-Wallis test is significant at the 1% level

Table 13
Fama-MacBeth Risk Adjusted Returns Controlling for NYSE and Nasdaq

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms by exchange listing, either NYSE or Nasdaq. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. In Panel C we compare the dividend paying firms listed on the NYSE/Amex versus the NASDAQ.

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{NYSE}_t + \varepsilon_{it}$$

Therefore, the variable NYSE is an indicator variable that equals one if the firm is listed on the NYSE/Amex and zero if listed on the NASDAQ. The data are from CRSP and Compustat and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Panel A: NYSE/AMEX Stocks					
Declining markets	-0.0200**	0.8977**	4.9194**	-0.2990**	0.5380**
Advancing markets	0.0078*	0.8734**	5.2358**	-0.4600**	0.5341**
Differences	**	**	**	**	*0.0039***
Panel B: NASDAQ Stocks					
Declining markets	-0.0270**	0.6674**	3.3524**	-0.4580**	0.2215**
Advancing markets	-0.0100**	0.6511**	3.5466**	-0.5910**	0.2061**
Differences	**	**	**	**	*0.0154***
	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	NYSE
Panel C: Dividend-paying NYSE/AMEX vs. Dividend-paying NASDAQ Stocks					
Declining markets	-0.0100**	0.7443**	5.1844**	-0.2550**	0.6969**
Advancing markets	0.0127**	0.7201**	5.4871**	-0.3980**	0.6965**
Differences	**	**	**	**	*0.0004*

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Table 14
Fama-MacBeth Risk Adjusted Returns Controlling for Volatility

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + \gamma_{iT}\beta_t + \mu_{iT}\text{Ln(Mktcap)}_t + \eta_{iT}\text{Ln(BVEquity)}_t + \delta_{iT}\text{DIV}_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on a stock in month t minus the three-month Treasury-bill return for month t, Ln(Mktcap) is the natural log of the firm's market capitalization for month t, Ln(BVEquity) is the natural log of the firm's book value of equity for month t, and DIV is an indicator variable that equals one if the firm pays a dividend in month t and zero if the firms does not pay a dividend in month t. We partition the market into high and low volatility markets. The data are from CRSP, Compustat, and CBOE and run from January 1986 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

	Intercept	β	Ln(Mktcap)	Ln(BVEquity)	DIV
Low Volatility Markets	-0.0070	0.6857**	4.6040**	-0.6550**	0.3298**
High Volatility Markets	-0.0170**	0.6255**	4.8030**	-0.6160**	0.3110**
Differences	**	**	**	**	*0.0188*

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Appendix
Table 1 – Fama-French
Average Return for Advancing and Declining Markets
for Dividend-Paying Stocks During Months with no Dividend Payments

Panel A of this table reports the average monthly return to dividend- and non-dividend-paying stocks from 1970 to 2000. We include dividend-paying stocks only for months during which a quarterly dividend-paying stock does *not* pay a dividend. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less. Overall, there are 217 advancing market months and 155 declining market months in our sample. We report average monthly returns for all stocks and for firms classified by their CRSP beta deciles. Panel B reports the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks for month t, and DOWN is an indicator variable that equals one if the market is a bear market and zero if the market is a bull market. The data are from CRSP and run from January 1970 to December 2000.

Panel A – Returns

	Advancing markets			Declining markets			
	Non-Dividend-paying	Dividend-paying	Difference	Non-Dividend-paying	Dividend-paying	Difference	Difference of Differences[a]
All Stocks	3.72%	3.72%	0.00%	-3.03%	-2.36%	-0.67%[**, w,k]	0.67%[**]

Panel B – Fama-French Regressions

	Intercept	RMRF	SMB	HML	DOWN	Adjusted R^2
Non-Dividend-paying	0.0042[*]	0.9210[**]	1.0580[**]	0.2641[**]	-0.0134[**]	89.8%
Dividend-paying	-0.0008	0.9527[**]	0.4036[**]	0.5161[**]	-0.0028	92.1%
Differences	*		**	**	**	

[a] Significance was only tested using parametric tests for the Differences of Differences.
[*] indicates t-test is significant at the 5% level
[**] indicates t-test is significant at the 1% level
[w] indicates the Wilcoxon sign-rank test is significant at the 1% level
[k] indicates the Kruskal-Wallis test is significant at the 1% level

Appendix
Table 2 – Fama- French
Fama-French Risk Adjusted Returns Partitioned by Dividend Yield

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks for month t, and DOWN is an indicator variable that equals one if the market is declining and zero if the market is advancing. The data are from CRSP and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less. We divide dividend-paying firms into quintiles based on their dividend yield.

	Intercept	RMRF	SMB	HML	DOWN	Adjusted R^2
Panel A: Dividend Yield Comparisons						
Lowest dividend yield	0.0092**	1.1117**	0.4625**	0.2911**	-0.0067*	89.7%
2	0.0028*	1.0520**	0.4504**	0.5183**	-0.0034	89.9%
3	-0.0001	0.9885**	0.4352**	0.5839**	-0.0013	90.7%
4	-0.0020	0.8990**	0.3864**	0.5982**	-0.0021	90.6%
Highest dividend yield	-0.0025*	0.6985**	0.2804**	0.5568**	-0.0008	85.0%
Differences	**	**	**	**		
Panel B: Comparison of non-dividend-paying and lowest yielding stocks						
Non-Dividend-paying	0.0042*	0.9210**	1.0580**	0.2641**	-0.0134**	89.8%
Lowest dividend yield	0.0092**	1.1117**	0.4625**	0.2911**	-0.0067*	89.7%
Differences		**	**		*	

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Appendix
Table 3 – Fama-French
Fama-French Risk Adjusted Returns by Volume Groups

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms by volume groups. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks for month t, and DOWN is an indicator variable that equals one if the market is declining and zero if the market is advancing. The data are from CRSP and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

		Intercept	RMRF	SMB	HML	DOWN	Adjusted R^2
Lowest	Non-Dividend-paying	-0.0122**	0.7230**	0.8198**	0.4980**	-0.0065	74.1%
	Dividend-paying	-0.0033**	0.6731**	0.5251**	0.5123**	0.0006	82.1%
	Differences	**		**		*	
2	Non-Dividend-paying	-0.0111**	0.9953**	1.1023**	0.7269**	-0.0069	83.3%
	Dividend-paying	-0.0027**	0.9083**	0.6354**	0.6260**	0.0006	88.8%
	Differences	**	*	**	*	*	
3	Non-Dividend-paying	0.0015	1.0813**	1.1926**	0.5375**	-0.0113**	86.7%
	Dividend-paying	0.0014	1.0122**	0.5680**	0.5939**	-0.0014	90.8%
	Differences			**		**	
4	Non-Dividend-paying	0.0156**	1.1656**	1.1928**	0.2320**	-0.0151**	90.5%
	Dividend-paying	0.0047**	1.0829**	0.3790**	0.5246**	-0.0050	89.9%
	Differences	**		**	**	**	
Highest	Non-Dividend-paying	0.0312**	1.2073**	1.2567**	-0.1641**	-0.0175**	90.1%
	Dividend-paying	0.0057**	1.1313**	0.0405	0.3627**	-0.0063**	91.6%
	Differences	**		**	**	*	

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Appendix
Table 4 – Fama-French
Fama-French Risk Adjusted Returns by Size Groups

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms by size groups. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks for month t, and DOWN is an indicator variable that equals one if the market is declining and zero if the market is advancing. The data are from CRSP and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

		Intercept	RMRF	SMB	HML	DOWN	Adjusted R^2
Smallest	Non-Dividend-paying	-0.0096**	0.6461**	1.1193**	0.4095**	-0.0240**	69.3%
	Dividend-paying	-0.0109**	0.6010**	0.6876**	0.5743**	-0.0015	65.7%
	Differences			**	*	**	
2	Non-Dividend-paying	0.0078**	0.9399**	1.2054**	0.4450**	-0.0171**	85.0%
	Dividend-paying	-0.0026	0.7617**	0.7201**	0.6514**	-0.0032	82.9%
	Differences	**	**	**	**	**	
3	Non-Dividend-paying	0.0109**	1.0892**	1.0730**	0.2592**	-0.0103**	91.3%
	Dividend-paying	-0.0001	0.8883**	0.6572**	0.6250**	-0.0023	89.5%
	Differences	**	**	**	**	*	
4	Non-Dividend-paying	0.0131**	1.1076**	0.8658**	0.0073	-0.0058**	95.9%
	Dividend-paying	0.0021	0.9671**	0.5221**	0.5448**	-0.0021	90.3%
	Differences	**	**	**	**		
Largest	Non-Dividend-paying	0.0126**	1.0226**	0.5355**	-0.1857**	0.0025	90.8%
	Dividend-paying	0.0044**	1.0440**	0.0295**	0.3804**	-0.0040	91.6%
	Differences	**		**	**		

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Appendix
Table 5 – Fama-French
Returns for both Bull and Bear Markets

Panel A of this table reports the average monthly return to dividend- and non-dividend-paying stocks in bull and bear markets from 1970 to 2000. Bull and bear markets are as defined by Ned Davis Research. Overall, there are 259 bull months and 113 bear months in our sample. We report average monthly returns for all stocks and for firms classified by their CRSP beta deciles. Panel B reports the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks for month t, and DOWN is an indicator variable that equals one if the market is a bear market and zero if the market is a bull market. The data are from CRSP and run from January 1970 to December 2000.

Panel A: Univariate Results

Advancing markets			Declining markets			
Non-Dividend-paying	Dividend-paying	Difference	Non-Dividend-paying	Dividend-paying	Difference	Difference of differences[a]
2.09%	2.23%	-0.14%$^{**, w,k}$	-2.37%	-0.53%	-1.84%$^{,w, k}$	1.70%**

Panel B: Fama-French Regressions

	Intercept	RMRF	SMB	HML	DOWN	Adjusted R^2
Non-Dividend-paying	0.0000	0.9885**	1.1225**	0.2808**	-0.0051	89.5%
Dividend-paying	0.0008	0.9623**	0.4168**	0.5138**	-0.0017	92.3%
Differences			**	**	*	

[a] Significance was only tested using parametric tests for the Differences of Differences.
* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level
^{w} indicates the Wilcoxon sign-rank test is significant at the 1% level
^{k} indicates the Kruskal-Wallis test is significant at the 1% level

Appendix
Table 6 – Fama-French
Fama-French Risk Adjusted Returns Controlling for NYSE and Nasdaq

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms by exchange listing, either NYSE or Nasdaq. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks listed on the NYSE/Amex (Nasdaq) exchange in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, HML is the difference in the returns of a value-weighed portfolio of high book-to-market stocks and low book-to-market stocks for month t, and DOWN is an indicator variable that equals one if the market is declining and zero if the market is advancing. The data are from CRSP and run from January 1970 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

	Intercept	RMRF	SMB	HML	DOWN	AdjustedR^2
Panel A: NYSE/AMEX Stocks						
Non-Dividend-paying	-0.0003	1.1219**	0.9474**	0.5791**	-0.0054**	89.9%
Dividend-paying	0.0009	1.0232**	0.3490**	0.5051**	-0.0028	92.1%
Differences		**	**		*	
Panel B: NASDAQ Stocks						
Non-Dividend-paying	0.0070**	0.7804**	1.1430**	0.0709	-0.0192**	85.3%
Dividend-paying	0.0023	0.7965**	0.5419**	0.5279**	-0.0047	84.5%
Differences	**		**	**	**	
Panel C: Dividend-paying NYSE/AMEX vs. Dividend-paying NASDAQ Stocks						
NYSE/AMEX	0.0009	1.0232**	0.3490**	0.5051**	-0.0028	92.1%
NASDAQ	0.0023	0.7965**	0.5419**	0.5279**	-0.0047	84.5%
Differences		**	**			

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level

Appendix
Table 7 – Fama-French
Fama-French Risk Adjusted Returns Controlling for Volatility

This table contains the coefficients of ordinary least squares across equally weighted portfolios of dividend-paying and non-dividend-paying firms. The regressions take the form:

$$r_{it} - r_{Ft} = \alpha_{iT} + b_{iT}RMRF_t + s_{iT}SMB_t + h_{iT}HML_t + d_{iT}DOWN_t + v_{iT}VOL_t + \varepsilon_{it}$$

where $r_{it} - r_{Ft}$ is the return on an equally weighted portfolio of either dividend or non-dividend-paying stocks in month t minus the three-month Treasury-bill return in month t, RMRF is the excess return on a value-weighted aggregate market proxy for month t, SMB is the difference in the returns of a value-weighted portfolio of small stocks and large stocks for month t, HML is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks for month t, DOWN is an indicator variable that equals one if the market is declining and zero if the market is advancing, and VOL is an indicator variable that equals one if the market has high volatility and zero if the market has low volatility. The data are from CRSP and the CBOE and run from January 1986 to December 2000. Advancing markets are when the S&P 500 index return is greater than zero and declining markets are when the S&P 500 index return is zero or less.

	Intercept	RMRF	SMB	HML	DOWN	VOL	Adjusted R^2
Panel A: Including 1986 and 1987 data							
Non-Dividend-paying	0.0088**	0.8159**	0.8162**	0.1731**	-0.0222**	-0.0024	86.9%
Dividend-paying	-0.0022	0.9057**	0.2974**	0.6364**	-0.0027	-0.0045	90.5%
Differences	**		**	**	**		
Panel B: Excluding 1986 and 1987 data							
Non-Dividend-paying	0.0112**	0.7498**	0.7706**	0.1501*	-0.0277**	-0.0011	84.8%
Dividend-paying	-0.0013	0.8632**	0.2773**	0.6497**	-0.0045	-0.0006	88.2%
Differences	**		**	**	**		

* indicates t-test is significant at the 5% level
** indicates t-test is significant at the 1% level