Interpreting “Good” and “Bad” News Signals: The Effects of Dividend Initiations on Stock Price Returns

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Introduction

Nearly fifty years have passed since John Lintner examined corporate dividend decisions and policies. Since then a wealth of literature has emerged in an attempt to explain dividend policy and its effect on capital markets. The phrase "the dividend phenomenon" often has been used to describe this effect, and real world occurrences of this phenomenon can be found throughout history. For example, Carol Loomis tells the story of General Public Utilities:

> In 1968 its management decided to reduce its cash dividend to avoid a stock issue. Despite the company's assurances, it encountered considerable opposition. Individual shareholders advised the president to see a psychiatrist, institutional holders threatened to sell their stock, the share price fell nearly 10%, and eventually GPU capitulated. (Loomis, qtd. in Brealy and Myers 376)

Despite anecdotal evidence such as the case of General Public Utilities, much debate remains in the academic realm about the role, if any, the dividend phenomenon plays on firm valuation.

Miller and Modigliani (1961) were the first to confront the issue of dividend relevance. The authors demonstrated that firm valuation was independent of dividend policy when using the assumption of perfect capital markets. There have been many exceptions to Miller and Modigliani's conclusions. Theoretical approaches by Lintner (1956), Bhattacharya (1979), and John and Williams (1985), for instance, suggested that corporate managers designed dividend policies to reveal earnings prospects to investors.

The ability of dividends to disseminate information to the market has been empirically tested to answer two main questions: Do unanticipated changes in dividends cause share prices to change in either direction? Do dividend changes predict firms' future earnings?

In general, empirical work has supported the signaling theory approach to the market behavior surrounding dividend announcements. Pettit (1972) determined that the market reacts significantly to dividend announcements when firms reduce dividends or when dividends substantially increase. In an attempt to quantify the dividend effect, Asquith and Mullins (1983) explored the impact of dividends on stockholders' wealth. Their results revealed a large, positive abnormal return following dividend initiations, supporting the view that dividends convey unique, valuable information to investors. There are of course contrasting conclusions about the market reaction to dividend changes. Watts (1973), for example, contended that any information contained in dividends is trivial, because the cost of deciphering the dividend signal outweighs the possible wealth effect resulting from a stock price increase.

The research concerning the reliability of the dividend signal is highly inconclusive. Healy and Palepu (1988) show that firms' earnings tend to increase after dividends are initiated and tend to drop when dividends are omitted. In a recent study Arnott and Asness (2003) showed that low dividend payout ratios historically preceded low earnings growth. This confirmed the notion that managers possess private information that leads them to pay out large shares of earnings when they are optimistic that no future dividend cuts will be necessary. Watts (1973) conceded that earnings did tend to rise after dividend announcements, but that the actual magnitude of the future earnings conveyed by unexpected dividend changes was very small. Moreover, Benartzi et al. (1997) found little evidence in support of the theory that dividend changes reflected firms' prospects of future earnings. Their conclusion, similar to Lintner's findings, suggested that dividend changes signaled something about either current earnings or perhaps previous years' earnings.

A relatively new topic of discussion in the dividend literature has been geared toward discerning the underlying causes of the market reaction. In other words, researchers have centered their analyses on the factors that explain stock price changes resulting from dividend increases, decreases, initiations, or omissions. These determinants include firm size, CEO age, project quality, reputation effects, managerial compensation, and a host of other explanatory variables.

The primary objective for this study is twofold: to examine the stock price change following a dividend announcement and to explore the causes behind the market reaction to dividend initiations. This study largely follows the work of Jin (2000) and similar theorists who have attempted to explain the stock market's reaction to dividend initiations using cross-sectional regressions. As an extension of the existing empirical work, the predictability of abnormal returns is examined. To this end, the logit model is implemented to determine the probability of a positive market reaction and, combined with the results from the cross-sectional regressions, the expected value from a dividend initiation is predicted.

The remainder of this paper is organized as follows: Section 2 is a review of the relevant literature. Section 3 outlines the data collection process. Section 4 describes the calculations of abnormal returns. Section 5 reports the methodology and results of multiple cross-sectional regressions. Section 6 uses the logit model to determine the probability of a positive market reaction to dividend initiation announcements. Section 7 discusses the calculation of expected abnormal returns from the dividend announcement. Section 8 supplies a critique of the models. Section 9 is the concluding remarks and suggestions for further research.

2. Literature Review

2.1 Measuring Abnormal Returns

Empirical studies looking at measuring abnormal returns that are a result of dividend announcements begin with a very important proposition. This proposition is that the announcements of dividend changes cause similar changes in share prices. Pettit (1972) provided one of the earliest validations of this widely accepted proposition. His study focused on the efficient market hypothesis[1] and examined this theory by testing the speed and accuracy with which market prices adjusted to dividend announcements. As a corollary, his investigation analyzed the possibility that changes in dividends contained informational content. Pettit found that the market is efficient in its use of the information provided by dividend announcements, evidenced by significant price changes during his specified announcement period. Additionally, Pettit's study suggested that dividends supply substantially more information to the market over-and-above the effect of concurrent earnings announcements.

Although Pettit provided some compelling evidence for the informational content of dividends, his conclusions met significant dispute, primarily from Watts (1976). The two researchers produced a series of articles criticizing the validity of each other's conclusions and how each arrived at different results. The main dispute between Petit and Watts was on the issue of adequate identification and control of the information conveyed by earnings (Aharony and Swary, 1980). Generalizing to the whole body of empirical work on dividends, Asquith and Mullins (1983) contended that the disparate findings among researchers stemmed from three main sources: (*i*) inadequate identification and control of other simultaneous sources of information; (*ii)* the lack of isolation and control for investors' expectations; and (*iii*) the

[1] The efficient market hypothesis states that stock prices incorporate and reflect all relevant, widely available information. The theory also implies that no investor can "beat the market" on a consistent basis.

inability to relate the wealth effect to the magnitude of dividends. Thus, subsequent researchers have attempted to ameliorate these problems of variable misspecification and improper methodology.

Aharony and Swary (1980) took a significant step toward resolving the confounding influence of earnings announcements on dividend announcements. To this end, they conducted a study designed to ascertain whether quarterly dividend changes provided information beyond that of quarterly earnings numbers. Their analysis focused on dividend announcement dates that differed from earnings announcement dates by at least 11 days. The authors also used daily stock price data to allow explicit identification and control of contemporaneous information. They reported a small, but significant effect from dividend announcements that was separate from the impact of information from earnings announcements. The authors found a significant average excess return of about 1% over the 2-day announcement period when reviewing dividend increases and when reviewing dividend decreases, found negative abnormal returns of about 3% over the 2-day period. Their results also indicated that there was no leakage of information, such as information provided by earnings numbers prior to the announcement. In other words, dividends appeared to signal unique, valuable information to the market. Their study also supported Pettit's (1972) semi-strong form of the efficient capital market hypothesis.

Asquith and Mullins (1983) improved on the existing empirical work, as discussed above. These authors eliminated the problem of investor expectations by focusing their analysis on dividend initiating firms,[1] which provided a clearer view of the true impact of dividends on shareholder wealth. They also controlled for contemporaneous earnings announcements by

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[1] The selection criteria used by the authors limited their sample only to firms in which the dividend was the first in their history or the resumption of a dividend after a 10-year suspension.

identifying other information releases within ±10 days of the dividend initiation, so as not to confound the dividend announcement effect.

Asquith and Mullins reported large and significant results over the two-day announcement period. They cited excess returns of 4.7% for the subset of firms with no contemporaneous announcements, while the subset of firms with concurrent earnings announcements realized an excess return of only 2.5%. Because earning numbers appear to negate the impact of the dividend announcement, these results indicated the importance of separating earnings information from dividend information. In light of this relationship, Asquith and Mullins suggested that dividend and earnings announcements were partial substitutes for conveying information to the market.

2.2 Theoretical Models

2.2.1 Signaling and Information Content Theory

In a perfectly informed market, all participants (managers, bankers, shareholders and others) have the same information about a firm. However, if one group has superior information about the firm’s current situation and future prospects, an information asymmetry exists. There is a general consensus between the academic and financial communities that managers possess superior information about their firms relative to other interested parties. When this type of information asymmetry exists, managers may be compelled to use dividends as signals to convey to investors the favorable future prospects of their firm.

Much of the theoretical and empirical work on the dividend phenomenon stems from the pioneering study of Miller and Modigliani (1961). These researchers are responsible for the much scrutinized “dividend irrelevance” conclusion – a conclusion based on several carefully defined assumptions regarding the state of the world. Specifically, the authors' analysis assumed that there were no taxes, transaction costs, asymmetric information, or other market imperfections. Under their perfect capital market assumption, Miller and Modigliani argued that the level of a firm's dividend payout should have no effect on the value of its shares of stock. They also maintained that the value of the firm's shares was the present value of the stream of future cash flows from current assets and future growth opportunities. This assumption held as long as the securities sold to finance any incremental current dividends were fairly priced. The authors further suggested that a dividend payment was merely an exchange of current cash for future cash of equal market value. Therefore, they concluded that dividend policy was irrelevant to the firm's financing decisions, because it had no effect on firm valuation.

Although Miller and Modigliani suggested that dividends were irrelevant under the assumptions of the perfect capital market, they did concede that dividend policy could be important if firms used dividend changes to convey information not otherwise known to the market. In this view, managers might announce dividend changes in an effort to move market expectations closer to those of management's expectations about future earnings. This proposition has given rise to significant research, both theoretical and empirical, termed the "informational content of dividends."

Announcements of dividend changes, initiations, and omissions are regularly found in the financial media. The responses to such announcements are that share prices usually increase following dividend increases and initiations, while share prices usually decline following dividend cuts and omissions. However, researchers (e.g. Jin, 2000) have acknowledged that price changes do not always follow this typical pattern.

In an attempt to explain the observed market reaction from dividend announcements, economists have formulated a variety of models to analyze whether dividends can be used credibly to signal new information to the market. The driving force behind these models is that managers have private information about their firms' future prospects and then choose dividend levels that support their private information. The signal is credible if other firms, whose future prospects are not as good, cannot deceptively mimic the dividend actions of the firms with good future prospects. These theories provide a rationale for dividend changes and generate hypotheses from which empirical work can judge the observed effects of dividend announcements.

Bhattacharya (1979) created an early model of dividend signaling, in which managers signal the quality of an investment project by adhering to a specific dividend policy. The "investment project quality," measured as the expected profitability, is private information known only to managers. A key assumption of this model is that, if the payoffs from the project are not sufficient to cover the committed dividends, the firm will resort to outside financing to cover the shortfall – a move that may involve significant transaction costs. Thus, a firm with an investment project of genuinely high-quality would have lower expected transaction costs to meet its committed dividend obligations than would a firm with a low-quality project. Accordingly, it would be unprofitable for the latter firm to mimic the dividend policy of the firm having a high-quality project.

John and Williams (1985) took a significant step toward formalizing what they referred to as "signaling equilibrium." A credible signal is defined as any action that is prohibitively expensive for other firms to mimic. This is why firms without favorable information do not increase dividends. If the signal is credible, then investors will attach a higher value to the signaling firm than to the non-signaling firm. Therefore, there exists a "signaling equilibrium," because investors are able to assign different values to firms based on the content of the signal, or lack thereof.

John and Williams' analysis indicated that the effect of asymmetric information[1] was most important when a firm had incentives to establish its true market value.[2] This can be accomplished when the payment of a dividend serves as a proxy for favorable inside information. In this case managers, acting in the interests of their current shareholders, may distribute a cash dividend if it signals that "better" firms distribute larger cash dividends. The market will believe that firms with more favorable private information will choose to pay larger dividends, and as a result will react to the signal in a way that adjusts share prices accordingly. John and Williams also focused on the tax disadvantage of cash dividends. They believed higher share prices must be great enough to compensate shareholders for additional personal taxes on dividends.

2.2.2 Agency Theory

The agency theory of dividends provides an alternative explanation for the positive wealth effect resulting from dividend announcements. Agency theorists point to two major sources of agency costs that are reduced by dividends. One is that issuing a dividend eliminates the amount of free cash flow available to managers to spend on poor or wasteful investment projects. The other is that by starting a dividend program, firms will find the need to go to

[1] Information asymmetry arises when investors are unaware of the quality of a firm's investment opportunities and future cash flows, for example.

[2] For example, the benefit of establishing maximum value may occur when (1) the firm is selling shares of stock in the market, (2) current shareholders are selling their shares to raise cash for personal reasons, or (3) the firm is facing a takeover threat (Brealey and Myers, 1988).

external financing sources. The external financing source will increase the monitoring of the firm and will reduce agency conflicts between management and stockholders.

Easterbrook (1984) and Jensen (1986) provided the theoretic groundwork for much of the literature concerning the relationship between dividends and agency costs. Easterbrook suggested that dividends might be an effective tool to reduce the agency costs associated with the separation of ownership and control. He argued that dividend payments forced managers to raise funds in the financial markets more frequently than they would without a dividend program, because cash flows would not be sufficient to meet regular dividend payments. As a result, dividends subjected managers to intense monitoring by outside professionals, such as investment bankers, commercial bankers, lawyers, and public accountants. Given the frequency of this scrutiny, managers have fewer chances to follow their own interests as compared to their shareholders' interests.

Jensen argued, in the spirit of Easterbrook, that agency costs exist because shareholders cannot perfectly monitor their managers. Without perfect monitoring, managers may use excess cash for uses not in the best interest of shareholders. Under this condition, Jensen claimed that dividends, which minimize discretionary cash flow from management control, benefit shareholders by eliminating the possibility of wasteful investments.

2.3 Determinants for Abnormal Returns

John and Lang (1991) asserted that dividend effects must be conditioned upon other important variables, termed the "determinants for abnormal returns." The authors constructed a theoretical model of insider trading surrounding dividend announcements and tested the model's predictions empirically. Given the reporting requirements and regulations of insider trading, John and Lang believed that the direction and extent of insider trading could be an important device to signal with less-informed investors. If insider trading and dividends are the firm's main signaling devices, then the firm's cost-effective blend of signals will depend on the investment opportunities it faces.

One important feature of the John and Lang model was the implication that all initiations of dividends do not indicate "good news." In other words, investors' interpretation of dividend initiations was conditional on the current state of the firm's investment opportunities, which the authors suggested are revealed through the trading activity of corporate insiders. Thus, some firms' higher than expected dividend announcements would generate a positive share price response when accompanied by significant insider buying. Alternatively, higher than expected dividend announcements would result in a negative stock price response for other firms when accompanied by unusually intense insider selling.

The novelty of the John and Lang model was that it departed from the common view that dividend initiations were unambiguous signals of good news. Their model predicted a significant difference in the share-price response to dividend initiations between firms with and without prior insider selling. Their results indicated that the average announcement-day excess return for the firms with insiders purchasing shares was about 2.5% higher than that for the group with insiders selling shares. The authors also reported that the most recent insider sales seemed to be the most informative of insider trading activity for understanding share price response around dividend initiations.

Since John and Lang's assertion that the market reacts in a disparate manner to dividend initiations, numerous researchers have expanded the analysis and the number of explanatory variables for the determinants of abnormal returns. Lang and Litzenberger (1989) provided evidence that the announcement of large dividend changes was significantly affected by investment opportunities of the firm. Specifically, the announcement of a dividend increase was significantly more positive for firms that appeared to over-invest. The authors captured the nature of investment opportunities using an approximation of Tobin's Q ratio.[1] This ratio supplied a proxy for the level of investment for the firm.

Lang and Litzenberger found that the average abnormal returns at the announcement of dividends was more than three times larger for firms with average Q ratios of less than 1.0 as compared to firms with average Q ratios greater than 1.0. They also showed an inverse relationship between the Tobin Q ratio and the dividend change announcement, implying that the dividend change was differentially interpreted by the market based on firms' investment opportunities.

A study by Lippert et al. (2000) examined the link between executive compensation and stock price performance. These authors' hypothesis was that the abnormal returns following dividend increases would be negatively related to pay-performance sensitivity (PPS), the extent to which management's compensation was tied to the performance of the firm. One important control variable used by these authors was the market-to-book asset ratio (MTBA). This ratio served as a proxy for project quality. High MTBA ratios indicated that management created value-added projects in the past or expects growth opportunities in the future. Termed the "reputation effect" by Lippert et al., market participants view dividend increases by firms with high MTBA ratios as credible signals, resulting in a more pronounced price response.

Lippert et al. employed numerous empirical models designed to examine the relationship between PPS and the share-price response to dividend increases. Their models controlled for the

[1] Tobin's Q ratio is calculated as the market value of installed capital divided by the replacement cost of installed capital. An average Q ratio of less than 1.0 implies a high likelihood of overinvestment, whereas a Q ratio of greater than 1.0 signifies a firm that has undertaken the value-maximizing level of investment.

effects of project quality, the size of the dividend increase, and regulation. Regression analysis validated the authors' primary theoretical prediction that the price response to dividend increases declines with PPS. With this response largely concentrated in firms with low MTBA ratios, these conclusions were consistent with both the agency cost and over-optimistic bias literature on the credibility of dividend signals. Thus, pay-performance sensitivity appears to be a substitute for dividends as a tool for reducing agency costs.

Mikhail et al. (2001) suggested that share price reactions to dividend changes were associated with firms' earnings quality. The authors defined earnings quality as the extent to which a firm's past earnings were associated with its future operating cash flows. Their primary theoretical prediction was that positive abnormal returns following dividend increases should be negatively related to a firm's earnings quality. Mikhail et al. found that as a firm's earnings quality increased, the market reaction to dividend increases reduced by approximately 34%. This strongly suggested that the information in a firm's earnings for future cash flows moderated the market reaction to dividend increases.

Jin (2000) explored the fundamental motivation for the market's disparate reaction to dividend initiations by quantifying the differences between firms with positive or negative abnormal returns. Jin's research was motivated by his observation of the substantial heterogeneity in stock market reaction to dividend initiations. He observed that 30 to 40 percent of dividend initiating firms realized a negative abnormal return. Apparently, the market perceived dividend announcements as positive, value-increasing events in some cases and negative, value-decreasing events in others. In order to test that such a dichotomy truly existed, Jin set out to examine empirically the firm-specific characteristics contributing to the credibility of the dividend announcement.

Jin utilized an extended version of the market model[1] to determine the firms' two-day cumulative abnormal return (CAR) surrounding the initiation announcement date, in a manner similar to previously employed empirical methodology. This regression allowed him to separate the sample into two groups based on the market reaction – a value-increasing group and a value-decreasing group –with the intent to judge the firm-specific differences between the two groups. His regression produced a group of 102 firms with positive returns averaging 6.12% and a group of 55 firms with negative returns averaging 2.88%.

Having divided his sample into two groups based on the market's assessment of the dividend initiation, Jin utilized cross-sectional regressions to examine the relationship between the observed announcement reaction and several proxies for the credibility of the announcement. These proxies included firm size, earnings volatility, institutional holdings, board ownership, Tobin's Q ratio, dividend yield, pre-announcement CAR, and earnings change. The regression results indicated that the two groups were significantly different with respect to firm size (extent of publicly available information), earnings volatility (predictability of firm performance), institutional holdings (extent of monitoring) and earnings change (market anticipation). These results were consistent with Jin's theoretical predictions. Thus, his study provided evidence that supports the notion that firm-specific credibility affects the market's reaction to dividend announcements.

3. Data and Methodology

The initial data set for this study consists of NYSE, AMEX, and NASDAQ firms listed in the Center for Research in Securities Prices (CRSP) monthly file that paid an initial cash

[1] $AR_{kt} = R_{kt} - (\_{k} + \_{k}R_{mt} + \_{2k}R_{ind,t})$, where R_{kt} is the stock return of Firm K on day *t*; R_{mt} is the return on the CRSP equally weighted index; and $R_{ind,t}$ is the return on an equally weighted portfolio of firms in the same industry as Firm K on day *t*.

dividend to common shareholders. The dividend represents either the first dividend in the firm's corporate history or the resumption of a dividend after five years without paying dividends during the period January 1975 to December 2002. Additionally, the following screens are used:

1. Each firm's dividend announcements date listed on CRSP is verified against *Moody's Annual Dividend Record*. Firms not listed in *Moody's* are omitted from the sample. In the cases where the CRSP announcement date does not correspond to the announcement date listed in *Moody's*, the *Moody's* date is used as the event day.
2. Each firm is required to have a minimum of 300 days of daily stock return data before the dividend announcement, with such data available from CRSP.
3. At least two years of quarterly data must be available from the CRSP/Compustat Merged Database. Specifically, complete information is required for earnings, earnings-per-share, total common equity, common shares outstanding, preferred stock, and deferred taxes and investment tax credits.
4. Each firm must have institutional holdings data available from *Standard & Poor's Security Owner's Stock Guide*.

The screening process yields a final sample of 302 firms.[1]

4. Test for Cumulative Abnormal Returns

This study utilizes event study methodology, developed by Asquith and Mullins (1983), to measure the common-stock valuation effects of dividend initiations. Assume that stock returns follow a single-factor market model,

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[1] Following the initial screening process, a number of outlier tests were run on the data. The residuals of twelve observations lay outside three standard deviations from the mean, and on this basis were omitted from the sample.

where R_{jt} is the return on the common stock of the *j*th firm on day *t*; R_{mt} is the return on the CRSP equally weighted market index on day *t*; and ε_{jt} is a random variable with an expected value of zero.[1]

The abnormal return for Firm J at time *t* is calculated by

$$AR_{jt} = R_{jt} - \left(\hat{\alpha}_j + \hat{\beta}_j R_{mt}\right),$$

where $\hat{\alpha}_j$ and $\hat{\beta}_j$ are the ordinary least squares estimates of α_j and β_j. The market model parameter estimation period comprises days –300 through –2 relative to the announcement date, $t = 0$.

The market reaction to Firm J's initiation announcement is defined as the day of and the day before the announcement date listed in *Moody's Annual Dividend Record.*[2] The work of Asquith and Mullins (1983) suggested this 2-day announcement period in order to capture the entire impact of the dividend initiation. Day $t = 0$ represents the day the news of the initiation was published in the *Wall Street Journal*. Day $t = -1$ is also used to capture the market reaction to the dividend, because dividends are often reported through wire services the day before the publication date. The underlying assumption behind the 2-day announcement period is that the market quickly assesses the news of the dividend initiation and reacts accordingly. Thus, the full impact of the announcement is captured by the cumulative abnormal return (CAR), calculated as

$$CAR_{jt} = \sum_{t=-1}^{0} AR_{jt} ,$$

where the CAR is for Firm J over the 2-day announcement period, $t = -1$ to $t = 0$.

[1] The disturbance terms satisfy the OLS assumptions of constant variance, uncorrelated with the market index or other stock returns on day *t*, and zero autocorrelation.

[2] In this study, news of the dividend initiation is verified against *Moody's Annual Dividend Record.* Although prior empirical work has used the *Wall Street Journal* as the source of verification, the announcement date indicated by *Moody's* corresponds to the publication date listed in the *Wall Street Journal*.

Table 1 **Mean Cumulative Abnormal Returns for 302 Sample Firms Surrounding the Dividend Announcement Date**

Days	N	Mean CAR	Positive: Negative	Z	SCS Z	GS Z
(-20,-2)	302	0.22%	161:141	0.544	0.676	2.812*
(-1,0)	302	1.93%	202:100	8.727**	8.156**	7.552**
(+1,+20)	302	-0.27%	145:157	-0.356	-0.444	0.962

The symbols * and ** denote statistical significance at the 1% and 0.1% levels, respectively, using a 2-tail test.

Tests of Significance[1]**:** The Patell Z test (Z) is a standardized abnormal return approach, which estimates a separate standard error for each security-event and assumes cross-sectional independence. The standardized cross-sectional test (SCS Z), introduced by Boehmer et al. (1991), is an extension of the Patell test. The standardized cross-sectional test compensates for a possible variance increase on the announcement dates by performing a cross-sectional variance adjustment. The generalized sign test (GS Z) is a nonparametric test that adjusts for the fraction of positive abnormal returns in the estimation period instead of assuming 0.5.

Table 1 reports the abnormal stock price reactions for 20 days centered on the announcement day 0. The mean CAR is positive for the event windows -20 to -2 and -1 to 0, whereas days +1 to +20 indicate a negative mean CAR. Focusing on days -1 to 0, the event period of interest, 202 of the 302 firms in the sample (67%) have positive cumulative abnormal returns and 100 firms (33%) have negative abnormal returns. The ratio of positive to negative abnormal return firms agrees with the results found in previous studies (see Jin, 2000; Asquith and Mullins,[2] 1983). Additionally, the mean 2-day CAR of 1.93% on days -1 to 0 is close to the mean of 2.5% reported by Asquith and Mullins (1983), and is significant at the 0.1% level using both parametric and nonparametric tests. The mean CAR for the 202 firms with positive returns is 4.07% with standard deviation of 3.18, compared to the mean CAR for the 100 firms with negative returns of 2.39% with standard deviation of 1.91.

[1] Prior literature on the calculation of abnormal has primarily used one or a combination of these tests of significance. See the Eventus User's Guide for a detailed description of these tests.
[2] Asquith and Mullins (1983) report that 30% of the firms in their sample experience a negative market reaction to dividend initiations. However, the authors' attribute the negative returns to a failure of their naïve expectations model rather than an adverse market reaction to the announcement.

5. Determinants of Abnormal Returns

5.1 Theoretical Description of the Model

Prior empirical work has found that firms' stock price reactions to dividend initiations vary cross-sectionally with several firm-specific characteristics. This study largely follows the methodology of Jin (2000), utilizing independent variables that proxy for reputation effects, the firm's investment opportunity set, market anticipation, firm operating risk, dividend clienteles, intensity of monitoring, and information environment. Collectively, these variables incorporate agency, signaling, and behavioral theories of the market reaction to dividend initiations.

Market-to-Book Ratio (MTB) has been used as a proxy for abnormal returns under both the signaling and agency theory frameworks (Lippert et al., 2000). Signaling theory suggests a "reputation" effect from the MTB variable. Lippert et al. hypothesize that a high MTB ratio signals to the market that the firm has a reputation for creating high value projects, which gives the firm more credibility with investors. Signaling theory indicates a positive relationship between the price response to initiations and MTB. Agency theory predicts that stockholders of firms with poor investment opportunities will prefer a cash dividend that will reduce the amount of free cash flow available to managers, reducing potential agency problems (Lang and Litzenberger, 1989). Thus, Lippert et al. suggest MTB as a measure of project quality.[1] Agency theory predicts an inverse relationship between abnormal returns and the market-to-book ratio.

Earnings change (ECHG) is a proxy for market anticipation. Rising earnings may signal to the market that the firm has improved its operating performance, which implies that the firm is in the financial position to begin a dividend program (Jin, 2000). ECHG is expected to be inversely related to abnormal returns. However, Jin suggests that there may be "corroboration

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[1] The authors' theorize a positive relationship between project quality and MTB, because a high MTB indicates that the firm has created value in the past or is expected to have growth opportunities in the future.

effects" between earnings and the dividend initiation, which would lead to a positive association between ECHG and abnormal returns. The sign on the coefficient will therefore depend on the relative strength of market anticipation and corroboration effects.

Earnings volatility (EVOL) has been used in many studies as a proxy for firm risk. Dyl and Weigand (1998) propose a risk-information hypothesis with regards to EVOL and initiation abnormal returns. In other words, a firm's decision to initiate a dividend releases information to the market indicating increased earnings stability, and therefore a decrease in firm risk. This result follows from evidence reported by Marsh and Merton (1987), who suggest that managers will avoid making dividend decisions that will subsequently have to be reversed. Under this interpretation, the sign is expected to be negative.

Jin (2000) provides an alternative explanation of EVOL. Consistent with Dyl and Weigand, the author describes EVOL as an information-releasing mechanism. However, Jin hypothesizes that the information-releasing mechanism established by a regular dividend program will be more valuable to firms with less predictable earnings, and therefore investors are likely to react more strongly to initiations by high-risk firms than to low-risk firms. Here, the sign is expected to be positive.

Dividend yield (DIVY) has been used as a determinate for abnormal returns in several studies (e.g. Asquith and Mullins, 1983; Jin, 2000; Mikhail et al., 2001; and others). Signaling and agency theory both predict a positive relationship between DIVY and abnormal returns. Under signaling theory, a higher dividend yield indicates improved operating performance, whereas agency theory suggests that agency costs diminish when a high dividend yield results in less free cash flow available to managers. However, if a higher dividend yield implies deterioration in investment opportunities, then we should observe a negative relationship between the dividend yield and abnormal returns.

Mikhail et al. (2001) offer an alternative interpretation, using dividend yield as a proxy for clientele effects. If investors with low marginal tax rates value dividends and invest in high yield stocks, then they will react more strongly to announcements of dividends. Thus, the dividend clientele argument implies a positive relationship between DIVY and abnormal returns.

Pre-announcement CAR (PRECAR) is used as a proxy for market anticipation of the announcement (Jin, 2000). A positive pre-announcement CAR implies that the market has anticipated the dividend initiation and therefore, will be negatively related to the announcement period abnormal returns.

Percentage of stock held by institutions (INST) is used as a proxy for the intensity of institutional monitoring of the firm (Jin, 2000). Jin hypothesizes that agency costs due to the manager-stockholder conflict of interest will be smaller when a firm is closely followed by institutions. Consequently, the benefits of agency cost reduction following the initiation of a dividend program may be smaller for firms with large institutional holdings. Jin also suggests that large institutional holdings may result in greater availability of information about the firm, mitigating the role of dividends as an information-releasing mechanism. Both of these interpretations predict a negative coefficient on the institutional holdings variable.

Firm size (SIZE) is a variable commonly used to proxy for the firm's information environment (e.g. Atiase, 1985; Mikhail et al., 2001). Thus, shareholders of larger firms will have greater access to publicly available information. Bajaj and Vijh (1990), for example, provide evidence that smaller firms exhibit more pronounced reactions to corporate

Table 2 Means and Standard Deviations (in parentheses) of all Variables for the Full Sample and Two Sub-samples

Variable	Full Sample (N = 302)	Positive CAR > 0 (n = 202)	Negative CAR < 0 (n = 100)
CAR	1.93	4.07	-2.39**
	(4.15)	(3.18)	(1.91)
MTB	1.85	1.65	2.28
	(3.60)	(1.92)	(5.63)
ECHG	0.78	0.81	0.72
	(0.42)	(0.39)	(0.45)
EVOL	0.39	0.41	0.34
	(0.47)	(0.48)	(0.43)
DIVY	0.82	0.85	0.77
	(0.99)	(1.00)	(0.98)
PRECAR	0.24	-0.54	1.81*
	(10.03)	(9.63)	(10.67)
INST	22.69	23.36	21.35
	(23.81)	(24.17)	(23.11)
SIZE	11.45	11.39	11.58
	(1.85)	(1.84)	(1.86)

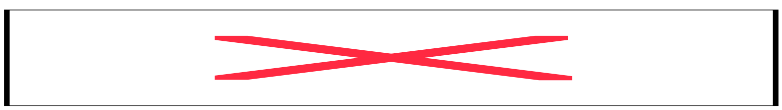
The symbols * and ** denote statistical significance at the 5% and 1% levels, respectively, using a 2-tail independent sample t-test for mean equality.

announcements than larger firms. Firm size is expected to be negatively related to the 2-day CAR.

Table 2 presents the means and standard deviations of the dependent and independent variables for the full sample, and separately for the group of firms that experience a positive market reaction at announcement (Positive) and those that have a negative CAR (Negative). An independent sample *t*-test for mean equality is used to test the statistical differences between the Positive and Negative groups. The obvious difference between the sub-samples is in the CAR, which is only to be expected given that the sub-samples were divided on the basis of CAR. For the variable PRECAR, the test rejects the null hypothesis that the means are equal at the 5% significance level. For the Negative group, the PRECAR value of 1.81% indicates that, on average, there is positive market anticipation of the initiation announcement. In contrast, the Positive group PRECAR value of -0.54% suggests that on average, the market does not appear to anticipate the dividend initiation for this subset of firms. According to Jin, if negative abnormal returns are a result of market anticipation, confounding events, or estimation errors, then the sub-samples should differ only with respect to variables that proxy for market anticipation.[1] Because the positive and negative subsets significantly differ only in the mean values of the pre-announcement CAR variable, the preliminary evidence found here suggests that market anticipation may be the underlying cause of negative abnormal returns.

5.2 Cross-Sectional Regressions and Results

Cross-sectional regressions of these variables on the 2-day announcement CAR are performed on the full sample and two sub-samples. The OLS linear regression model is defined as



where:

CAR_{jt}	=	two-day market-model cumulative abnormal return for Firm J surrounding the initiation announcement date;
MTB_{jt}	=	the market-to-book ratio, with the numerator calculated as the closing market price three-days before the announcement multiplied by outstanding common shares, and the denominator as the value of shareholders' equity less the book value of preferred stock, plus deferred taxes and investment tax credits on the balance sheet;[2]
$ECHG_{jt}$	=	dummy variable taking on a value of 1 if quarterly earnings during the period immediately preceding the announcement are an increase over earnings during the same period the previous year, and 0 otherwise;

[1] Jin runs a similar test of mean equality in his study. The results of this test on his sample of firms substantially differ from the results found here. Specifically, Jin finds statistically significant differences between the two sub-samples in the variables SIZE, EVOL, INST, DIV, and ECHG.

[2] This definition of MTB comes from www.investopedia.com, which can be interpreted as the market-to-book investment ratio. Lippert et al. (2000) define this variable as the market-to-book asset ratio. In their study, the numerator is equal to the book value of total assets less the book value of common equity plus the market value of common equity. The denominator is the book value of total assets.

$EVOL_{jt}$ = standard deviation of earnings-per-share (basic EPS excluding extra-ordinary items) over the 16 quarters prior to the dividend announcement;

$DIVY_{jt}$ = dividend yield calculated as the initial dividend amount divided by closing share price 3 days prior to the dividend announcement;

$PRECAR_{jt}$ = market-model cumulative abnormal return for Firm J from day -20 through day -2;

$INST_{jt}$ = percentage of Firm J's stock held by financial institutions (banks, investment, insurance, college endowments, and 13F money managers);

$SIZE_{jt}$ = the natural log of the market value of equity, calculated as the stock price 3-days prior to the dividend announcement multiplied by shares of common stock outstanding;

ε_{jt} = the disturbance term, assumed iid $N(0,\sigma^2)$.

Before running the final regressions, several tests are performed on the data to ensure that the assumptions of the OLS regression procedure are satisfied. First, White's general test for heteroscedasticity is run on the full sample and two subgroups. For the negative subgroup, White's test reveals the presence of heteroscedasticity at the 0.05 level. Although the full and positive samples have constant variance terms across the data, all of the results reported in Table 3 are adjusted using White's robust covariance matrix.[1] Secondly, the Durbin-Watson test for autocorrelation indicates no first-order serial correlation in the disturbances (ε_{jt}) at the 5% significance level.[2] Finally, the condition index (CI) for the independent variables is examined to detect the presence of multicollinearity (MC). Results of this analysis indicate strong MC stemming from the firm size variable in each of the regressions, with CI values ranging from

[1] Given that White's heteroscedasticity-consistent estimators of the variances are available in the statistical program Limdep, Gujarati (2003) recommends that the corrected output be compared to the regular OLS output. Because comparison of these two outputs does not materially differ, only White's robust covariance matrix is reported.
[2] For the full sample and positive and negative subgroups, the *d*-statistics are 2.05, 2.14, and 2.13, respectively.

Table 3 **Results of Cross-Sectional OLS Regressions**

Variables	Full Sample (N = 302) _ (t-statistic)	Positives (n = 203) _ (t-statistic)	Negatives (n = 100) _ (t-statistic)
Constant	5.65** (3.07)	6.50** (3.28)	-1.04 (-0.62)
MTB	-0.11** (-3.77)	-0.10 (-0.77)	-0.01 (-0.28)
ECHG	0.87 (1.44)	-0.26 (-0.045)	0.46 (1.02)
EVOL	0.77* (1.70)	0.13 (0.26)	0.61* (1.80)
DIVY	0.14 (0.50)	0.095 (0.38)	-0.18 (-0.79)
PRECAR	-0.06** (-2.57)	-0.046* (-1.94)	0.00 (-0.03)
INST	0.02 (1.61)	0.0005 (0.04)	0.01 (0.43)
SIZE	-0.44** (-2.65)	-0.19 (-1.05)	-0.16 (-1.01)
R^2	0.06	0.05	0.04
F-Statistics	2.91**	1.41	0.53

The symbols * and ** denote significance at the 10% and 1% levels, respectively. Results are corrected for heteroscedasticity using White's robust covariance matrix.

26.52 to 28.74.[1] Given the presence of MC in the data, precise estimation of the parameters may be difficult. Attempts to correct for this problem will be discussed later in Section 5.4.

Reported in Table 3 are the estimated beta-coefficients and t-statistics (in parentheses) of the OLS regressions on the full sample and subgroups. For the full sample, the coefficient on the market-to-book ratio is negative and significant at the 1% level, in accord with the agency theory hypothesis that investors of firms with high project quality, or the potential for future growth opportunities, will prefer the benefits of capital gains over cash dividend payments. In line with the market anticipation theory, pre-announcement CAR is negative and significant (p<0.01). This indicates that expectation of the dividend mitigates the impact of the announcement period abnormal returns. The variable for firm size is negative and significant (p<0.01), as expected, signifying a negative association between the current extent of publicly available information about the firm and the information-releasing benefits of the new dividend program. All of the other explanatory variables are insignificant at the 5% level, although the signs on the estimated coefficients tend to agree with theoretical predictions.

[1] CI values between 10 and 30 suggest moderate to strong multicollinearity. See Gujarati (2003) for a detailed explanation of this diagnostic tool.

Turning to the two sub-samples, the regression results indicate a poor overall performance of the model for these groups, with insignificant *F*-statistics of 1.41 and 0.53 for the positive and negative samples, respectively. For the positive sample, PRECAR is negative and significant at the 10% level, indicating weak evidence of market anticipation. The EVOL variable for the negative sample is positive and significant at the 10% level, suggesting that firms with high earnings volatility benefit most from the introduction of the dividend program. Given the presence of high standard errors and lack of statistical significance, comparisons of the regression coefficients between these groups at this point would be imprudent, and would probably result in misleading conclusions.

5.3.1 Chow Test for Structural Differences

In a similar study, Jin (2000) performs a standard Chow test to examine whether the explanatory variables in the positive CAR sub-sample statistically differ from the variables in the negative CAR sub-sample. However, there may be several problems that arise from using this procedure on the two sub-samples.[1] First, the assumption of homoscedastic error variances is violated in this sample.[2] Technically, a violation of this assumption would prohibit the use of the standard Chow test. Although the Chow test can be modified to accommodate heteroscedastic error variances,[3] interpretation of the results based on this method will still suffer from inadequate information about the source of the difference between the regressions. Despite this limitation, Jin uses the standard Chow test anyway. After obtaining a statistically significant result from this test (rejecting the null hypothesis that there is no difference between the

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[1] This assertion may be limited. Jin uses two variables (board ownership and Tobin's Q ratio) that are not examined in this study, and the MTB ratio in this study is omitted from Jin's analysis. In addition, the sample period, makeup, and size differ between the two studies. Jin does not report whether his sample satisfies the model's assumptions.
[2] The F-test rejects the null hypothesis that the variances in the two sub-samples are the same (F=2.9, p <.01).
[3] For a discussion of the Chow test under heteroscedasticity, see Greene (2000) pp. 292-293.

variables in the two sub-samples), Jin asserts that there are in fact two groups of firms with different characteristics that result in different market reactions to the initiation announcement. This conclusion, however, is misleading, because the Chow test does not provide information about *which* fundamental characteristics are different.

A far more informative method of determining structural differences in the regression model is the dummy variable alternative to the Chow test.[1] The dummy variable approach utilizes a differential intercept coefficient and differential slope coefficients on each explanatory variable, as defined by

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where D_{pos} is a dummy variable taking on a value of 1 if Firm J had a positive CAR, and 0 otherwise. Using this procedure, the source of difference, if any, can be established by running one multiple regression on the full sample.[2]

5.3.2 Results of Test for Structural Differences

The dummy variable alternative to the Chow test is performed to test the hypothesis that the independent variables in the two sub-samples are statistically different. Results of this test indicate that the differential intercept term, $\square_1$, is statistically significant at the 1% level (t=2.64, p<0.01). Additionally, all of the differential slope coefficients were found to be insignificant at the 10% level,[3] which suggests that the explanatory variables in the positive and negative subgroups affect abnormal returns similarly. Based on these results, we can conclude that the two

[1] The dummy variable alternative also assumes homoscedasticity of the variance terms. Using White's test for heteroscedasticity, the constant variance assumption is satisfied in this study (_^{2}=1.66, p<.005).
[2] For a more detailed description of the procedure see Gujarati (2003), pages 306-310.
[3] The slope coefficient on $MTB_{jt}D_{pos}$ is significant at the 15% level (t = -1.45). Because this is a borderline case, an OLS regression of CAR on the explanatory variables plus $MTB_{jt}D_{pos}$ was run. Regression results indicated that the slope coefficient on this term was not significant, and therefore results are not reported in the discussion.

Table 4 **Results of OLS Regressions – Modified for Differential Intercept and Multicollinearity**

Panel A		*Panel B*	
Variable	_-Coefficient (*t*-statistic)	Variable	_-Coefficient (*t*-statistic)
CARSIGN	6.30	CARSIGN	5.89
	(21.21)***		(18.83)***
MTB	-0.03	MTB	-0.06
	(-1.54)		(-1.87)*
ECHG	0.02	ECHG	-0.85
	(0.05)		(-2.71)***
EVOL	0.28	EVOL	0.05
	(0.94)		(0.17)
DIVY	0.002	DIVY	-0.25
	(0.01)		(-1.51)
PRECAR	-0.03	PRECAR	-0.03
	(-1.85)*		(-1.99)**
INST	0.001	INST	-0.008
	(0.14)		(-0.89)
SIZE	-0.21	DBIG	-0.99
	(-4.91)**		(-1.87)*
		DMED	-1.01
			(-2.38)***
R^2	0.55	R^2	0.53
F-Statistic	51.68***	*F*-Statistic	41.24***

The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, using a 2-tailed test.

regression lines from the sub-samples are parallel, and differ only with respect to the intercept term.

5.4 Modified Regression for Determinants of Abnormal Returns

The dummy variable test for structural differences indicates a differential intercept between the positive and negative CAR groups, rather than differences in slope coefficients as Jin reports. Consequently, a dummy variable for the direction of the market reaction, CARSIGN, is introduced into the regression model, taking on a value of 1 if the firm realized a positive CAR and 0 otherwise.[1] In other words, this dummy variable allows for the structural change between the positive and negative CAR firms in the sample. A cross-sectional regression is now run on

[1] Because the variable CARSIGN takes into account the different intercept for the two sub-samples, the constant term is omitted from the OLS regression model.

Figure 1 Observed CAR vs. OLS Point Estimate

1 32 63 94 125 156 187 218 249 280

Observation

Observations are ranked by observed CAR.

the full sample of firms to determine the explanatory power and goodness-of-fit of the independent variables on CAR.

Panel A of Table 4 reports the coefficients and *t*-statistics (in parentheses) for the OLS regression using the variable CARSIGN to allow for the differential intercept between the positive and negative CAR firms. CARSIGN is positive and highly significant, which is intuitive given that we have established that a structural dichotomy exists in the full sample. Pre-announcement CAR, as expected, is significant and negative, indicating that market anticipation has a negative impact on the announcement period abnormal returns. The coefficient on firm size is highly significant and negative, consistent with the hypothesis that smaller firms will benefit more from the information-releasing mechanism associated with starting a dividend program than larger firms. The signs on the coefficients of the other explanatory variables in the regression, although insignificant, tend to agree with their theoretical predictions. Additionally, the measure for goodness-of-fit of the model (R^2 = 0.55) far exceeds the explanatory power of the initial regression on the full sample in Table 3. The F-statistic of 51.68, which measures the overall significance of the multiple-regression, also improves dramatically in Panel A compared to the regression in Table 3. Figure 1 shows the relationship between the observed CAR and the OLS point estimate for each firm in the sample.

As previously noted in Section 5.2, one potential problem in all of the regressions run to this point has been the presence of multicollinearity (MC) in the independent variables. For the entire sample, the correlation coefficients across the independent variables range from a minimum of -0.34 to a maximum of 0.69, indicating strong MC. The source of the MC problem appears to be the SIZE variable, which is highly correlated with EVOL, DIVY, and INST, with correlation coefficients of -0.34, 0.32, and 0.69, respectively. Unfortunately, this result is only to be expected, given that larger, more established firms tend to have more stable earnings, have the financial ability to pay larger dividends, and are followed more closely by institutions.

Because multicollinearity causes OLS estimators to have large variances, which tends to lead to statistically insignificant *t* ratios, several attempts were made to mitigate the problem.[1] Panel B of Table 4 reports the most successful regression alternative, where dummy variables for the size of the firm replace the SIZE variable in Panel A. The variable DBIG takes on a value of 1 for the largest third of the firms in the sample and 0 otherwise. DMED takes on a value of 1 for the middle third of firms in the sample and 0 otherwise.

Results from Panel B suggest an improvement in the precision of the estimation of the coefficients. As is usual when correcting for multicollinearity, we see higher significance of the *t*-ratios and a lower R^2 value of the overall model fit. The coefficient of the market-to-book ratio is significant ($p<0.10$) and negative, indicating a stronger impact of the agency cost explanation

[1] A dummy variable for whether the firm had institutional holdings of its stock was introduced, replacing the INST variable (next to SIZE, INST also was correlated with several other variables, although not as severely). Furthermore, SIZE was omitted from the regression, although this method probably resulted in an omitted variable bias. In addition to including the dummy variables for SIZE, each of these alternatives was implemented on the full, positive, and negative samples in Section 5.2. None of these methods materially affected the results, and therefore are not reported.

compared to the reputation effect. As expected, the coefficient of earnings change is significant ($p<0.01$) and negative, consistent with the hypothesis that rising earnings portend the dividend initiation, which causes market anticipation. PRECAR, again, is significant ($p<0.05$) and negative, indicating an inverse relationship between market anticipation and announcement-day abnormal returns. The coefficients on the dummy variables DBIG and DMED are negative and significant ($p<0.10$ and $p<0.01$, respectively). Both yield results similar to the SIZE variable, where the market reaction to the announcement is less pronounced for larger firms that have a greater amount of publicly available information. EVOL, DIVY, and INST are all insignificant at the 10% level.

6. Determining the Probability of a Positive Market Reaction

In this section the logit model is implemented to determine the probability that a firm, given its fundamental characteristics, will realize a positive CAR surrounding the dividend initiation announcement. The logit function is derived from the logistic distribution function (LDF), defined as

[illegible],

where $Z_j = \beta_0 + \beta_1 MTB_j + \beta_2 ECHG_j + \beta_3 EVOL_j + \beta_4 DIVY_j + \beta_5 PRECAR_j + \beta_6 INST_j + \beta_7 SIZE_j + \varepsilon_j$, for Firm J. The LDF is now transformed into the logit model, defined as

$$L_j = \ln\left(\frac{P_j}{1 - P_j}\right) = Z_j,$$

where L_j is the natural log of the odds ratio, $P_j/(1- P_j)$.[1]

[1] For a more detailed discussion of the logit model and its properties, see Gujarati (2003), pp. 595-607.

Table 5 **Logit Regression Results**

Variable	_-Coefficient (*t*-statistic)	Odds	Variable	_-Coefficient (*t*-statistic)	Odds
Constant	1.94 (1.82)*	6.96	DIVY	0.11 (0.75)	1.11
MTB	-0.06 (-1.31)	0.94	PRECAR	-0.025 (-1.96)**	0.98
ECHG	0.61 (2.02)**	1.83	INST	0.02 (2.09)**	1.02
EVOL	0.41 (1.33)	1.51	SIZE	-0.19 (-1.91)**	0.83

The symbols * and ** denote significance at the 10% and 5% levels, respectively, using a 2-tailed test.
Chi-squared = 16.41 (*df*=7, p<0.05).

Logit regressions are run using the statistical program Limdep, which has a built-in routine to estimate the logit at the individual case level.[1] Because this study utilizes individual data, the parameters are estimated using the method of maximum-likelihood. Table 5 reports the estimated coefficients and associated *t*-statistics (in parentheses) of the logit regression.[2] However, a word is in order regarding how the coefficients should be interpreted. According to Gujarati (2003), each slope coefficient is a partial slope coefficient and measures the change in the estimated logit for a unit change in the value of the given regressor. Because this is not an intuitive explanation, Gujarati suggests interpreting the coefficients in terms of odds, which are obtained by taking the antilog of the slope coefficients. For instance, taking the antilog of the EVOL coefficient results in a value of 1.51. This implies that firms with volatile earnings preceding the announcement are 1.5 times as likely to have a positive market reaction to the dividend as firms with stable earnings, *ceterus paribus*.

[1] As opposed to the grouped or replicated data case. Because of its ability to run regressions on individual data and it breadth of output information, Limdep was found to be a better suited program for this estimation procedure than SPSS. See the Limdep Help Manual for a complete discussion of estimation with the logit model.
[2] The marginal effects of each slope coefficient were also tested on the positive and negative CAR firms in the sample in order to determine whether the variables in the two groups impacted the probability of a positive market reaction differently. This test did not yield materially different results between the two sub-samples and is therefore not included in the discussion.

With the exception of ECHG and INST, the signs on the partial slope coefficients are consistent with theoretical predictions. The coefficient of ECHG is positive and significant, although theory predicts that rising earnings should result in a negative CAR as a result of market anticipation. Likewise, although the agency and information-releasing hypotheses indicate an inverse relationship between institutional holdings and abnormal returns, the logit model predicts a positive and significant coefficient. The other variable that proxies for market anticipation, PRECAR, is negative and significant. This suggests that greater anticipation of the announcement reduces the likelihood of a positive CAR. Similarly, SIZE is both negative and significant, which indicates that large firms have a lower likelihood of a positive market reaction than small firms. MTB, EVOL, and DIVY are all insignificant at the 10% level.

Using the partial slope coefficients, the logit estimation procedure predicts the probability of a positive market reaction for each firm in the sample. For firms having actual positive CARs, a "successful" probability prediction is defined as one that exceeds 0.5, whereas predictions of less than 0.5 are deemed successful for firms with actual negative CARs. The results of this analysis show 192 correct positive predictions (95%) and 13 correct negative predictions (13%), for an overall success rate of 71%.

7. Calculating the Expected Value of Dividend Initiation

In this section the predictive power of the estimated OLS and logit regression models, reported in Section 5.4 and Section 6, respectively, is put to the test. The equation for the expected value of dividend initiation is as follows:

$$E(CAR) = P(+) \times [CAR(+)] + [1 - P(+)] \times [CAR(-)].$$

The term P(+)*[CAR(+)] is simply the product of the logit-estimated probability of a positive market reaction and the OLS-estimated CAR including the intercept term, CARSIGN. In other words, each firm is treated as though it realized a positive market reaction.[1] The second term, [1-P(+)]*[CAR(–)], represents the product of the logit-estimated probability of a negative market reaction and the OLS-estimated CAR omitting the intercept term, CARSIGN. For this calculation, each firm is treated as though it had a negative market reaction.

The expected CAR calculations yield overall "success" rates for the full, positive and negative samples, where a success is defined as a prediction that yields a sign on the expected CAR that corresponds to the sign on the actual (observed) CAR. A comparison of the actual and expected CARs results in 196 correct predictions for the positive CAR group (97%) and nine correct predictions for the negative CAR group (9%), for an overall model success rate of 68%. Although we see excellent results for the predictive power of the positive expected CARs, the far more enlightening and informative prediction is for the negative CAR group. For instance, a manager would be much more interested in knowing whether his decision to initiate a dividend would lead to adverse investor reactions and subsequently a plummeting stock price.

Given the low predictability of negative abnormal returns, the expected CAR observations are more closely examined in order to better understand the distribution. Table 6 lists the mean values of the explanatory variables for the nine largest positive expected CAR observations and the nine negative expected CAR observations, as well as the respective positive and negative sample means for the independent and dependent variables (in parentheses). It is immediately evident that these two groups differ materially in the mean values of the independent variables, with each mean difference significant at the 10% level, except for the

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[1] Both positive and negative CAR firms are given a value of 1 for the dummy variable CARSIGN, which in effect estimates the CAR as if the firms all had a positive abnormal return.

Table 6 Means for Largest Positive Expected CAR Cases and Smallest Negative Expected CAR Cases

Variable	Positive E(CAR) Mean	Negative E(CAR) Mean
CAR	11.96 (4.07)	-2.95*** (-2.39)
Expected CAR	3.32 (2.01)	-0.57*** (-1.60)
MTB	1.28 (1.65)	3.46* (2.28)
ECHG	1.00 (0.81)	0.56 (0.72)
EVOL	0.45 (0.41)	0.14* (0.34)
DIVY	1.51 (0.85)	0.56* (0.77)
PRECAR	-4.52 (-0.54)	11.94*** (1.81)
INST	11.00 (23.36)	29.32** (21.35)
SIZE	10.24 (11.39)	12.76*** (11.58)
Probability of CAR(+)	0.82 (0.68)	0.42*** (0.63)

The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed independent sample t-test for mean equality. The Positive E(CAR) column presents the means for nine highest expected values for the positive expected CAR calculation. The Negative E(CAR) column presents the means for the nine lowest expected values for the negative expected CAR calculation. Shown in parentheses are the respective positive and negative sample mean values for the independent and dependent variables, as previously reported in Table 2.

earnings change variable. The biggest difference between the means of the two groups exists in the variables for pre-announcement CAR, institutional holdings, size, and the probability of a positive return.[1] Although it seems intuitive that the two groups would differ on the basis of the probability of a positive return, recall that the logit model correctly predicted only 13 firms as being likely to have negative abnormal returns. In other words, it appears that the success of the expected value computation for negative abnormal returns depends crucially on the success of the logit-estimated probabilities, although other factors are important as well. Additionally, it should be noted that the differences in means between the positive and negative groups not only agree with the theoretical predictions outlined in Section 5.1, but also tend to exceed in magnitude (either less than or greater than) the appropriate mean value for each group. For example, the mean of the size variable for the negative expected CAR firms (12.76) is greater than the mean value for the full subset of negative CAR firms (11.58).

[1] The means for the groups are also significantly different with respect to the dependent variables, CAR, and Expected CAR, although these variables are necessarily different, as they provide the basis for stratifying the sample.

Although the expected value estimation procedure results in rather weak results for the negative firms in the sample, it does succeed in predicting the cases where the independent variables take on extreme values, as previously mentioned. For the observations that take on values in the independent variables that are closer to the full sample means, there appears to be a zone in the distribution where we can only interpret the sign on the expected value computation as indeterminate. The only way to get around this problem would be if the true positive and negative expected value distributions were known. If these distributions were known, then confidence intervals could be constructed, which in turn would allow for better inferences about whether observations that are "close" to zero should be interpreted as being either positive or negative. Unfortunately, confidence intervals could not be constructed for each distribution.[1]

8. Critique of the Models

The primary concern about each of the models used in this study is the possibility of omitted variable bias. Throughout each step of the process – from the OLS regression on the determinants of abnormal returns, to the logit estimation of the probability of a positive market reaction, and finally to the expected value calculation – the results have been crucially dependent on the explanatory power of the independent variables used. Although these variables are hypothesized to capture a variety of factors that influence investor behavior, the fact is, modeling behavior of any kind is a complex undertaking.

There are several possible variables that theoretically could be included in the models. One possibility is that business cycle fluctuations may have a significant impact on investor anticipation. Recall that the data set covers a very large period of time – from 1975 to 2002 –

[1] Essentially, the problem is determining the properties of the distribution resulting from taking the product of the normal distribution for CAR(+) and the logistic distribution function for P(+).

over which there have been five economic recessions and subsequent expansions. It is reasonable to assume that investor optimism, and thus anticipation, is directly related to the business cycle. As a result, we would expect greater market anticipation during business cycle upswings, whereas lower market anticipation would coincide with economic downturns. One way to control for this effect would be to include a dummy variable for the current condition of the economy, which in theory would capture general investor optimism at any given time. Therefore, firms that initiate a dividend during an economic upswing would be given greater weight than firms that initiate during a downturn.

In addition to business cycle considerations, this study may have benefited from the inclusion of key financial statement numbers and ratios. For instance, the price-to-earnings ratio (P/E) is a commonly followed indicator of a firm's earnings prospects. The P/E ratio theoretically would capture a portion of the market anticipation of the dividend announcement. Another interpretation of the P/E ratio is that investors of firms with low P/E ratios would react more favorably to a dividend initiation, because regular dividend payments would be more desirable than the capital gains prospects for a firm with low earnings potential.

Aside from the possibility of omitted variables from this study, another shortcoming in the models is the lack of control for confounding events. Asquith and Mullins (1983) assert that contemporaneous announcements, namely earnings releases, are likely to confound the dividend announcement effect. Concurrent earnings releases could be problematic to this study if the negative announcement CARs stem from the information contained in the earnings releases, rather than specific economic factors relating to that subset of firms. If this is in fact the case, then the results from the initial OLS regression run in Section 5.2, which finds no differences in the independent variables between the positive and negative sub-samples, may actually have been a symptom of confounding events. The only way to judge this assertion would be to re-screen the initial data set for concurrent earnings releases, rerun the regressions, and then compare the results with those found in this study. Unfortunately, these steps could not be taken given the time frame for this study.

9. Conclusions and Suggestions for Further Research

While previous research (Jin, 2000) has demonstrated that the observed negative market reaction for a subset of dividend initiating firms reflects an assessment by the market that initiation is a value-decreasing event due to firm specific factors, there remains further work to be done concerning the effects of these firm attributes on abnormal returns. This paper attempts to explore these firm characteristics, make forward-looking predictions, and draw conclusions concerning investor reactions to dividend initiations.

In theory, there are many variables that can affect abnormal returns surrounding dividend announcements. Essentially, the models in this study attempt to capture investor expectations and ultimately predict their behavior. Drawing on agency, signaling, and behavioral theories from previous research, the models incorporate proxies for firm reputation, investment opportunity set, operating risk, intensity of monitoring, information environment, dividend clienteles, and market anticipation.

Following the general methodology developed by Asquith and Mullins (1983), an event study was conducted to determine the 2-day abnormal returns resulting from each firm's dividend initiation announcement. This procedure essentially measured the magnitude of investors' reactions to this corporate event, controlling for normal market fluctuations during the time period. Results from these regressions indicate that for 67% of the firms in the sample, the dividend initiation was perceived by the market as a value-increasing event, in contrast to the market's negative assessment of the announcement for the remaining third of firms in the sample. Collectively, the mean cumulative abnormal return was 1.93%, consistent with prior empirical findings.

Using the estimated CAR for each firm to stratify the sample into positive and negative CAR groups, this study followed the empirical methodology of Jin (2000). An econometric model was constructed to determine whether firms' stock price reactions to dividend initiations vary with several firm-specific characteristics, and whether the characteristics for positive CAR firm affect abnormal returns differently than for negative CAR firms. The explanatory variables in this model include proxy variables for the market-to-book ratio, earnings change, earnings volatility, pre-announcement CAR, institutional holdings, and firm size. Results from the initial cross-sectional regression indicated a poor overall performance of the model when applied separately to the positive and negative CAR subgroups, evidenced by low F-statistics for overall model significance and lack of significant t-scores for nearly all of the coefficients. Consequently, no inferences or comparisons between the subgroups could be made regarding the explanatory power of the independent variables for abnormal returns.

Given the inability to make valid comparisons based on the initial regression results between the positive and negative CAR sub-samples, a dummy variable test for structural differences was implemented in order to test directly whether the independent variables in the two subgroups were statistically different. Results from this procedure indicated that the positive and negative groups differed only with respect to the intercept term, which suggested that one, pooled regression should be used instead of two separate regressions on the stratified sample.

Based on the results from the analysis of structural differences, a modified regression of determinants for abnormal returns was conducted, where a dummy variable for the direction of the market reaction was introduced to capture the differential intercept between the positive and negative CAR firms. Results of this regression showed significance in the coefficients on the pre-announcement CAR and size variables, as well as an improved overall model fit compared to the initial OLS regression.

This study departed from previous empirical work on this topic by introducing a logit model to determine the probability of a positive market reaction, based on the aforementioned explanatory variables. The signs on the partial slope coefficients tended to agree with theoretic predictions, and showed statistical significance for four out of the seven explanatory variables. Overall, the logit model was successful in predicting the market reaction in 71% of the estimated cases, with 192 correct positive CAR predictions and 13 correct negative CAR predictions.

The culmination of this study was an estimation of the expected value of a dividend initiation. The expected value model drew on the results from each of the previous models, using the estimated cumulative abnormal returns from the OLS regression and the estimated probability of positive abnormal returns from the logit regression. This procedure yielded expected abnormal return predictions for each of the 302 firms in the sample, which were then compared against the actual, or observed, CARs calculated in Section 4. Although the model predicted the correct sign for 97% of the positive CAR firms, only 9% of the negative CAR firms were successfully predicted. An in depth analysis of the nine largest positive expected CAR firms and the nine lowest negative expected CAR firms suggested that the predictive power of the model is highest when the firms take on extreme values in the independent variables. Alternatively, it appears that for firms with values of the explanatory variables close to the sample means, the results of the expected value computation become more ambiguous, as there is an indeterminate zone in the distribution.

In summary, explaining the general relationship between abnormal returns surrounding dividend announcements (i.e. investor behavior) and firm-specific characteristics is extremely difficult. Although the foundation of this study follows the theoretic framework and methodology of Jin (2000), the results of the two studies differ markedly. Specifically, Jin reports that dividend initiations, which are seemingly positive corporate events, could very well be perceived by the market as having a negative impact on the value of the company based on certain firm-specific attributes. While this paper does confirm that nearly a third of firms that initiate a dividend are met with an adverse market reaction, it does not find any evidence to suggest that the firm-specific characteristics of positive CAR firms affect abnormal returns differently than the characteristics of negative CAR firms. Rather, the two subsets of firms only appear to differ in the *level* of the values of the explanatory variables (i.e. the means of the variables for the two groups are significantly different). Given these contrasting conclusions, further research needs to be conducted in order to determine the true relationship between abnormal returns and firm-specific characteristics. Ideally, future research on this topic will also consider adding other proxies for the determinants of abnormal returns in order to better capture the complexity of investor behavior surrounding corporate announcements.

The theory behind the heterogeneous market reaction to dividend initiations may also have implications for other corporate events. These could include dividend omissions, stock repurchases, or stock splits. Determining whether there exists a differential market reaction and how the market reactions are affected by firm-specific characteristics may yield interesting insights into these important corporate events.

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