Earnings and Dividend Information Contained in Bond Rating Changes

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Abstract

We study the information contained in corporate bond rating changes relating to firms' future earnings and dividends. Consistent with previous findings, rating downgrades are associated with a negative stock price response while rating upgrades appear to be nonevents. For rating downgrades, earnings decline in the two years prior to and the year of the rating change announcement. However, contrary to expectations, earnings increase in the year after the rating review. Similarly, rating upgrades follow a period of rising earnings but do not signal any increase in future earnings. Our results also show that firms whose bonds are downgraded decrease their subsequent dividend payments while no dividend adjustments are made by upgraded firms. Expectation of a policy shift could partially explain the negative stock price response around rating downgrade announcements.

Keywords: Bond rating changes; Signaling; Earnings; Dividends.

JEL Classification: G10, G14.

1. Introduction

Bond rating agencies such as Moody's and Standard and Poor's gather and analyze public and non-public information to rate corporate bonds. Such ratings are frequently updated to reflect significant changes in a firm's financial and operating performance. In this study we examine the information content of such bond rating changes. Specifically, we test whether rating changes act as signals of future earnings and/or dividend policy adjustments, or rating changes follow earnings changes.

Early evidence by Pinches and Singleton (1978) using monthly data showed that a firm's stock price did not respond to a bond rating change. Wakeman (1984) suggested that rating agencies do not provide any economic function in re-rating bonds as they only act on publicly available information. Recent evidence, however, shows that changes in a firm's bond rating result in a significant change in stock prices (Griffin and Sanvicente, 1982; Holthausen and Leftwich, 1986; Glascock, Davidson, and Henderson, 1987; Dichev and Piotroski, 2001; Hand, Holthausen and Leftwich, 1992). In particular, stock prices decline around announcements of rating downgrades while announcement of rating upgrades are generally found to be nonevents. Ederington, Yawitz, and Roberts (1987) argue that rating changes could provide valuable information to investors, since economies of scale may exist for bond rating agencies in collecting and evaluating information. Alternatively, firms may provide rating agencies with non-public (or insider) information not readily available to outside investors.

The negative stock price response to rating downgrades could in part signal a decline in future earnings. To this end, Caton and Goh (2003) find that analysts revise their earnings estimates downward following a rating downgrade. But do firms themselves respond to such reviews by external credit rating agencies? If rating changes are indicative of changes in earnings performance, a firm may choose to make suitable adjustments to its dividend policy. Thus, a rating downgrade may subsequently lead to an appropriate adjustment to the payout ratio if management believes a period of falling earnings is likely to ensue. The vast body of empirical evidence on payout policies, however, suggests that firms tend to smooth their dividend payments and any adjustments to dividend policy, particularly a downward

revision, are infrequent and undertaken only when other possibilities are exhausted. Whether payout policy is influenced by changes to a firm's credit rating remains an empirical issue.

Since the seminal work of Modigliani and Miller (1961), researchers have extensively examined the relationship between earnings and dividend policy. Despite the obvious disadvantages to paying dividends for both investors and the firm, the role of dividends as signals of future firm performance has been modeled by several researchers (for example, John and Williams (1985) and Miller and Rock (1985)) which was empirically examined by Healy and Palepu (1988). But the signaling role of dividend changes has been contested by recent empirical evidence. Benartzi, Thaler and Womack (1997) and Nissim and Ziv (2001) document that dividend policy adjustments follow 'permanent' changes in earnings. But whether dividend changes precede or follow earnings changes, either way the evidence shows that dividend changes are associated with changes in earnings performance. Changes in bond ratings should be even more informative since meeting interest obligations is a much more binding contract than maintaining dividends. Thus, a rating change, if anything, should be a stronger signal vis-à-vis the firm's future ability to meet its debt (and dividend) obligations.

It is not clear if credit rating agencies respond to permanent changes in earnings or changes in debt ratings precede changes in earnings performance. If ratings changes follow a period of earnings change, then the information value of rating adjustments will be limited. On the other hand, if ratings changes signal changes in future earnings, these ratings reviews should provide substantial new information to the investor. Given the asymmetry in the stock price response observed for upgrades and downgrades, the information vis-à-vis earnings performance in a rating review is likely to be different for rating upgrades and downgrades. This asymmetry suggests that even if a rating downgrade is subsequent to a period of declining earnings, the rating review itself may signal that poor earnings will ensue. However, a rating upgrade after a period of rising earnings is more likely to be just a confirmation of the positive changes in earnings preceding the rating review with little or no information about future earnings changes. A firm is, therefore, more likely to respond with an adjustment to its dividend policy after a rating downgrade rather than an upgrade.

We use a methodology similar to Healy and Palepu (1988) to examine the relationship between earnings and dividends changes around bond rating changes. Consistent with previous findings (see, for example, Griffin and Sanvicente, 1982; Holthausen and Leftwich, 1986; Hand, Holthausen and Leftwich, 1992), we find a positive relationship between the direction of bond rating change and stock price response and this association is greater for rating downgrades than for rating upgrades. Further, we find a positive relationship between the stock price reaction to rating downgrade announcements and the earnings change in the year of the announcement. However, contrary to prior expectations, earnings increase in the years following the downgrade. On the other hand, a rating downgrade follows a period of declining earnings. For rating upgrades we find that earnings also increase in the year prior to and the year of upgrade announcement. However, as with rating downgrades, it does not appear that upgrades signal future earnings improvement.

We find that dividends decline in the four quarters following rating downgrades, whereas there is no discernable trend for rating upgrades. This suggests that the information contained in rating downgrades could relate to future dividend decreases and thus provides a possible explanation for the stock price reaction to the announcement of rating downgrades. However, this expectation is only partially anticipated by the market. We find that, contrary to expectation, investor reaction to subsequent changes in dividend policy does not evoke a weaker response.[1] Thus, while rating downgrades appear to signal a decline in future dividend payments, this information does not completely explain the negative abnormal returns observed at the announcement of a bond rating downgrade.

This study contributes to the previous literature in at least two ways. First, it is a direct test of the efficient market hypothesis. If information regarding future earnings or dividend changes is revealed through a bond rating change, it should be fully reflected in stock prices at the announcement of the rating change and subsequent earnings-related events should not result in any price response in the absence of new information. Second, it underpins the social role of ratings agencies, not only in alerting small

[1] Abnormal returns at dividend announcements are expected to be positively related to unexpected dividend changes (Lang and Litzenberger, 1989). In this case, returns are 'normal' relative to abnormal returns for dividend announcements not related to bond rating changes.

investors who do not have the resources to screen companies with respect to future performance, but also in performing the all important role of being an external monitor. Easterbrook (1985) suggests agency ridden managers prefer to stay clear of capital markets to dodge the scrutiny that accompanies the underwriting process, even if it means passing up on perfectly profitable investment opportunities. While it is difficult for shareholders to compel managers to be in the market (since information about the value of potential projects is not transparent), and hence be subjected to the monitoring, rating agencies perform this important role, even when insiders manage to avoid other forms of monitoring.

The remainder of the paper is organized as follows. Section 2 contains a review of previous literature relating to this paper, while information on bond rating changes and the data analyzed appear in section 3. In section 4 we describe the methodology used and present the empirical results. Section 5 concludes the paper.

2. Review of previous work

Bond ratings are widely used by the investment community and are seen as a measure of the riskiness of a bond (Kaplan and Urwitz, 1979).[2] Corporate bonds are particularly interesting because they are rated by presumably informed and skilled financial analysts (Kaplan and Urwitz, 1979).[3] The event of a bond rating change offers a powerful setting to analyze the signaling theory since the information contained in bond rating changes is usually widely disseminated (Dichev and Piotroski, 2001).

Previous work in this area has focused on the stock price reaction to changes in firms' bond ratings and generally present mixed results. Early studies such as Pinches and Singleton (1978) find that investors anticipate improved or deteriorating financial and operating conditions, well before a ratings change. They conclude that this lagged relationship meant that the information content of bond rating changes was relatively small. They also examine the difference in reaction to company-specific events and non-company-specific events and find that increases (decreases) in stock prices associated with

[2] For example, Schwendiman and Pinches (1975) find a monotonic relationship between a firm's bond rating and its common stock beta.

[3] See Hickman (1958), Pogue and Soldofsky (1969), West (1973) and Ross (1976) for more discussion on the importance of bond ratings.

ratings upgrades (downgrades) were greater for firms that had no company-specific event leading to the ratings change. Based on these findings, they conclude that the market appears to be quite efficient in processing information regarding rating changes.

In contrast to Pinches and Singleton (1978), Griffin and Sanvicente (1982) document a negative stock price reaction to the announcement of bond rating downgrades. They interpret rating downgrades as conveying information regarding firms' earnings. They also find that stock prices are affected by the placement of firms on the Standard and Poor's *Credit Watch* list.[4] Ederington, Yawitz, and Roberts (1987) offer two explanations for the stock price reaction reported by Griffin and Sanvicente (1982). Economies of scale may exist for bond rating agencies in collecting and evaluating information, and firms may provide rating agencies with non-public insider information. Subsequent research into the information content of rating changes is consistent with these explanations.

Using both Standard and Poor's, and Moody's bond rating changes, Holthausen and Leftwich (1986) find that rating downgrades are associated with negative abnormal returns in the two-day window starting on the day the rating agency makes a press release.[5] However, they do not find any evidence of abnormal returns around the announcement of rating upgrades.[6] They interpret the stock price reaction to bond rating downgrades to imply that either rating agencies provide information to capital markets through a downgrade announcement, or that a downgrade imposes costs on the affected firm.

The information content of bond rating changes was further investigated by Hsueh and Liu (1992). They examine the effect of market anticipation of a ratings change on the announcement period stock returns. Firms owned mainly by large investors can be viewed as "high-information" firms, whereas

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4 A *Credit Watch* listing highlights the potential for a near term change in the credit rating. It signals to investors that further analysis is being performed by the rating agency (Standard and Poor's, 2005).

5 Similar results are also found by Glascock, Davidson, and Henderson (1987), and Hand, Holthausen and Leftwich (1992).

6 Holthausen and Leftwich also find that significant abnormal returns are associated with announcements of additions to the Standard and Poor's *Credit Watch* list, with either a potential downgrade/upgrade indication. For firms placed on the *Credit Watch* list much of the information regarding a future ratings change is disseminated at the time of the *Credit Watch* placement rather than at the actual ratings change announcement. Therefore, for firms placed on the *Credit Watch* list the stock price reaction to the actual ratings change is not expected to be as large as the reaction of firms whose bonds are not placed on *Credit Watch* list.

firms with a diverse ownership are not expected to be closely followed by analysts and therefore viewed as "low-information" firms. Hsueh and Liu find that the effect of a ratings change was larger when market conditions were less certain and conclude that rating changes convey information when the market as a whole is facing a shortage of information. However, a significant relationship is observed only for rating downgrades and not for upgrades, a result consistent with the findings of other studies.

It is possible that a ratings downgrade does not always signal "bad news" to investors. In the case of a leverage change, it may be that a ratings downgrade provides good news to stockholders as wealth is expropriated at the expense of bondholders.[7] Goh and Ederington (1993) examine this issue by separating rating changes into groups based on whether or not they have positive or negative implications for stockholders. They find that downgrades associated with deteriorating financial prospects for a firm convey new negative information, whereas downgrades due to leverage changes do not.

Explaining what information is actually conveyed by rating changes is a relatively unexplored area. Altman and Koa (1992) and Dichev and Piotroski (2001) find serial autocorrelation in bond ratings, particularly for rating downgrades. This suggests that a ratings change is likely to be followed by subsequent rating changes in the same direction. If investors recognize this trend and overreact to the initial rating change in anticipation of future changes, the abnormal returns associated with the initial change would be overstated. The serial autocorrelation in rating changes also emphasizes the idea that rating downgrades signal bad news about the firms' future prospects. Dichev and Piotroski (2001) provide evidence consistent with this notion by documenting negative abnormal long-run returns following a ratings downgrade. Using the return on equity (ROE) as a measure of profitability, they find that upgraded firms show improved profitability while downgraded firms' profitability worsens in the year following a ratings change. These results, combined with the previous finding of Kaplan and Urwitz (1979), who document that profitability of assets is a significant predictor of bond ratings, imply that rating changes and future earnings changes are likely to be correlated.

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[7] This is the incentive effect discussed in Jensen and Meckling (1976).

Several studies have also found a strong association between dividends and earnings. Linter (1956) documents that managers consider the past, current and future earnings in making dividend policy decisions. Healy and Palepu (1988) provide evidence consistent with this view in their examination of dividend initiations and omissions. Benartzi *et al* (1997) also find a positive relationship between dividend changes and earnings. These findings can be interpreted not only as dividends being a result of past earnings, but also as dividends acting as a signal of future earnings. The information content of dividends was first considered by Modigliani and Miller (1961). They examined reasons for firms to pay dividends when, under perfect capital markets, dividends should be irrelevant to firm value. Subsequent theoretical models strongly advocate the signaling role of dividends as a reason for a company to issue dividends (see John and Williams, 1985 and Miller and Rock, 1985). Therefore, if bond rating changes contain earnings sensitive information, they could also signal future policy changes with respect to dividend payouts.

3. Bond ratings and data

Credit ratings for corporate bond issues are routinely produced by rating agencies such as Moody's and Standard and Poor's. Table 1 summarizes the ratings symbols used by Moody's and their interpretation. The highest rating assigned by Moody's is Aaa and bonds with this rating are considered highly creditworthy with an extremely low probability of future default. The next best rating is Aa, followed by A, Baa, Ba, B, Caa, Ca, C and D. To create finer rating categories Moody's divides its Aa category into Aa1, Aa2, and Aa3; its A category into A1, A2, and A3; and so on. Ratings in the Aaa to Baa categories are regarded as investment grade while ratings in the Ba to C categories are regarded as having significant speculative characteristics. Standard and Poor's use a similar ratings system.

[Insert Table 1 here]

Analysts and commentators often use ratings as descriptors of the creditworthiness of bond issuers rather than as descriptors of the quality of the bonds themselves (Hull, Predescu, and White, 2004). This is reasonable given that it is rare for two different bonds issued by the same company to have different ratings. Indeed, when rating agencies announce rating changes they often refer to companies and

not individual bond issues. In this study, we adopt this view and assume that the ratings are attributes of firms rather than individual bond issues.

Our initial sample consists of 1423 rating changes announced by Moody's between 1990 and 2001 which included 890 ratings downgrades and 533 ratings upgrades.[8] Daily stock and market returns data for 260 days prior to until 20 days following the ratings change were obtained from the *Center for Research in Security Prices* (*CRSP*) database. Annual earnings data from five years before to five years after the ratings change was obtained from the *Compustat Annual Industrial and Research* (*Compustat*) database. Firms were eliminated from the sample if they did not appear on *Compustat*, if they did not have earnings data (*Compustat* data item DATA18) available in years 0 and +1, or if they did not have data on stock prices (*Compustat* data item DATA24) or the number of shares outstanding (*Compustat* data item DATA25) available in year -1. Note that year 0 is defined as the fiscal year ending immediately following the ratings change announcement year. This reduced the final sample size to 1233 which included 766 ratings downgrades and 467 ratings upgrades. Table 2 provides information on the sample analyzed in this paper. As panels A and B of the table show firms undergoing rating changes are evenly spread across time and industries implying that clustering by industry or time is not a problem.

[Insert Table 2 here]

A smaller sample is used for the estimation of dividend changes as not all firms pay dividends. Firms are excluded from this sample if they do not pay dividends in quarters 0, +1 and +2 relative to the quarter of the ratings change announcement, defined as quarter 0. This sub-sample consists of 628 firms which include 335 ratings downgrades and 293 ratings upgrades. Dividend amounts and declaration dates are obtained from the *CRSP* database.

[8] There is a potential for the data to be confounded by rating changes announced by Standard and Poor's that do not coincide with rating changes announced by Moody's. In this context, Griffin and Sanvicente (1982) find that in their sample of 180 firms which had their bond ratings changed, only 32 ratings were changed by both rating agencies. Of these, 10 firms' ratings were changed on the same date, 18 firms' rating were changed first by Moody's, and only 4 ratings were changed first by Standard and Poor's. Thus, it is not expected that the rating changes announced by Standard and Poor's will have a significant confounding effect on our sample.

4. Methodology and empirical results[9]

4.1. Stock price reaction to the rating change announcement

We first examine the abnormal stock returns over an event period starting 60 days prior until 20 days after relative to the ratings change day. Abnormal returns are computed in two ways. First, we employ the standard market model to estimate the model's parameters over days -260 to -61 (see MacKinlay, 1997), as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \qquad t = -260,\ldots, -61, \tag{1}$$

where α_i is a constant term of the i^{th} stock, β_i is the market beta of the i^{th} stock, R_{it} is the return in the i^{th} stock, R_{mt} is the return on the CRSP value-weighted market portfolio, and ε_{it} is an error term. The estimated $\hat{\alpha}_i$ and $\hat{\beta}_i$ coefficients are used to estimate the abnormal returns for the estimation period as:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}, \qquad t = -60,\ldots, +20, \tag{2}$$

where AR_{it} is the abnormal return for the i^{th} stock.

Holthausen and Leftwich (1986), among others, report abnormal returns in the period up to 300 days prior to a bond rating change. Hence, the estimated beta and intercept coefficients may not reflect the "true" beta resulting in biased results. To eliminate this bias, the abnormal returns are also computed using the market-adjusted method where the market-adjusted returns are computed as the difference between the i^{th} stock's return, R_{it}, and the return on the CRSP value-weighted market portfolio, R_{mt}, as follows:

$$AR_{it} = R_{it} - R_{mt}. \tag{3}$$

For both methods of estimating abnormal returns we compute the average abnormal returns across firms as follows:

[9] The methodology used in this study is similar to that in Healy and Palepu (1988) and is adapted to suit this study (see Healy and Palepu, 1988, pp. 156-169).

$$AAR_t = \sum_{i=1}^{N} AR_{it}. \quad (4)$$

Next the cumulative average abnormal returns (CAR_i) over the different event periods are computed as follows:

$$CAR_{t_1,t_2} = \sum_{t=t_1}^{t_2} AR_t. \quad (5)$$

Panel A of Table 3 contains the CARs using the market model methodology and Panel B contains the market-adjusted CARs.

[Insert Table 3 here]

The period of particular interest is the 3 days surrounding the bond rating change announcement. Abnormal returns at the announcement day should provide an indication of the information content of bond rating changes. Results in Table 3 suggest that firms which had their bonds downgraded experience significant negative CARs of approximately -3.5%. Results in Panel B, obtained using the market-adjusted methodology are quantitatively similar. Consistent with Holthausen and Leftwich (1986), among others, no significant announcement period abnormal returns are found for firms whose bonds are upgraded. Like Holthausen and Leftwich (1986), this result suggests that bond rating downgrades either provide information to capital markets, or impose costs on the affected firm.

Abnormal returns prior to a rating change (-60 days to -2 days) are also computed to examine whether market participants anticipated the change in financial position. We observe significant abnormal returns over -60 and -2 days prior to both upgrades and downgrades. These results are again consistent with the previous literature and indicate that investors recognize the declining or improving financial position of firms well before rating changes are announced.

4.2. Earnings changes surrounding bond rating changes

We next examine whether the information conveyed by rating downgrades relates to future earnings and/or dividend changes. Since no abnormal returns are observed for rating upgrades our analysis focuses on the rating downgrades sample. To examine whether firms that had their bond ratings

upgraded or downgraded show systematic earnings patterns, we examine earnings changes before the ratings change over years -4 to -1, the year of the ratings change (that is, year 0), and years +1 to +5 following the ratings change.[10] To aggregate results across firms, earnings changes were expressed as a percentage of market capitalization of the stock at the fiscal year end prior to the announcement of the change, MV_i.[11] Thus, the standardized change in earnings for firm *i* in year *t*, ΔE_{it}, is defined as:

$$\Delta E_{it} = (E_{it} - E_{it-1}) / MV_i, \tag{6}$$

where E_{it} is earnings before extraordinary items (*Compustat* data item DATA18) for firm *i* in year *t*. Abnormal earnings are computed using the random-walk model, suggested in Ball and Brown (1968), in which average earnings changes for a random sample of firms are expected to be zero.

Given that bond ratings are a measure of a firm's ability to meet its financial commitments, we expect rating changes to be a function of, among other factors, a firm's future earnings. Therefore, a positive relationship is expected between the direction of the ratings change and future earnings. The results for this test are reported in Table 4.

[Insert Table 4 here]

For the downgrades sample, earnings changes are negative and significant in years -2 and -1 relative to the ratings change year. This seems reasonable since downgraded firms are likely to not be performing well in the recent past and rating agencies consider past as well as future expected performance in their decision to alter firms' bond ratings. Contrary to prior expectations however, earnings increase in year +1. This suggests that it is unlikely that rating downgrades act as a signal of a decline in future earnings. On the contrary, future earnings increase following a ratings downgrade.

This result can possibly be explained by the 'big bath' explanation (see, for example, Nissim and Ziv, 2001). That is, managers may choose to write-off assets, or announce costly restructuring in a fiscal

[10] Year 0 earnings are the fiscal year earnings immediately following the bond rating change announcement.

[11] The stock's market capitalization is calculated as the number of shares outstanding multiplied by the closing price of the stock at fiscal year end (*Compustat* data item DATA24 multiplied by data item DATA25).

year where bad news is already being delivered to the market with the expectation that by doing this they can put the poor performing period behind them. Therefore, rather than rating downgrades signaling bad news in the future, they may signal that the poor performing period is coming to an end.[12] Consistent with our expectations, earnings also increase in the year prior to and the year of a bond ratings upgrade (Panel B). However, it does not appear that the upgrade signals future earnings improvement.

4.3. Dividend changes surrounding bond rating changes

Both quarterly and annualized dividend changes are computed for firm *i* in period *t* as follows:

$$\Delta D_{it} = (D_{it} - D_{it-1}) / P_i, \tag{7}$$

where P_i is the price per share at the fiscal year ending prior to the ratings change announcement and D_{it} is the quarterly dividend per share. When calculating annualized dividend changes D_{it} is the sum of four quarterly dividends.[13] Abnormal dividends are computed using the random-walk model suggested in Ball and Brown (1968).

The mean abnormal dividends are tested to see if they are significantly different from zero. A positive relationship is expected between the direction of firms' rating changes and future dividend changes for two reasons. First, firms must make debt payments before paying dividends. A decrease in a firm's bond rating implies that it is less likely to meet its debt obligations, and hence would also be less likely to pay dividends. Second, as mentioned above, a positive relationship between earnings and dividends has been widely reported in the previous literature (see Healy and Palepu, 1988; Benartzi *et al*, 1997; and Nissim and Ziv, 2001).

[Insert Table 5 here]

Annualized changes in dividends for years 0 to +2 are reported in Table 5. Consistent with our expectations, Panel A shows that dividends decrease in the year of and the year following a ratings downgrade. Therefore, ratings downgrades appear to act as a signal for future dividend reductions. Not

[12] Such results could also occur in the presence of a survivorship bias. Healy and Palepu (1988) report a similar earnings reversal for a sample of dividend omissions, another "bad news" event.

[13] For example the annualized dividend D_{i0} is the sum of the four quarterly dividend payments immediately following the ratings change announcement.

only does a ratings downgrade signal that a firm is less likely to be able to meet its debt obligations, it also implies a firm is less likely to maintain its existing dividend payout policy. Conversely, we do not find any significant dividend changes for firms experiencing ratings upgrades (see Panel B).

Quarterly dividend changes are computed from quarter's -3 to quarter +11 to examine more closely when the dividend policy changes occur. These results are reported in Table 6. An examination of quarterly dividend changes shows that dividends decrease significantly from quarter -3 through to quarter +3 for ratings downgrades. These firms then experience a significant increase in dividends in quarter +10 following the ratings downgrade. These results are not surprising since dividend changes appear to occur in the same direction as earnings change during each year. They are also consistent with the big bath explanation, with firms reducing dividends surrounding ratings downgrades and then increasing them again in later quarters when earnings begin to improve. For the upgrades sample, the only significant change in dividends is positive in the fourth quarter following the ratings upgrade.

[Insert Table 6 here]

4.4. Relationship between bond rating change and future earnings changes

We next examine the relationship between the information contained in bond rating changes and future earnings changes. Ordinary least square regression analysis is used to test if subsequent earnings changes are related to the stock price response at the announcement of a bond rating change. Previous studies report that prior earnings changes may be used to forecast subsequent earnings. Therefore the standardized change in earnings in year t - 1 is included as an independent variable in the regression model for year t.[14] We estimate the following regression model for each year following a ratings change.

$$\Delta E_{it} = \beta_0 + \beta_1 AR_i + \beta_2 \Delta E_{it-1} + \varepsilon_{it}, \tag{8}$$

where ΔE_{it} is the standardized earnings change for firm i in year t as defined in equation (6), and AR_i is the market-adjusted cumulative abnormal return over the 3 days surrounding the ratings change.[15] The

[14] Although not reported in the table, we did not find any multicollinearity among the independent variables.

[15] The regressions were also fitted using the market model abnormal returns instead of market-adjusted returns as the independent variable. The results were essentially the same to those reported here.

coefficient of interest is β_1. If bond rating changes convey information regarding future earnings, this coefficient will be positive and significant. If earnings changes in year *t* - 1 can be used to forecast changes in year *t* earnings the β_2 coefficient will be non-zero. The results from these regressions are reported in Table 7.

[Insert Table 7 here]

As expected, the β_1 coefficient in the year 0 regression is positive and significant for the downgrade sample. This suggests that there is a positive relationship between the announcement period abnormal returns and earnings changes in year 0. However, this result is not surprising given that negative abnormal returns were observed at the announcement of ratings downgrades (see Table 3), and although not significant, the change in year 0 earnings is negative (see Table 4). This suggests that, in addition to past and expected future earnings, rating agencies also take current information into account when changing bond ratings.

Although the significantly negative β_1 coefficients in later years are not in line with our initial hypothesis, they are consistent with the positive earning changes observed in the years following a ratings downgrade (see Table 4). That is, the negative β_1 coefficient observed in years +1 to +5 reflects the earnings reversal observed for the downgraded firms in years +1 to +5.

Surprisingly, the β_2 coefficients are significantly negative for most of the regressions, a result inconsistent with the earnings drift argument. Additional tests, which are not reported in this paper, show that positive earnings drift occur prior to rating changes, but not following the ratings change. Similar unexplained negative earnings drift coefficients were reported by Healy and Palepu (1988) following dividend initiations and omissions. Therefore, it appears that a ratings change event, or just the fact that a firm is going through a turbulent period, suggests that the usual positive earnings drift does not occur. Alternatively, the rating change happens when the worst is over, in which case earnings are poised for a reversal.

For the ratings upgrade sample, the expected positive β_1 coefficient are observed when the year 0 earnings change is used as the dependant variable. Again, the β_2 coefficients are often significantly negative.

4.5. Relationship between bond rating change information and future dividend changes

We now examine the relationship between the information contained in rating changes and future dividend changes. Once again, regression analysis is used to test if dividend changes are related to the market reaction at the announcement of a bond rating change. The regression model is estimated for each of the years following the rating change as follows:[16]

$$\Delta D_{it} = \beta_0 + \beta_1 AR_i + \varepsilon_{it}, \tag{9}$$

where ΔD_{it} is the standardized dividend change for firm *i* in year *t* as defined in equation (7), and AR_i is the market-adjusted cumulative abnormal return over the conventional 3-day event window surrounding the announcement.[17] The above regression model is also estimated using quarterly dividends changes as the dependant variable. We exclude the drift control variable since dividends in general are much more stable, i.e., an increase in dividend in one period is not likely to be followed by another dividend increase in close succession.

Once again, the coefficient of interest is β_1. If rating changes convey information about future dividends, this coefficient will be positive and significant. The regression results for annual dividend changes are reported in Table 8, and those for quarterly dividend changes are reported in Table 9.

[Insert Tables 8 and 9 here]

Results in Tables 8 and 9 confirm the relationship between the negative abnormal stock returns at the announcement of a rating downgrade and subsequent dividend declines. β_1 is positive and significant for the year 0 regression, and although not significant, is still positive in the year +1 regression. A closer

[16] The regressions were also fitted using quarterly dividends changes as the dependant variable. The results are reported in Table 9.

[17] The regressions were also fitted using market model abnormal returns instead of market-adjusted returns as the independent variable. The results were essentially the same to those reported here.

analysis of quarterly changes reveals that this relationship is strongest between the announcement returns and the dividend decrease in the quarters immediately following ratings downgrades. The positive β_1 coefficient in year +2 reflects the increasing dividends observed in quarters +10 and +11 following the downgrade, a result consistent with Healy and Palepu (1988), and Benartzi *et al* (1997). For the ratings upgrades sample, however, the only significant relationship is the positive association between the rating change announcement returns and the dividend payment in quarter +7 following the ratings upgrade.

4.6. Market reaction to dividend announcements after a bond rating change[18]

We next test whether any dividend related information in bond rating changes result in lower than normal stock price impact at subsequent dividend change announcements. The results of tests in Table 6 indicate that bond rating downgrades could be a signal of future dividend reductions in at least the quarter immediately following the rating downgrade. If this is the case, we should expect investors to react to this signal at the time of the bond rating downgrade, as opposed to when the subsequent dividends are actually decreased. The following model represents the usual relationship between dividend announcement returns and the size of the unexpected dividend:

$$ARD_{it} = \beta_{0i} + \beta_{1i}\Delta D_{it} + \varepsilon_{it}, \qquad (10)$$

where ARD_{it} is the market-adjusted cumulative abnormal return at the time of quarterly dividend announcement, and ΔD_{it} is the unexpected random-walk dividend expectation model, deflated by the firm's stock price as shown in equation (7). We expect abnormal returns to be positively related to the announcement of any unexpected dividend changes (Lang and Litzenberger, 1989). Therefore, we hypothesize that β_{1i}, the elasticity of the market reaction to unexpected dividends, will be positive. However, if changes in firms' ratings convey information about future dividends, we would expect investors to revise their expectations of future dividends, and consequently lessen the stock price impact

[18] Ideally, the stock price reaction at subsequent earnings announcements would also be considered. However, this was not pursued due to lack of earnings announcement data. Unexpected dividends however, should also act as a proxy for an earnings information announcement as these are seen as another event which can provide information regarding future earnings to the market (see Healy and Palepu, 1988; and Nissim and Ziv, 2001).

of subsequent dividend announcements. We, therefore, expect β_1 to be less significant than normal for firms that undergo a ratings change.[19] To test this prediction, the following model is estimated.

$$ARD_{it} = \beta_{0i} + \beta_{1i}\Delta D_{it} + \sum_{\tau=0}^{11} \lambda_\tau M_\tau \Delta D_{it} + \varepsilon_{it}, \quad (11)$$

where λ_0 to λ_τ are the cross-sectional average adjustments to β_{1i}, the elasticity of the market reaction to unexpected dividends in each of the 12 quarters following the bond rating change announcement. The multiplicative dummy variable M_τ takes the value 1 in the quarter τ following the ratings change and 0 in other quarters. If our prediction is correct and rating changes cause investors to revise their forecasts of subsequent dividends, λ_0 to λ_{12} will be negative and significant. The results are reported in Table 10.

[Insert Table 10 here]

Consistent with results reported in the previous literature, the β_{1i} coefficients for both the upgrade and the downgrade samples are positive and significant. While the λ_0 coefficient for the downgrades sample has the expected negative sign, it is not statistically significant. The negative sign on this coefficient suggests that the stock price does not decline as much as it normally would among firms that have had their ratings downgraded when the bad news of a dividend decrease is announced. However, against prior expectations, the sign on coefficients λ_1 to λ_3 is positive and statistically significant, suggesting that the market reacts more than it normally would to the dividend decrease in quarters +1 to +3.

Altman and Koa (1992) and Dichev and Piotroski (2001) find serial autocorrelation in bond ratings, particularly with regards to rating downgrades. This suggests that a rating change is likely to be followed by subsequent rating changes in the same direction. The serial autocorrelation in rating changes also emphasizes the idea that downgrades signal bad news about the firm's future prospects. Dichev and Piotroski (2001) provide evidence consistent with this notion by documenting negative abnormal long-run

[19] This means less significant than for dividends announcements of firms that have not had their ratings changed.

stock returns following a downgrade. Using the return on equity as a measure of profitability, they find that upgraded firms show improved profitability while downgraded firms' profitability worsens in the year following the ratings change. The positive sign on λ_1 to λ_3 is consistent with findings in these studies and the market reads a change in dividend policy as an affirmation of additional like changes in bond ratings and firm performance. Alternatively, it is also possible that investors do not fully price future dividend declines at the time of the ratings change. One final possibility is that these findings suggest that bond rating changes and future dividend reductions are not related to the negative abnormal stock returns observed at the announcement of a bond rating downgrade. However, if this were true we should not see any systematic relationship between the announcement period abnormal returns and β_{1i}.

5. Summary and Conclusions

We examine the information contained in bond rating changes by analyzing earnings and dividend changes around these events. Consistent with prior work, we find significant negative abnormal returns for rating downgrades and no announcement period abnormal returns for rating upgrades. This suggests that while bond rating downgrades provide information to capital markets (or impose costs on the affected firms), rating upgrades are nonevents. We also find a run up (run down) in stock prices over days -60 to -2 days prior to bond rating upgrades (downgrades), indicating that investors partially anticipate the ratings change.

We find that rating downgrades are preceded by a decline in earnings in the two years prior to the announcement. Using cross-sectional regression analysis, we document a positive relationship between the stock price reaction to rating downgrades and the earnings change in the year of the announcement. However, contrary to our prior expectations, we observe significant increases in earnings in the years following the ratings downgrade. Taken together, these findings suggest that ratings downgrade occur after 'permanent' cash flow changes and do not signal future earnings changes. Likewise, for the ratings upgrade sample, we observe increases in earnings in the fiscal year prior to and the year of the rating change but no increase in earnings in subsequent years.

Firms respond to rating downgrades by adjusting their dividend policy. Dividends decline in the four quarters following the ratings downgrade, suggesting that the information contained in bond rating downgrades could be related to future dividend decreases. In an efficient market, investors would revise their expectations of future dividends at the time of the rating change and subsequent changes in dividend policy should not evoke a price response. However, we find that investors do not fully revise their forecast of future dividends at the time of the bond rating downgrade. Rather, they still react normally, or often more than normally, to a dividend decline.[20] Alternatively, the larger than normal stock price response at subsequent policy change announcements could confirm the positive autocorrelation in ratings documented in the previous literature. Therefore, while bond rating downgrades signal a decline in future dividends, this relationship does not appear to completely explain the negative abnormal returns observed at the announcement of a bond rating downgrade. Overall, we provide evidence that rating downgrades contain significant price sensitive information and signal changes in future dividend payout policy than changes in future earnings.

[20] Abnormal returns at dividend announcements were expected to be positively related to unexpected dividend changes (see Lang and Litzenberger, 1989). In this case, returns are "normal" relative to abnormal returns for dividend announcements not related to bond rating changes.

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Table 1: This table summarizes the long term debt rating symbols used by Moody's and their interpretation

Investment Grade Ratings		**Speculative Grade Ratings**	
Aaa	Highest quality	Ba1 Ba2 Ba3	Likely to fulfill obligations, ongoing uncertainty
Aa1 Aa2 Aa3	High quality	B1 B2 B3	High risk obligations
A1 A2 A3	Strong payment capacity	Caa	Current vulnerability to default, or in default
Baa1 Baa2 Baa3	Adequate payment capacity	Ca C	In bankruptcy or default, or other market shortcoming

Table 2: This table presents the annual and industry-wise frequency distribution of bond rating upgrades and downgrades during 1990 and 2001.

Panel A: Distribution by year of bond rating change		
Year	**Upgraded firms**	**Downgraded firms**
1990	20	65
1991	19	38
1992	23	21
1993	36	35
1994	54	33
1995	40	46
1996	75	42
1997	47	47
1998	51	75
1999	38	95
2000	41	119
2001	23	150
Total	**467**	**766**

Panel B: Distribution by industry			
Industry	**SIC Code**	**Upgraded firms**	**Downgraded firms**
Mining, Construction	1000-2000	38	59
Food, Chemicals	2000-3000	60	123
Machinery, Manufacturing	3000-4000	106	179
Transportation	4000-5000	84	98
Wholesale, Retail Trade	5000-6000	58	103
Finance, Real Estate	6000-7000	96	131
Hotels, Entertainment	7000-8000	16	54
Services	8000-9000	9	18
Public Administration	9000-9999	0	1
Total		**467**	**766**

Table 3: This table presents the cumulative abnormal returns for firms that had their bond ratings changed between 1990 and 2001 (*t* statistics are in parentheses).

Days Relative to the Event Day	Upgraded Firms	Downgraded Firms
Panel A: Market model abnormal returns		
-60 to -21	-0.0024	-0.0348
	(-0.28)	(-3.45)**
-20 to -11	-0.0043	-0.0116
	(-1.07)	(-2.00)**
-10 to -2	-0.0015	-0.0350
	(-0.45)	(-5.40)**
-1 to +1	0.00069	-0.0349
	(0.31)	(-6.89)**
+2 to +10	-0.0074	0.0134
	(-2.23)**	(1.77)*
+11 to +20	-0.0086	0.0261
	(-2.42)**	(3.96)**
Panel B: Market-adjusted abnormal returns		
-60 to -21	0.0344	-0.0881
	(5.20)**	(-9.14)**
-20 to -11	0.0066	-0.0262
	(1.87)*	(-4.53)**
-10 to -2	0.0093	-0.0471
	(2.92)**	(-7.26)**
-1 to +1	0.0024	-0.0386
	(1.09)	(-7.57)**
+2 to +10	0.0018	-0.0003
	(0.58)	(-0.04)
+11 to +20	0.0014	0.0128
	(0.41)	(1.96)*

* Significant at the 10% level.
** Significant at the 5% level.

Table 4: This table presents the summary statistics on changes in earnings before extraordinary items for firms that had their bond ratings changed between 1990 and 2001.[a]

Year in Relation to Bond Rating Change[b]	Number of Firms	Mean	*t* Statistic[c]
	Panel A: Downgraded Firms		
-4	710	-0.0391	-1.03
-3	736	0.0171	0.50
-2	754	-0.1109	-3.57**
-1	766	-0.5102	-5.34**
0	766	-0.0889	-1.03
+1	702	0.2916	4.45**
+2	642	0.0350	0.74
+3	572	0.0096	0.36
+4	426	0.0261	1.44
+5	310	0.0108	0.58
	Panel B: Upgraded Firms		
-4	425	0.0572	1.12
-3	444	-0.0122	-1.33
-2	458	-0.0061	-0.47
-1	467	0.0312	2.48**
0	467	0.0822	2.22**
+1	435	-0.0213	-0.98
+2	402	-0.0043	-0.33
+3	373	0.0170	1.10
+4	335	0.0221	1.27
+5	290	-0.0048	-0.26

[a] The standardized change in annual earnings for firm i in year t, ΔE_{it}, is defined as $\Delta E_{it} = (E_{it} - E_{it-1})/MV_{it}$, where E_{it} is the earnings before extraordinary items, and MV_{it} is the firm's market capitalization in the fiscal year ending prior to the ratings change.

[b] Year 0 is defined as the first fiscal year earnings after the ratings change announcement.

[c] The t statistic tests the null hypothesis that mean earnings changes are equal to zero.

* Significant at the 10% level.

** Significant at the 5% level.

Table 5: This table presents the summary statistics on changes in annual dividends for firms that had their bond ratings changed between 1990 and 2001.[a]

Year in Relation to Bond Rating Change[b]	Number of Firms	Mean	*t* Statistic[c]
	Panel A: Downgraded Firms		
0	310	-0.0091	-5.49**
+1	287	-0.0018	-3.79**
+2	261	-0.0002	-0.31
	Panel B: Upgraded Firms		
0	249	-0.0008	-1.22
+1	244	0.0005	1.14
+2	213	0.0003	0.62

[a] The standardized change in dividends for firm *i* in year *t*, ΔD_{it}, is defined as $\Delta D_{it} = (D_{it} - D_{it-1})/P_{it}$, where D_{it} is the sum of quarterly or semi-annual dividends per share, and P_{it} is the firm's stock price at the fiscal year ending prior to the ratings change.
[b] Year 0 is defined as the sum of the four quarterly dividend payments after the ratings change announcement.
[c] The *t* statistic tests the null hypothesis that mean annual dividend changes are equal to zero.
* Significant at the 10% level.
** Significant at the 5% level.

Table 6: This table presents the summary statistics on changes in quarterly dividends for firms that had their bond ratings changed between 1990 and 2001.[a]

Quarter in Relation to Bond Rating Change[b]	Number of Firms	Mean	*t* Statistic[c]
	Panel A: Downgraded Firms		
-3	319	-0.0001	-1.74*
-2	327	-0.0005	-2.48**
-1	328	-0.0009	-3.43**
0	330	-0.0008	-5.14**
+1	335	-0.0004	-3.33**
+2	335	-0.0003	-2.82**
+3	323	-0.0002	-2.52**
+4	317	0.0000	0.09
+5	303	0.0000	0.65
+6	294	-0.0001	-1.22
+7	287	-0.0000	-0.02
+8	280	-0.0001	-0.64
+9	273	-0.0000	-0.49
+10	267	0.0001	2.29**
+11	261	0.0001	1.43
	Panel B: Upgraded Firms		
-3	253	-0.0001	-1.38
-2	259	-0.0001	-0.83
-1	262	-0.0000	-0.08
0	264	-0.0001	-0.60
+1	293	-0.0001	-1.08
+2	293	0.0001	1.25
+3	289	-0.0001	-0.62
+4	279	0.0002	2.70**
+5	269	-0.0000	-0.23
+6	254	0.0000	0.14
+7	244	0.0001	1.47
+8	239	0.0001	0.68
+9	233	-0.0001	-1.31
+10	217	-0.0000	-0.05
+11	213	0.0001	0.90

[a] The standardized change in quarterly dividends for firm i in year t, ΔD_{it}, is defined as $\Delta D_{it} = (D_{it} - D_{it-1})/P_{it}$, where D_{it} is the quarterly dividend per share, and P_{it} is the firm's stock price at the fiscal year ending prior to the ratings change.

[b] Year 0 is defined as the quarterly dividend payments after the ratings change announcement.

[c] The t statistic tests the null hypothesis that mean annual dividend changes are equal to zero.

* Significant at the 10% level.

** Significant at the 5% level.

Table 7: This table tests the relationship between changes in earnings following the announcement of a bond rating change, and the market-adjusted announcement returns for firms that had their bond ratings changed between 1990 and 2001.[a]

$$\Delta E_{it} = \beta_0 + \beta_1 AR_i + \beta_2 \Delta E_{it-1} + \varepsilon_{it}$$

Year in Relation to Bond Rating Change[b]	Number of Firms	β_0	β_1	β_2	R^2
Panel A: Downgraded Firms					
0	720	-0.3692 (-5.62)**	1.2209 (2.37)**	-0.6307 (-21.14)**	0.384
+1	658	0.1966 (3.83)**	-1.6722 (-4.00)**	-0.2521 (-10.72)**	0.165
+2	601	0.1450 (3.93)**	-0.6718 (-2.11)**	-0.5144 (-17.66)**	0.343
+3	534	0.0505 (2.13)**	-0.2154 (-0.98)	-0.4261 (-15.19)**	0.304
+4	400	0.0327 (2.06)**	-0.1287 (-0.78)	-0.4841 (-12.39)**	0.279
+5	287	0.0071 (0.37)	-0.0953 (-0.41)	-0.0683 (-1.44)	0.008
Panel B: Upgraded Firms					
0	440	0.0330 (2.45)**	0.6186 (2.11)**	0.1213 (2.36)**	0.022
+1	408	-0.0006 (-0.07)	-0.039 (-0.17)	-0.0141 (-0.47)	0.001
+2	376	-0.0101 (-1.05)	0.0492 (0.24)	0.2359 (3.11)**	0.025
+3	348	0.0112 (0.94)	-0.2065 (-0.82)	-0.7446 (-11.68)**	0.285
+4	310	0.0262 (1.52)	-0.0622 (-0.17)	-0.2415 (-3.62)**	0.041
+5	265	0.0030 (0.18)	0.9151 (2.25)**	-0.4499 (-8.84)**	0.243

[a] ΔE_{it} is the standardized earnings change for firm i in year t is regressed against AR_i, the market-adjusted abnormal returns from one day prior to the bond rating change until one day after the ratings change, and ΔE_{it-1} is the prior year's earnings change.

[b] Year 0 is defined as the first fiscal year earnings after the ratings change announcement.

* Significant at the 10% level.

** Significant at the 5% level.

Table 8: This table tests the relationship between changes in annual dividends following the announcement of a bond rating change, and the market-adjusted announcement returns for firms that had their bond ratings changed between 1990 and 2001.[a]

$$\Delta D_{it} = \beta_0 + \beta_1 AR_i + \varepsilon_{it}$$

Year in Relation to Bond Rating Change[b]	Number of Firms	β_0	β_1	R^2
		Panel A: Downgraded Firms		
0	308	-0.0081 (-4.95)**	0.1275 (4.57)**	0.064
+1	285	-0.0018 (-3.70)**	0.0023 (0.27)	0.000
+2	259	-0.0003 (-0.67)	-0.0209 (-2.45)**	0.023
		Panel B: Upgraded Firms		
0	247	-0.0008 (-1.15)	-0.0078 (-0.39)	0.001
+1	241	0.0005 (1.19)	-0.0018 (-0.15)	0.000
+2	211	0.0002 (0.42)	0.0136 (1.13)	0.006

[a] ΔD_{it} is the standardized annual dividend change for firm i in year t is regressed against AR_i, the market-adjusted abnormal returns from one day prior to the ratings change until one day after the ratings change.
[b] Year 0 is defined as annual dividend payments after the ratings change announcement.
* Significant at the 10% level.
** Significant at the 5% level.

Table 9: This table tests the relationship between changes in quarterly dividends following the announcement of a bond rating change, and the market-adjusted announcement returns for firms that had their bond ratings changed between 1990 and 2001.[a]

$$\Delta D_{it} = \beta_0 + \beta_1 AR_i + \varepsilon_{it}$$

Quarter in relation to bond rating change[b]	Number of firms	β_0	β_1	R^2
		Panel A: Downgraded Firms		
0	328	-0.0008 (-4.68)**	0.0102 (3.81)**	0.043
+1	333	-0.0004 (-3.23)**	0.0009 (0.42)	0.001
+2	333	-0.0003 (-2.89)**	-0.0012 (-0.74)	0.002
+3	321	-0.0002 (-2.42)**	0.0006 (0.42)	0.001
+4	315	-0.0000 (-0.20)	-0.0009 (-1.54)	0.008
+5	301	0.0000 (0.74)	0.0006 (0.59)	0.001
+6	292	-0.0001 (-1.42)	-0.0017 (-1.27)	0.006
+7	285	0.0000 (0.14)	0.0011 (0.98)	0.003
+8	278	-0.0001 (-1.06)	-0.0042 (-2.35)**	0.020
+9	271	-0.0000 (-0.28)	0.0002 (0.28)	0.000
+10	265	0.0001 (2.02)**	-0.0015 (-1.41)	0.008
+11	259	0.0001 (1.33)	-0.0005 (-0.49)	0.001

Table 9 (Continued)

		Panel B: Upgraded Firms		
0	262	-0.0001 (-0.70)	0.0016 (0.67)	0.002
+1	290	-0.0001 (-0.95)	-0.0017 (-0.87)	0.003
+2	290	0.0001 (1.16)	0.0002 (0.10)	0.000
+3	286	-0.0006 (-0.73)	0.0020 (0.88)	0.003
+4	276	0.0002 (2.77)**	-0.0011 (-0.71)	0.002
+5	266	-0.0000 (-0.14)	0.0009 (0.69)	0.002
+6	251	0.0000 (0.01)	0.0009 (0.50)	0.001
+7	241	0.0000 (1.27)	0.0024 (1.69)*	0.012
+8	237	0.0000 (0.60)	0.0019 (0.68)	0.002
+9	231	-0.0001 (-1.37)	0.0012 (0.58)	0.002
+10	215	-0.0000 (-0.27)	0.0006 (0.39)	0.001
+11	211	0.0001 (0.94)	-0.0009 (-0.46)	0.001

[a] ΔD_{it} is the standardized quarterly dividend change for firm *i* in year *t* is regressed against AR_i, the market-adjusted abnormal returns from one day prior to the bond rating change until one day after the ratings change.
[b] Year 0 is defined as quarterly dividend payments after the ratings change announcement.
* Significant at the 10% level.
** Significant at the 5% level.

Table 10: This table tests the relationship between market-adjusted abnormal stock returns at the declaration of dividends and standardized changes in quarterly dividends following the announcement of a bond rating change for firms that had their bond ratings changed between 1990 and 2001.[a]

$$ARD_{it} = \beta_0 + \beta_1 \Delta D_{it} + \sum_{\tau=0}^{11} \lambda_\tau M_\pi \Delta D_{it} + \varepsilon it$$

	Panel A: Downgraded Firms		***Panel B:*** Upgraded Firms	
Coefficient	**Mean**	***t* Statistic**	**Mean**	***t* Statistic**
β_0	0.00	3.30**	0.00	2.20**
β_1	1.10	2.60**	1.64	1.70*
λ_0	-0.71	-0.80	-2.83	-1.40
λ_1	2.96	2.50**	-2.27	-1.10
λ_2	2.76	1.80*	2.54	1.10
λ_3	5.70	3.30**	1.34	0.70
λ_4	6.21	1.50	-1.54	-0.60
λ_5	2.03	0.70	-0.43	-0.10
λ_6	1.78	0.90	1.86	0.70
λ_7	-3.63	-1.40	-0.75	-0.20
λ_8	-0.03	0.00	-2.49	-1.30
λ_9	-0.01	0.00	3.40	1.40
λ_{10}	-1.44	-0.50	3.14	0.90
λ_{11}	-3.46	-1.00	-1.27	-0.50

[a] The twelve parameters λ_0 to λ_τ are cross-sectional average adjustments to β_1, the elasticity of the market reaction to unexpected dividends, in each of the twelve quarters following the bond rating change announcement. The multiplicative dummy variable $M_{\tau t}$, takes the value 1 in the quarter following the ratings change, and 0 in other quarters.

[b] Year 0 is defined as quarterly dividend payments after the ratings change announcement.

* Significant at the 10% level.

** Significant at the 5% level.