

The Impact of Mergers and Acquisitions on Corporate Bond Ratings

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ABSTRACT

The Impact of Mergers and Acquisitions on Corporate Bond Ratings

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We examine the impact of mergers and acquisitions on a firm's bond ratings using a large sample of U.S. firms between 1990 and 2012 that experienced a rating change. For both the upgrade and downgrade samples, we investigate the acquisitions undertaken by these firms within three years and five years before the rating change. We find that firms with positive announcement period abnormal returns around the acquisition preceding the rating change are more likely to experience a rating upgrade, whereas firms with a rating downgrade had abnormal returns around acquisitions that were more negative. Before the bond rating change, the upgraded firms make better acquisitions compared to downgraded firms; however downgraded firms make fewer but higher quality acquisitions in the post rating change period. We further employ the Berkovitch and Narayanan (1993) methodology to distinguish between the synergy, agency and hubris motives for acquisitions. We determine that for rating upgrades, the acquisitions are mostly motivated by synergy in the years prior to the upgrade announcement. For rating downgrades, there is some evidence to suggest that the acquisition motive is either agency or hubris prior to the downgrade announcement. However, in the post rating period, our evidence suggests that value creation through synergy is an important motive for acquisitions in subsequent years for both, upgraded and downgraded firms.

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1. Introduction

Moody's, Standard and Poor's and Fitch Ratings are the three primary bond rating agencies that produce manuals of statistics associated with bonds and stocks and bond ratings, and also provide information to financial markets. The creditworthiness of most issuers along with their obligations is not steady and fixed over an extended period of time. Bond rating changes reveal the variations in the inherent position of issuers as well as their obligations. The rating revisions should convey significant valuable information since rating agencies use the through-the-cycle methodology. According to Moody's, the through-the-cycle rating methods are constant since they are intended to analyze default risk across long investment horizons and are typically changed only after rating agencies are confident that the riskiness changes in the firms' profile are likely to be more than just transitory (Altman and Rijken, 2004). Previous studies find that rating revisions have an ambiguous effect on providing new information to the financial markets. Pinches and Singleton (1978) suggest that rating changes carry comparatively little information. However, subsequent studies robustly find that bond rating downgrades are associated with negative abnormal returns, while bond rating upgrades appear to be nonevents (Griffin and Sanvicente (1982), Holthausen and Leftwich (1986), Hsueh and Liu (1992), Dichev and Piotroski (2001), Anderson, Bhabra, Bhabra and Lamba (2011)). Changes in ratings reflect the changed circumstances for a firm to meet its fixed obligations. Recent research suggests that ratings changes follow permanent changes in a firm's cash flow situation and are not necessarily signals of future earnings. These cash flow changes are impacted by the long-term investment decisions undertaken by the firm.

While the level of a firm's capital investments can be observed by looking at the capital expenditures made over the years, it is difficult to assess the quality of projects undertaken since actual project investments are not observable. Mergers and acquisitions undertaken by a firm, on the other hand, are both long-term investments and provide us with unique insights into the quality of investments made by managers. In an efficient market, the stock market's response to an acquisition decision provides an objective assessment of whether the investment is value creating

or not. In this study, we analyze if rating revisions are related to the mergers and acquisitions undertaken by the firm in the years preceding the rating revision. We hypothesize that acquisitions that are value creating improve the firm's ability to meet its fixed obligations and thus lowers the risk for lenders. These firms are likely to experience an upward revision in their credit rating. On the other hand, acquisitions that result in no change in firm value or adversely affect firm value increases the risk for lenders and will likely lead to a downward revision in rating. We also examine the acquisitions after the rating change to determine if firm's make adjustments to their investment strategy, particularly following a downgrade.

Our sample consists of 3295 announcements of U.S rating changes from Moody's from 1990 to 2012. We limit our sample to companies which had no other rating change announcement in the 3 years preceding the rating revision included in the sample. The announcement year of the rating adjustments is defined as Year 0. Relative to Year 0, we collect all mergers and acquisitions from three years and five years before and after the announcement year, listed on SDC (Securities Data Corporation's U.S. Mergers and Acquisitions database). Our M&A sample covers the period 1985 to 2013.

We find the abnormal returns for downgrade firms surrounding the bond rating change are significantly negative, largely because the downgrade firms either offer significant information to capital markets or impose costs on the affected firms in the pre-rating change period. Some evidence for upgrade firms shows the abnormal returns to be generally positive. Upgrade firms with acquisitions announced in the pre-rating change period have better abnormal returns than upgrade non-acquirer companies, which imply that investors recognize the improving financial position of companies well through acquisitions before rating changes are acknowledged by the market. Before the bond rating change, acquirers that experience positive abnormal return acquisitions are more likely to get upgrade. Firms with acquisitions accompanied by negative abnormal returns prior to the rating change are more likely to experience a rating downgrade.

However, in the subsequent years, the downgrade companies appear to apply remedial measures on their long-term investment activities and make fewer but higher quality acquisitions compared to upgrade companies.

Our results strongly suggest that the quality of acquisitions in the period preceding the rating revision are significantly related to the direction of the rating revision. Acquirers that experience positive abnormal returns, positive stock price run up, higher free cash flow and better operating income growth, acquisitions by firms with low Tobin's q and low leverage, and acquirers that make non-diversifying and smaller relative deal size acquisitions are more likely to have a rating upgrade. Extant research suggests that acquirers tend to pay with shares (possibly overvalued) as a hedge in deals that are deemed more risky. One possible explanation for our result on the method of payment could be that by paying for the target in shares, the firm preserves valuable cash flow and thus lowers the underlying risk for the lender.

Employing the Berkovitch and Narayanan (1993) methodology, we also examine the motives in the acquisitions. Synergy or value-enhancing acquisition should reduce the risk for lenders whereas agency or hubris driven acquisitions will likely have an opposite effect. Our findings are consistent with these predictions. Before the bond rating change, synergy is the main motive in takeovers for firms with a rating upgrade. There is some evidence to suggest that agency and hubris are more prominent in acquisitions in the downgrade rating firms, although the evidence is not strong. After the rating change, upgraded rating firms appear to continue to make value-enhancing acquisitions. Downgraded rating firms appear to take corrective measures in their long-term investment decisions. For these firms, in the post rating change period, our evidence suggests that synergy becomes a major motive. Overall, for rating upgrades, the acquisitions are mostly motivated by synergy in the years prior to the upgrade announcement, while for rating downgrades synergy becomes an important motive in acquisitions in the years subsequent to the rating change.

This paper is organized as follows. We exhibit the literature review and demonstrate the details of empirical results from prior studies in section 2. In section 3 we present an overview of our hypothesis while in section 4 we introduce the bond rating change and data information analyzed in our sample. Section 5 provides the methodology employed and section 6 summarizes the empirical results. The last section concludes the paper.

2. Literature review

Corporate bond ratings are extensively used in the investment community as a measure for the credit riskiness of bonds. This information is considered very valuable since it presents the judgments of skilled and informed financial analysts (Kaplan and Urwitz, 1979). Bond rating revisions are significant procedures since they alert investors to the change in the firm's risk profile. Several early studies focus on how rating revisions are related to operating performance changes, before, after and during the rating revisions.

Pinches and Singleton (1978) find that bond rating changes convey relatively little information. Griffin and Sanvicente (1982) support the proposition that bond rating downgrades convey information to the common stockholders. For bond rating upgrades, the price adjustment was insignificant in the announcement month, while in the 11 preceding months, upgrades firms showed positive abnormal returns. Subsequently, Holthausen and Leftwich (1986) document that downgrade rating announcements are associated with negative abnormal returns while there is little evidence of abnormal returns on rating upgrade announcements. Hsueh and Liu (1992) also find that rating downgrades are associated with negative abnormal return but upgrades show no exhibition of abnormal returns by considering the differing market anticipation of bond rating changes. Consistent with the prior studies, Dichev and Piotroski (2001) examined the long-run stock returns following the bond ratings changes and find that there are significant negative abnormal returns following bond rating downgrades, whereas no abnormal returns following bond

rating upgrades.

Anderson, Bhabra, Bhabra and Lamba (2012) propose two hypothesis: the cash flow signaling hypothesis and the cash flow permanence hypothesis, to consider whether a rating revision is a precursor to firms' future earnings performance or a response to firms' past earning performance. They find that rating downgrades are related to negative abnormal stock returns, though rating upgrades seem to be nonevents. For the rating downgrades, earnings decrease 2 years prior to the announcement year and increase in the following year of the rating downgrades. For rating upgrades, earnings increase prior to the rating change year but show no subsequent change to the rating change. The results of their analyses provide evidence that supports both the cash flow signaling hypothesis and the cash flow permanence hypothesis. Rating agencies like Moody's, Standard and Poor's and Fitch Ratings are more likely to act after the firms' performance has changed. While ordinary least squares regressions show a positive relation between the rating change announcement period abnormal return and the earning change in the announcement year, there is no relation observed in subsequent years. Generally their evidence is substantially more supportive of the cash flow permanence hypothesis.

Takeovers are an essential part of the corporate environment. There is an extensive body of empirical research that has examined both the short-term and long-term impact of mergers and acquisitions on firm performance. Firth (1980) showed that mergers and acquisitions resulted in profits to both acquired firms' shareholders and acquiring firms' managers, while the losses were mainly suffered by the acquiring firms' shareholders. However, the cumulative effect of acquisitions on both acquire and target firms is generally positive and is inferred as evidence that acquisitions are beneficial both to the firms concerned and to the economy generally (Halpern, 1983). Also, Agrawal, Jaffe and Mandelker (1992) find consistent evidence that shareholders of acquiring firms suffer a significant loss of approximately 10% over the 5-year post-merger period. Tuch and O'Sullivan (2007) further show that in the short run, mergers and acquisitions have at best

an insignificant effect on shareholder wealth. In the long run, the analysis presents overwhelmingly negative returns with mixed evidence from accounting performance. Finally, a number of researchers examine the effect of acquisitions versus internal growth on the firm performance. The most remarkable study in this area is that from Meeks (1977). He seeks to examine the rate of return of acquiring firms accurately by allowing for the accounting biases that exist. Both the pre- and post-acquisitions productivity related to the industry average around acquisitions are compared in the UK-quoted acquiring firms (generally 3 years prior to the acquisitions, and up to as much as 7 years after if it's available). He finds a relatively small positive effect in the acquisition year, and the profitability is significantly less than in the pre-acquisitions period afterwards. This evidence suggests that mergers have an adverse effect on profitability. However, Ravenscraft and Scherer (1989) focus on tender offers specifically in their study. They note that the post-acquisition profitability deteriorates after removing accounting biases, though the decline is statistically insignificant. Other researchers in this topic either confirm these negative results or discover little variation in performance following acquisition (Cosh et al. 1984; Geroski, 1988; Hughes, 1993).

Masulis, Wang and Xie (2007) examined whether corporate governance, the market for corporate control particularly, affects the viability of firm acquisitions. They show that acquirers with more antitakeover provisions experience lower announcement-period abnormal returns. Acquirer characteristics (firm size, free cash flow, Tobin's q, leverage, management quality, and stock price run-up) and deal characteristics (target firm ownership status, methods of payment, industry connection of acquisitions, relative deal size and whether both the acquired and acquiring firms are from high tech industries) are presented as control variables in their research and are related to acquirer returns.

The question of how mergers and acquisitions affect a firm's credit rating has remained unexplored, despite the fact that M&As have been found to significantly impact the long-term performance of

acquiring firms. In this paper we investigate if performance changes following mergers and acquisitions affect a firm's bond ratings and if firms respond to these credit revisions by updating their acquisition strategies. Chen (2003) is the only study we could identify who examines M&As for a sample of 29 Taiwanese high-tech and non-high-tech firms that experienced 73 rating changes and finds that lower leverage, higher return on equity and acquisitions by high-tech firms increase the probability of a higher credit rating. Our study focuses on the impact of mergers and acquisitions on bond rating change for a large sample of U.S firms that had a bond rating change between 1990 and 2012. We analyze firms with ratings changes that engage in M&As as well as those did not make any acquisitions. Furthermore, we investigate if firms respond to the credit rating change by making adjustments to their M&A strategy. We control for acquirer, target and deal characteristics identified in Masulis, Wang and Xie (2007) that affect acquisition decisions.

We also examine the different motives for mergers and acquisitions for upgraded and downgraded bond rating firms both before and after the rating change. Three main motives have been proposed for takeovers in the literature: synergy, agency and hubris. Berkovitch and Narayanan (1993) present an intuitive method to distinguish among these three motives by looking at the correlation between target, acquirer and total gains around an acquisition. They conclude that the correlation between target gain and total gain should be positive when synergy is the dominant motive, negative when agency is the dominant motive, and zero when hubris is the dominant motive. Hubris may be present even if the main motive for acquisitions is synergy or agency.

3. Hypothesis

Changes in corporate credit ratings reflect the ability of a firm to maintain its contractual obligations to lenders. This ability is affected in large measure by the long-term investment decisions undertaken by management. Investments that yield positive and stable cash flows lower the risk for lenders while risky investments with a higher probability of a negative payoff increases the risk for lenders. The performance of investment activity is a significant factor for credit

ratings considered by rating agencies. Mergers and acquisitions pursued by management are long-term strategic investments made by a firm that can be identified both in terms of the time of the investment as well as its long-term impact on financial performance. M&As, thus, present a perfect setting to examine how long-term investments affect the credit standing for a firm. In this study, we propose and test the following hypotheses.

- (1) A firm that makes value-enhancing acquisitions is likely to experience a rating upgrade. Conversely, a firm that makes a value destroying acquisition is likely to experience a rating downgrade. This suggests that upgrade rating changes are a response to positive performance following past mergers and acquisitions programs, while the downgrade rating changes are a negative response to previous acquisition decisions.
- (2) Firms respond to bond rating changes by adjusting their future mergers and acquisitions activities. In particular, firms which experience a downgrade rating change are more likely to make subsequent acquisitions that enhance shareholder wealth.
- (3) For acquisitions undertaken before the bond rating change, synergy is the main motive in takeovers for firms with upgrade rating changes, while agency is the main motive in takeovers for firms with downgrade rating changes.
- (4) For acquisitions undertaken after the bond rating change, synergy is the primary motive in acquisitions for both, firms that had a rating upgrade or a rating downgrade. Whereas there is no change in the main motive for upgraded firms, the main motive for downgraded firms changes from agency to synergy from before the rating change to after the rating change.

4. Bond ratings and data description

Bond rating agencies such as Moody's, Standard and Poor's and Fitch Ratings gather and analyze market information and provide an assessment of corporate bond credit ratings. They assess a bond issuer's financial condition and evaluate its capability of repaying its obligations on a timely manner. There is a high degree of correlation among the rating categories adopted by these three

agencies. In our study, we use the bond rating changes announced from Moody's. There are 20 rating symbols used by Moody's that indicate the gradations of creditworthiness from least credit risk to greatest credit risk: Aaa, Aa1, Aa2, Aa3, A1, A2, A3, Baa1, Baa2, Baa3, Ba1, Ba2, Ba3, B1, B2, B3, Caa1, Caa2, Caa3, Ca, and with each symbol signifying a group in which the creditworthiness are nearly the same level. Ratings from Aaa to Baa3 categories are considered as investment grade, while ratings from the Ba1 to Ca categories are considered as non-investment grade.

We hand collect a total 3,295 announcements of U.S bond rating changes from Moody's during 1990 to 2012, which include 1,265 rating upgrades and 2,030 rating downgrades. Since our objective is to study the impact of acquisition activity on a firm's credit risk, we restrict our sample to events of rating changes that are not preceded by a rating change in the preceding 3 years. When examining the long-term impact of acquisition decisions, researchers have typically studied the operating and stock return performance for a period of 3 to 5 years after the transaction (for e.g., Loughran and Vijh, 1997). We, therefore, assume that a 3-year window allows for sufficient time for an acquisition decision to impact a firm's credit rating, if any. This restriction reduces the sample to 2,092 announcements, which include 875 rating upgrades and 1,217 rating downgrades. The distribution of this sample by year is shown in Table 1. The largest number of bond rating change announcements occurred in 2002 (202, 9.66% of the sample). In large part, this increase in the rating revisions during this period can be attributed to the aftermath of the tech bubble in 2000 and 2001. The number of rating downgraded companies is more than the number of rating upgraded companies by year, which is consistent with the sample distributions observed in previous studies. The largest number of rating upgrades is in 2010, whereas the largest number of rating downgrades is in 2002. Most of the sample (68%) is from 2000 to 2012, largely because there is more data available for recent years compared to the earlier years.

We define the announcement year of the bond rating change as Year 0, then match all the mergers

and acquisitions made by bond rating change companies from Year -5 to Year 0 listed on SDC (Securities Data Corporation's U.S. Mergers and Acquisitions database) from 1985 to 2013. We use the following criteria to retain acquisitions for further analyses: 1) the acquisitions are completed, 2) the acquirer firms own 100% of the target firms' shares after the transaction, and 3) there is only one acquisition announcement for each company on the same date. A total of 6,794 acquisitions were made by our sample firms that had a bond rating change. The distribution of acquisitions by year is shown in Table 3. We also extract another subsample by restricting acquisitions that occurred from Year -3 to Year 0. The total number of transactions for this time period is 4,408 and the distribution by year is shown in Table 2. From Table 2 we can observe that downgraded firms are more active in making acquisitions compared to upgraded firms before the bond rating change, but turn to be less involved in acquisitions after the bond rating change. And there are similar results from acquisitions announced from Year -5 to Year 0 subsample, which indicates that firms that experienced a downgrade rating change are more cautious about making acquisitions afterwards. Firms that experienced an upgrade rating change appear to be more involved in acquisitions subsequently. Within 3 years (5 years) before the bond rating change, the large numbers of acquisitions announced by upgrade firms are in years 1995-1997 (1994-1999), and by downgrade firms are in years 1996-2001 (1995-2001), which is very consistent with the surging United States stock market in the latter half of the 1990s. Within 3 years (5 years) after the bond rating change, upgraded firms generally remain active in acquisitions while downgraded firms reduce their acquisition activities.

For the cross-sectional analyses, the annual earnings information within three (five) years before the rating change were acquired from COMPUSTAT (Compustat Annual Industrial and Research database), and market return and daily stock information were obtained from the CRSP (Center for Research in Security Prices database). Acquisitions were removed from the sample if they did not have annual earnings information on COMPUSTAT in the announcement year, or if they did not have market return and daily stock information available on CRSP. Missing data decreased the

number of “acquisitions made by acquirer with 3 years (5 years) before bond rating change” sample to 1,643 (2,566) observations.

Most of the targets in these acquisitions were private firms. In our sample, there are a total 370 (492) public target firms within 3 years (5 years) before the bond rating change and 285 (403) public target firms within 3 years (5 years) after the bond rating change. The missing information on annual earnings in COMPUSTAT reduced the initial sample to 146 (199) public target firms within 3 years (5 years) before the bond rating change and 131 (188) public target firms within 3 years (5 years) after the bond rating change.

The method applied to estimate the target and total gain is obtained from Berkovitch and Narayanan (1993). The sample is selected by these three criteria: 1) at the time of the acquisition, the shares of both the acquirer and target firms were traded, 2) the market value of equity for both acquirer and target firms is available for each of the 6 days before the event day, and 3) the daily stock return information is available for estimating the market model. These constraints reduced the number of observations to 604 acquisitions. The analyses are undertaken for the following four subsamples: 1) acquisitions announced by upgrade bond rating change companies within 5 years before the rating change, 2) acquisitions announced by downgrade bond rating change companies within 5 years before the rating change, 3) acquisitions announced by upgrade bond rating change companies within 5 years after the rating change, 4) acquisitions announced by downgrade bond rating change companies within 5 years after the rating change.

5. Methodology

5.1 Event study around bond rating and acquisitions announcement dates

In this part, we examine the abnormal return changes for firms that had their bond rating change from 1990-2012 over the event windows (-1,0), (0,1), (-1,1), (-2,2), (-5,5) surrounding the bond rating change announcements. Here the abnormal returns are calculated in two ways. First, we

apply the standard market model to assess the model's parameters from days -260 to -61 (MacKinlay, 1997), where day 0 is day of the bond rating change announcement day. The estimated betas in the standard market model may be biased since Holthausen and Leftwich (1986) report abnormal returns in the time period up to 300 days before bond rating changes. To diminish this bias, we calculate market-adjusted abnormal returns also by using the CRSP value-weighted return as the market portfolio proxy. We employ the methodology suggested in Patell (1976) to examine the statistical significance of the cumulative abnormal returns (CARs) for different event windows as stated above. These analyses are undertaken for both upgrade and downgrade firms for the full sample as well as the subsamples: firms that announced acquisitions before their bond rating change and firms that announced no acquisitions before their bond rating change.

We also examine the abnormal return changes for acquisitions announced by bond rating change acquirers from 1985-2013 by using market model and market adjusted returns separately over the event windows (-1,0), (0,1), (-1,1), (-2,2), (-5,5), where day 0 is the mergers and acquisitions announcement day. The subsamples for this analysis include: 1) acquisitions made by upgrade and downgrade firms within 3 years before and after the bond rating change, and 2) acquisitions made by upgrade and downgrade firms within 5 years before and after the bond rating change.

5.2 Univariate comparisons of acquirer and target firms

We compare the mean of the following variables: relative deal size, firm size, free cash flow, Tobin's q, leverage, operating income growth and stock price run-up (variables are defined in the appendix) of the upgrade and downgrade acquirer companies within three (five) years before the rating change announcements during 1985-2013, to evaluate if firm and deal characteristics are different before and after the rating changes for both upgrade and downgrade acquirer companies. Likewise, we calculate the mean of the variables, relative deal size, firm size, Tobin's q and premium of public target firms within three (five) years before and after the rating change during 1985-2013 to examine which characteristics of public target companies are associated with rating

upgrade and downgrade firms.

5.3 Logistic regression analysis

We estimate logistic regressions to determine if the acquisitions undertaken by our sample firms affect the likelihood of a positive or negative rating change. The dependent variable is the dummy variable which equals to 1 if the acquirer companies have upgrade bond rating change and 0 otherwise. Acquisitions that create shareholder wealth through positive synergies lower the risk for creditors. These firms are expected to experience a positive change in their credit ratings. On the other hand, acquisitions motivated by agency and hubris are associated with shareholder wealth destruction and reduced cash flows in the future. These firms are more likely to experience a rating down grade.

Here we examine the key explanatory variable for the mergers and acquisitions announcement effects by using market model adjusted stock returns surrounding the acquisition announcements date obtained from SDC. Market model estimates for each acquirer firms are obtained using 240 trading days of daily return ending 200 days before the acquisition announcement date (Masulis, Wang and Xie, 2007). We calculate 2-day, 3-day, 5-day and 11-day cumulative abnormal return (CARs) for each acquirer firm for the event windows $(-1,0)$, $(0,+1)$, $(-1,+1)$, $(-2,2)$, $(-5,5)$, where the event day 0 is the announcement date of acquisitions.

We also consider deal characteristics and acquirer characteristics as control factors. The control variables are adapted from Masulis, Wang and Xie (2007) and are defined as follows:

a) Deal characteristics: We control target public status, Fama-French industry relatedness of the acquisitions, whether the acquirer and target firms are both from the high tech industry, relative deal size and method of payments. We include public, private and subsidiary dummy variables to symbolize the target ownership status, and also use diversifying acquisition which is equal to one if the acquirer and target firms do not belong in the same Fama-French industry and zero otherwise.

We classify dummy variable high tech that equals to one if the acquirer and target firms are both from high-tech industries obtained from SDC and zero otherwise. We control for the methods of payments by two dummy variables: All-cash deal and stock deal. All-cash deal is the deal financed by pure cash and stock deal is the deal financed at least partially by stock.

b) Acquirer characteristics: We use firm size, free cash flow (FCF), Tobin's q, leverage, operating income growth, stock price run-up as control variables that are all described as acquirer characteristics. We evaluate firm size by using the log transformation of the total assets of acquirers', and calculate the free cash flow (FCF) by using Operating Income before Depreciation minus Interest and Related Expense minus Income Taxes minus Capital Expenditures, scaled by the book value of total assets. Tobin's q is defined by the market value of total assets divided by the book value of total assets, where the market value of total assets is evaluated by the book value of total assets minus the book value of total equity plus the market value of total equity, scaled by the book value of total assets, and the market value of total equity is calculated by the number of shares outstanding times the stock price at the end of 11 trading days prior to the announcement date. Leverage is equal to the sum of short-term debt and the long-term debt over the market value of total assets. Bidder management quality is measured by industry- adjusted operating income growth of acquirer firms over 3 years before the acquisitions. Finally, we examine the bidder's stock price run-up by buy-and-hold abnormal return (BHAR) with a 200-day time period from event day -210 to -11.

5.4 Assessing the Motives of Acquisitions

Berkovitch and Narayanan (1993) provide a simple and intuitive approach to determine acquisition motives by examining the relation between target gain, acquirer gain and total gain. They define target and acquirer gain as the change of the shareholders' wealth of the target and acquiring firms, and total gain is the sum of target and acquirer gain. The examination of the change of the shareholders' wealth are established on market model prediction errors. For each target and acquirer firm, the market model estimates are obtained by using 240 trading days of daily return

ending 200 days before the acquisition announcement date. The CAR of each target and acquirer firm is computed for a 11-day window defined as five days before the acquisition announcement date through five days after the acquisition announcement date.

The target gain is calculated by the target firms' CAR times the market value of target firms' common equity which is measured on the 6th trading day prior to the acquisition announcement date, minus the value of target firms' shares held by the acquirer before the transaction. The acquirer gain is calculated by the acquirer firms' CAR times the market value of acquirer firms' common equity which is measured on the 6th trading day prior to the acquisition announcement date. The total gain is the sum of the target gain and acquirer gain.

6. Empirical Results

6.1 Event study results for rating change and acquisition announcements

Table 4 shows the CARs using market model and market adjusted model in Panels A and B, respectively. The event days are (-1,0), (0,+1), (-1,+1), (-2,2), (-5,5) surrounding the bond rating change announcement. In Panel A, which reports the results using the market model approach, the CARs for upgrade firms are mostly positive and insignificant around the rating change announcements for the full sample as well as the subsamples of firms that made acquisitions and those that did not. The results for the full sample are mostly consistent with previous research. For downgrade firms, the CARs are negative and significant both in the full sample and the two subsamples, and turn to be more negative when the event window is longer. Firms that were downgraded and had made acquisitions in previous years are less negative compared to the firms that did not make any acquisitions. The smaller negative CARs for downgraded firms that made prior acquisitions suggests that some of the rating change announcement is most likely anticipated as a result of the poor acquisitions.

Panel B shows the results with market adjusted CARs. The CARs for upgrade firms are positive

and significant around the rating change announcements for the full sample as well as the subsample “firms who announced acquisitions before their bond rating change”. In the subsample “firms who no announced acquisitions before their bond rating change”, the significant CARs of 0.27% and 1.37% are observed for the (0,1) and (-5,5) windows, others are all insignificantly positive. Clearly, the choice of the risk adjustment model seems to impact the event study results due to run up prior to the rating change as noted by Holthausen and Leftwich (1986). For downgrade firms, the CARs are significantly negative for the full sample and the two subsamples. The CARs are, likewise, more positive (negative) when the event window is longer. Once again the CARs for the downgrade subsample with no M&As are more negative compared to the CARs for the subsample with M&As. Our results show that the negative returns suggest the downgrade firms either offer significant information to capital markets or impose costs on the affected firms (Holthausen and Leftwich, 1986).

We present t-statistics tests across the following groups: “upgrade companies with M&A announcements and without M&A announcements before bond rating announcement” and “downgrade companies with M&A announcements and without M&A announcements before bond rating announcement” by using market model and market adjusted model, separately, in Panels A and B in Table 5. For upgrade firms, the CARs for “companies with acquisitions announcements before bond rating announcements” are significantly bigger than “companies without acquisitions announcements before bond rating announcements” in event windows (-1,0), (0,1), (-1,1), (-2,2) both in Panel A and Panel B, which indicate that investors recognize the improving financial position of companies well through acquisitions before rating changes are acknowledged by the market.

We next calculate the CARs for the event windows (-1,0), (0,1), (-1,1), (-2,2) and (-5,5) surrounding the acquisitions announcements. Panel A and Panel B of Table 6 present the results measured by market model and market adjusted model, separately. Before the bond rating change

(3 years before and 5 years before), the CARs of the upgrade firms are generally higher than those of the downgrade firms, which imply that firms which make acquisitions that are accompanied by positive abnormal returns are more likely to get upgraded compared to firms which make acquisitions with negative abnormal returns. However, after the bond rating change (3 years after and 5 years after), the abnormal returns of acquisitions announced by downgrade firms are significantly higher, which reveal that downgrade firms make better quality acquisitions to improve firms' performance and prevent the continued rating downward trend. Additionally, we note that the number of firms that make acquisitions increases from before to after rating change period for the upgrade sample. However, for the downgrade sample, only about 50 percent of the firms make acquisitions after the negative rating change. There are two possible reasons for this. Downgraded firms are more cautious in long term M&A investments resulting in only a smaller subset making acquisitions after the rating change. Alternately, a subset of the downgraded firms possibly get delisted in the ensuing years which results in a smaller number of firms that are active in the acquisition market. We do not explore this issue further in this paper.

6.2 Characteristics of variables for target and acquirer firms

We compare the mean of the variables (defined in methodology section) of the upgrade and downgrade bond rating change acquirer companies within three (five) years before the rating change announcements during 1985-2013 in Table 7. The time period in Panel A is from Year -3 to Year 0 and in Panel B is from Year -5 to Year 0, where Year 0 is the bond rating change announcement year. Column 1 shows the variables Relative deal size, Firm size, FCF, Tobin's q, Leverage, Operating income growth and Stock price run-up. Columns 2 and 3 display the mean of the variables in the subsample of upgrade and downgrade rating acquirer firms with standard deviation shown in parentheses. Columns 4 and 5 present the t-statistics and p-value for each variable.

For the time period from Year-3 to Year 0 in panel A, the mean Tobin's q of upgrade firms is 1.5079,

which is significantly smaller than the mean Tobin's q of downgrade firms 1.6044 on 1%-level ($p=0.0091$). This suggests that firms with higher Tobin's q are more likely to get a rating downgrade, since these high growth firms take on more risk when acquiring targets and generate negative dollar synergies. The pre-announcement stock price run-up of the acquirers' is also significantly different for the two groups. The average of stock price run-up of upgrade firms is -0.0529, which is significantly higher than the average of stock price run-up of downgrade firms -0.1732 on 1%-level ($p=0.0002$). This result suggests that firms with higher buy-and-hold abnormal return leading up to the acquisition are likely making value maximizing acquisitions and have a greater possibility to get a rating upgrade. Consistent with this result, from Year-5 to Year 0 in panel B, we find the mean Tobin's q of upgrade firms is 1.5167, which is significantly smaller than the mean Tobin's q of downgrade firms 1.5945 on 1%-level ($p=0.007$). The average stock price run-up of upgrade firms is -0.0503, which is significantly higher than the average of stock price run-up of downgrade firms -0.1744 on 1%-level ($p<0.0001$). Furthermore, the average of leverage of upgrade firms is 0.0838, which is significantly less than the average of leverage of downgrade firms 0.0937 at 5%-level ($p=0.0314$). Firms with more debts are more likely to face financial distress and get a rating downgrade compared with firms with less debt. It is however interesting to note that firms that are subsequently downgraded are high growth (Tobin's q) but have larger debt. This is inconsistent with the vast body of literature on corporate capital structure which shows a negative relation between firm growth and leverage (Myers, 1977; Myers and Majluf, 1984; Titman and Wessels, 1988; Rajan and Zingales, 1995). The mean of operating income growth of upgrade firms is 1.3325, which is marginally significantly higher than the mean of operating income growth of downgrade firms 1.0820 at the 10%-level ($p=0.0716$). This provides some evidence that firms with better management quality make better acquisitions for companies' shareholders and reduced risk for creditors as evidenced by subsequent bond upgrades. These two results are consistent with those shown in panel A from Year -3 to Year 0, although the results for operating income growth in panel A are statistically insignificant.

In Table 8 we compare the mean of variables (defined in methodology section) of the public target firms acquired by upgrade and downgrade acquirer companies separately in the time period 3 years (5 years) before and after the bond rating change. From Panels A and C in Table 8, we observe that before the bond rating change, the upgrade firms acquire targets with lower Tobin's q and pay lower premium compared to downgrade firms, albeit some results are insignificant. And from Panels B and D, after the bond rating change, the upgrade firms continue to pay lower premium and acquire mostly smaller size target as compared to downgrade firms. For the most part, however, the evidence in Table 8 suggests that there is not much difference in the characteristics of the public targets in terms of relative deal size, firm size, Tobin's q and the premium paid in the acquisition.

6.3 Logistic regression analysis

We next undertake cross-sectional analyses to determine if the types of acquisitions preceding the rating change can predict the bond rating revision. The analysis so far suggests that firms with rating upgrades are associated with positive acquisition announcement returns in the years before the rating change while those with a rating downgrade have negative abnormal returns around acquisition announcements. We now employ logistic regressions, controlling for other factors that affect acquisition motives, to determine the likelihood of a rating upgrade or downgrade.

Before the bond rating change, our samples contain 1,643 completed U.S. mergers and acquisitions within 3 years before their bond rating announcements from 1988-2013 and 2,566 acquisitions within 5 years before the bond rating change during 1985-2013. We implement logistic regressions by using the variables noted previously to examine whether mergers and acquisition activities influence the acquirer firms' future bond rating change. The dependent variable is the dummy variable which equals to 1 if the acquirer companies have upgrade bond rating change and 0 otherwise. The results are displayed in Tables 9 and 10. The key explanation variable is acquirers' announcement-period CAR, which represent the acquirer returns during acquisitions. Columns 2 to 6 present the coefficients of independent variables and the dependent variable which

equals to 1 if the acquirer companies have upgrade bond rating change and 0 otherwise during the event days (-1,0), (0,+1), (-1,+1), (-2,2), (-5,5).

From Table 9, we can conclude that the possibility of firms getting an upgrade rating change is positively related to the acquirers' announcement-period CARs, stock deal, free cash flow, operating income growth and stock price run-up. First, the acquirers' announcement-period CARs are significantly positive related to acquirer firms' upgrade rating change during each event window on 1%-level, which strongly support our hypothesis about bond rating change is a response to companies' past mergers and acquisitions activities (H1). The performance of investment activity clearly is a significant determining factor for rating revisions. Second, the control variable stock deal is significantly positively related to acquirer firms' upgrade rating change during each event window on 1%-level, which means firms are more likely to experience upgrade rating change by paying for their acquisitions with at least partially by stock. Since private and subsidiary targets make up most of the acquisitions (85.5%) in our sample, the stock price influence of stock deals may be less negative or even turn out to be positive if the target is private (Fuller, Netter and Stegemoller, 2002). New blockholders may be brought into the stock acquisitions from the target shareholders, and the bidding firm probably will benefit from these positive monitoring actions of their firm management by these blockholders (Chang, 1998). Third, the variables free cash flow and operating income growth are significantly positively related to acquirer firms' upgrade rating change through each event windows on 5%-level, which suggest that higher free cash flow is a proxy for better firm performance and higher quality managers tend to make better acquisitions. For the stock price run-up, the coefficients estimated are significantly positive during each event window on 1%-level, which indicates that acquirer pre-announcement buy-and-hold abnormal return effect acquirer firms' bond rating upgrade positively and significantly.

Also, from Table 9 we determine that the possibility of firms getting upgrade rating change is

negatively related to diversifying acquisition, relative deal size and Tobin's q. Diversifying acquisition is significantly negatively related to firm upgrade rating change during each event window on 1%-level, which is consistent with the previous finding about diversifying acquisitions generally destroying shareholder value and possibly benefit self-interested managers (Morck, Shleifer and Vishny, 1990). Relative deal size is significantly negatively related to firm upgrade rating change through each event window on 5%-level, though the numbers are small (-0.0003), perhaps because of large acquirers (Moeller, Schlingemann and Stulz, 2004). Firm performance variables such as Tobin's q is significantly negatively related to firm upgrade rating change during each event window on 1%-level. These results reflect that, on average, higher growth firms are more likely to pay higher premiums due to agency and hubris (Roll, 1986). Thus, managers from high growth firms are more likely to make the value-reducing acquisitions especially with more debts and less free cash flows followed.

Table 10 shows the results for time period from Year -5 to Year 0. The results overall are qualitatively similar to those reported in Table 9. The possibility of firms getting upgrade rating change is positively related to the acquirers' announcement-period CARs, stock deal, operating income growth and stock price run-up. Though the free cash flow variable is not statistically significant, it is still positively related to likelihood of bond rating upgrades following these acquisitions. Meanwhile, diversifying acquisition, Tobin's q and leverage are negatively related to bond upgrades and are statistically significant. Leverage is also an essential governance mechanism, since higher leverage reduces the future free cash flow and limits managerial discretion. Though the relative deal size turns out to be statistically insignificant, it is still negatively related to bond upgrades.

6.4 Analysis of Motives of Acquisitions

In this section we investigate the rationale behind takeovers and if they are related to acquirer bond rating change. We compute the relation between target gain and total gain, and target gain and

acquirer gain to distinguish between the three motives: synergy, agency and hubris (Berkovitch and Narayanan, 1993). Our sample only contain acquisitions where both the acquirer and target firms are public. The sample size for this analysis is significantly reduced as most targets in our sample are private firms. The results for acquisitions prior to the bond rating change are shown in Table 11 while the results for acquisitions after the bond rating change are shown in Table 12.

From Panel A in Table 11, we note that target gain is positively related to total gain in the total “acquisitions announced by upgrade firms within 5 years before the rating change” sample at the 1%-level ($\beta=0.0653$, $p=0.0003$) as well as in the positive total gain subsample at the 1%-level ($\beta=0.1384$, $p=0.0004$). Meanwhile the estimate of β in the negative total gain subsample is positive and insignificant. These results strongly support our hypothesis that synergy is the prime motive in acquisitions announced by upgrade acquirer firms before the bond rating change, while the agency and hubris hypothesis are rejected for this group. This result is consistent with our prior findings about “good” acquisitions, that had a positive abnormal return on the announcement date, have a positive effect on rating revisions. Panel B provides the regressions between target and acquirer gain for the same sample as in Panel A. Target gain and acquirer gain is positively correlated in the total sample of “acquisitions announced by upgrade firms within 5 years before the rating change” and positive total gain subsample, and negatively correlated in negative total gain subsample, though the results are insignificant. In panel C, target gain is positive and insignificantly related to total gain in the total sample of “acquisitions announced by downgrade firms within 5 years before the rating change”. In the subsample of negative total gain, the correlation is negative and insignificant, while in the subsample of positive total gain the correlation is positive and significant, which implies that synergy is still a motive in positive total gain group of acquisitions announced by downgrade acquirer firms before bond rating change, and agency is a likely motive in negative total gain group though the result is insignificant. In panel D, target gain is negative and insignificantly related to acquirer gain in the total “acquisitions announced by downgrade firms within 5 years before the rating change” sample as well as in

positive total gain subsample. In the negative total subsample, the estimate is negative and significant on 5%-level ($\beta=-0.0373$, $p=0.0226$), which suggests the presence of agency in takeovers announced by downgrade firms before the bond rating change.

The results in Table 11 strongly suggest that firms that experience ratings upgrades tend to make value-enhancing acquisitions in the years preceding the rating change. For the downgrade sample, both synergy and agency appear to exist as motives. For the subgroup with positive total gains it is synergy while for the subgroup with negative total gains it is agency.

Our earlier analysis suggests that firm with ratings downgrades are more cautious in acquisitions after the rating change. We noted this from the positive abnormal returns for acquisitions by these firms in the post rating change period. We further examine the motives for acquisitions after the ratings change using target gain, acquirer gain and total gain. The results are shown in Table 12. From panel A, the correlation between target and total gain is negative and insignificant in sample “acquisitions announced by upgrade firms within 5 years after the rating change”. For subsample negative total gain, the estimate of β is -0.0211 ($p=0.0264$), and for subsample positive total gain, the estimate of β is 0.0423 ($p=0.0047$). The estimates are significant at 5%-level and 1%-level, respectively. These result suggests that after the bond rating change, for the upgraded rating change firms the overall evidence suggests that both synergy and agency are motives, whereas prior to the rating change, synergy was the dominant motive. We do not find evidence for the hubris hypothesis in this group. Panel B shows the correlation between target and acquirer gain is negative and significant in subsample negative total gain at 1%-level ($\beta=-0.0269$, $p=0.0033$), while the estimate in the subsample of positive total gain it is positive and insignificant, which suggests that agency is a motive in this sample. It thus appears that some of the upgraded firms pursue more aggressive and riskier M&A strategies after the rating change. In panel C, the estimates of β are positive and significant in sample “acquisitions announced by downgrade firms within 5 years after the rating change” ($\beta=0.2010$, $p<0.0001$), the subsample of negative total gain

($\beta=0.2185$, $p<0.0001$) and the subsample positive of total gain ($\beta=0.1339$, $p=0.0038$). These results strongly suggest that after a bond rating downgrade, synergy is a primary motive for takeovers announced by these acquirers. This result is very consistent with our hypothesis that downgraded firms make suitable adjustments to their acquisition strategies to prevent a continued decline in the firm's financial performance. From panel D, the correlations between target and acquirer gain are positive in the sample “acquisitions announced by downgrade firms within 5 years after the rating change” ($\beta=0.1814$, $p<0.0001$) and subsample negative total gain ($\beta=0.2348$, $P<0.0001$), both estimates are significant on 1%-level, which again means that synergy is the primary motive. There is no evidence for agency or hubris in this sample for acquisitions made after the rating change.

7. Conclusions

Previous studies have mostly focused on the relation between bond rating change and firms' financial performance. In this study, we examine the impact of acquisitions on the likelihood of a positive or a negative rating change and any change in subsequent acquisition strategy.

The abnormal returns for downgrade firms surrounding the bond rating change are significantly negative, largely because the downgrade firms either offer significant information to capital markets or impose costs on the affected firms. There is some evidence that upgrade firms show positive abnormal returns but otherwise they are not statistically significant. These results are largely consistent with the prior literature. For the upgrade firms with acquisitions announced during the pre-rating change period, we observe higher positive abnormal returns than upgrade non-acquirer firms, which suggests that investors recognize the improving financial position of companies well through acquisitions before rating changes are acknowledged by the market. On the other hand, firms with ratings downgrades that made prior acquisitions experience less negative abnormal returns on the announcement of the rating change compared to firms that made no acquisitions. This suggests that some of the information in the rating change announcement is

anticipated for this group due to the poor acquisition decisions made by these firms.

We also find significant higher acquirers' M&A announcement-period CARs for rating upgrades before the rating change, which suggest that mergers and acquisitions activities provide information to rating agencies and financial market, and firms which announced higher abnormal return acquisitions are significantly more likely to get rating upgrades, whereas firms with a rating downgrade had abnormal returns around acquisitions that were either negative or statistically not significant. Meanwhile, higher free cash flow and stock price run-up, better management quality, lower Tobin's q and lower leverage, acquisitions that are non-diversifying and with smaller relative deal size and financed by at least partially with stock have a positive influence on rating revision.

Rating upgrades are preceded mainly by synergy motivated acquisitions while both synergy and agency appear to be motives for these firms subsequent to the rating upgrade. Rating downgrades, on the other hand, are preceded by acquisitions that have synergy and agency as motives. However, in subsequent years, the downgrade firms appear to apply remedial measures on their long-term investment activities. They make fewer but value-increasing acquisitions which reduce the lenders' risks and prevents from further downgrades.

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Appendix: Variable Definitions

Variable	Definitions
Panel A: Abnormal return and bond rating change	
CAR(-1,0)	2-day cumulative abnormal return calculated by the market model which is estimated over the time period (-210,-11) with the CRSP value-weighted return as market index.
CAR(0,+1)	2-day cumulative abnormal return calculated by the market model which is estimated over the time period (-210,-11) with the CRSP value-weighted return as market index.
CAR(-1,+1)	3-day cumulative abnormal return calculated by the market model which is estimated over the time period (-210,-11) with the CRSP value-weighted return as market index.
CAR(-2,+2)	5-day cumulative abnormal return calculated by the market model which is estimated over the time period (-210,-11) with the CRSP value-weighted return as market index.
CAR(-5,+5)	11-day cumulative abnormal return calculated by the market model which is estimated over the time period (-210,-11) with the CRSP value-weighted return as market index.
Panel B: Deal Characteristics	
Public target	Dummy variable: 1 if public target firms, 0 otherwise.
Private target	Dummy variable: 1 if private target firms, 0 otherwise.
Subsidiary target	Dummy variable: 1 if subsidiary private firms, 0 otherwise.
Diversifying acquisition	Dummy variable: 1 for bidder and target do not both from a Fama-French industry, 0 otherwise.
High tech	Dummy variable: 1 if both bidder and target are from high tech industries, 0 otherwise.
Relative deal size	Deal value (SDC) divided by bidder market value of equity.
All-cash deal	Dummy variable: 1 if it's pure cash-financed deals, 0 otherwise.
Stock deal	Dummy variable: 1 if it's at least partially stock-financed deals, 0 otherwise.
Panel C: Firm Characteristics	
Firm size	Log of book value of the total assets
Market value of equity	Number of shares outstanding multiplies the stock price in the end of 11 trading day before announcement date.
Free cash flow	(Operating Income before Depreciation–Interest and Related Expense–Income Taxes–Capital Expenditures)/the book value of total assets
Tobin's q	(Book value of assets–Book value of equity+Market value of equity)/Book value of assets
Leverage	(Short-term debt+ Long-term debt)/(Book value of assets–Book value of equity+ Market value of equity)
Operating income growth	(EBITDA _{t-1} – EBITDA _{t-4})/EBITDA _{t-4}
Stock price runup	Acquirer's buy-and-hold abnormal return in the period (-210,-11) with the CRSP value-weighted return.
Premium 1 week prior to announcement	Offer price/Target's stock price 1 week before the merger public announcement date
Premium 4 week prior to announcement	Offer price/Target's stock price 4 weeks before the merger public announcement date

Table 1. Bond Rating Change Distribution by Announcement Year

This data consists of 2092 announcements of U.S. bond rating changes during 1990 to 2012 (listed on Moody's), which include 875 rating upgrades and 1217 rating downgrades. This sample includes those observations when a single bond rating change occurred within 3 years for each company.

Year	Number of bond rating change announcements	Percentage of total sample	Number of bond upgrade rating change announcements	Number of bond downgrade rating change announcements
1990	80	3.82%	20	60
1991	46	2.20%	18	28
1992	31	1.48%	17	14
1993	52	2.49%	26	26
1994	66	3.16%	39	27
1995	66	3.16%	31	35
1996	83	3.97%	57	26
1997	66	3.16%	32	34
1998	86	4.11%	32	54
1999	86	4.11%	30	56
2000	98	4.69%	30	68
2001	78	3.73%	14	64
2002	202	9.66%	34	168
2003	146	6.98%	47	99
2004	117	5.59%	60	57
2005	84	4.02%	41	43
2006	86	4.11%	51	35
2007	104	4.97%	50	54
2008	118	5.64%	28	90
2009	93	4.44%	28	65
2010	99	4.73%	71	28
2011	84	4.02%	51	33
2012	121	5.78%	68	53
Total	2092	100%	875	1217

Table 2. Summary Distribution of Acquisitions Announced within 3 years before and after the Bond Rating Change

This sample concludes 4408 mergers and acquisitions announced by bond rating change companies within 3 years before and after the bond rating change from 1987 to 2013. There are 1028 mergers and acquisitions announced by upgrade rating change companies and 1395 mergers and acquisitions announced by downgrade rating change companies within 3 years before the bond rating change. Meanwhile, 1290 mergers and acquisitions announced by upgrade rating change companies and 695 mergers and acquisitions announced by downgrade rating change companies within 3 years after the bond rating change.

Year	3 Years before		3 Years after	
	UPG	DNG	UPG	DNG
1987	3	3		
1988	11	21		
1989	16	22		
1990	19	32		3
1991	33	15	7	10
1992	22	24	17	20
1993	52	27	25	22
1994	54	28	49	27
1995	73	38	49	18
1996	75	94	81	27
1997	82	145	106	33
1998	49	134	131	41
1999	58	152	88	42
2000	48	137	76	35
2001	41	115	40	53
2002	57	62	30	46
2003	40	52	51	48
2004	47	45	73	56
2005	39	40	66	37
2006	27	71	58	31
2007	45	57	78	24
2008	31	30	44	17
2009	30	12	20	13
2010	41	16	38	23
2011	26	18	42	32
2012	9	5	72	19
2013			49	18
Total	1028	1395	1290	695

Table 3. Summary Distribution of Acquisitions Announced within 5 years before and after the Bond Rating Change

This sample consists total 6794 mergers and acquisitions made by bond rating change companies 5 years before and after the bond rating change listed on SDC between 1985 and 2013. There are 1616 mergers and acquisitions announced by upgrade rating change companies and 2260 mergers and acquisitions announced by downgrade rating change companies within 5 years before the bond rating change. Meanwhile, 1770 mergers and acquisitions announced by upgrade rating change companies and 1148 mergers and acquisitions announced by downgrade rating change companies within 5 years after the bond rating change.

Year	5 Years before		5 Years after	
	UPG	DNG	UPG	DNG
1985		3		
1986	8	26		
1987	13	16		
1988	19	35		
1989	30	35		
1990	29	47		3
1991	56	28	7	10
1992	44	35	17	20
1993	85	40	27	27
1994	93	59	58	40
1995	93	102	59	34
1996	103	154	100	41
1997	115	237	125	59
1998	95	280	159	51
1999	100	254	130	60
2000	80	190	112	48
2001	62	136	81	65
2002	79	84	54	74
2003	59	77	79	82
2004	57	94	91	75
2005	61	77	79	79
2006	75	81	94	86
2007	95	79	111	71
2008	56	38	70	40
2009	33	14	40	21
2010	41	16	61	31
2011	26	18	65	42
2012	9	5	85	50
2013			66	39
Total	1616	2260	1770	1148

Table 4. Event Study Results for Bond Rating Change Announcement Date

This table presents the event study results for the cumulative abnormal return around bond rating change announcement day by market model and market adjusted model, separately. Day 0 is the bond rating change announcement day. The event windows include 2-day, 3-day, 5-day, 11-day and 21-day. The numbers of patell Z-test are reported in parentheses.

	All rating changes		M&A announced before rating changes		No M&A announced before rating changes	
<i>Panel A: Value weighted by market model</i>						
Days relative to the event day	UPG	DNG	UPG	DNG	UPG	DNG
(-1,0)	0.12% (1.155)	-1.06%*** (-8.069)	0.17%* (1.320)	-0.75%*** (-5.653)	0.00% (0.118)	-1.77%*** (-6.078)
(0,1)	0.15%* (1.474)	-1.37%*** (-10.349)	0.18% (1.114)	-1.25%*** (-9.180)	0.08% (0.981)	-1.64%*** (-4.883)
(-1,1)	0.10% (1.01)	-1.70%*** (-10.056)	0.17% (1.131)	-1.41%*** (-7.945)	-0.04% (0.136)	-2.37%*** (-6.216)
(-2,2)	0.06% (0.846)	-2.19%*** (-9.923)	0.15% (0.992)	-1.98%*** (-7.802)	-0.12% (0.049)	-2.67%*** (-6.190)
(-5,5)	-0.30% (-0.416)	-2.31%*** (-7.304)	-0.59%* (-1.302)	-2.08%*** (-5.638)	0.34% (1.164)	-2.84%*** (-4.715)
Number of obs.	750	914	511	636	239	278
<i>Panel B: Value weighted by market adjusted returns</i>						
Days relative to the event day	UPG	DNG	UPG	DNG	UPG	DNG
(-1,0)	0.30%*** (2.414)	-1.23%*** (-8.985)	0.38%*** (2.464)	-0.94%*** (-6.538)	0.13% (0.675)	-1.91%*** (-6.399)
(0,1)	0.30%*** (2.532)	-1.56%*** (-11.373)	0.31%** (1.900)	-1.43%*** (-9.909)	0.27%** (1.706)	-1.87%*** (-5.636)
(-1,1)	0.35%*** (2.513)	-1.98%*** (-11.226)	0.43%*** (2.423)	-1.67%*** (-8.859)	0.18% (0.91)	-2.69%*** (-6.954)
(-2,2)	0.57%*** (3.143)	-2.70%*** (-11.781)	0.67%*** (2.953)	-2.45%*** (-9.267)	0.37% (0.961)	-3.27%*** (-7.343)
(-5,5)	0.91%*** (3.243)	-3.49%*** (-10.492)	0.69%** (2.001)	-3.21%*** (-8.313)	1.37%*** (2.817)	-4.13%*** (-6.450)
Number of obs.	750	914	511	636	239	278

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively, using a generic one-tail test.

Table 5. Comparison of Bond Rating Firm with and without M&As

This table presents t statistics results for two following groups, “upgrade companies with M&A announcements and without M&A announcements before bond rating announcement” and “downgrade companies with M&A announcements and without M&A announcements before bond rating announcement”, the results are presented by using market model and market adjusted model, separately, in Panel A and Panel B. The numbers of patell Z-test are reported in parentheses.

	UPG				DNG			
<i>Panel A: Value weighted by market model</i>								
Days relative to the								
event day	M&A	no M&A	T stat	P-value	M&A	no M&A	T stat	P-value
(-1,0)	0.17%* (1.320)	0.00% (0.118)	1.9444*	0.0524	-0.75%*** (-5.653)	-1.77%*** (-6.078)	2.4880**	0.0131
(0,1)	0.18% (1.114)	0.08% (0.981)	1.8245*	0.0686	-1.25%*** (-9.180)	-1.64%*** (-4.883)	1.9224*	0.0550
(-1,1)	0.17% (1.131)	-0.04% (0.136)	1.9663**	0.0498	-1.41%*** (-7.945)	-2.37%*** (-6.216)	2.2823**	0.0228
(-2,2)	0.15% (0.992)	-0.12% (0.049)	1.9884**	0.0473	-1.98%*** (-7.802)	-2.67%*** (-6.190)	1.9377*	0.0531
(-5,5)	-0.59%* (-1.302)	0.34% (1.164)	-1.4769	0.1403	-2.08%*** (-5.638)	-2.84%*** (-4.715)	1.9029*	0.0575
Number of obs.	511	239			636	278		
<i>Panel B: Value weighted by market adjusted returns</i>								
Days relative to the								
event day	M&A	no M&A	T stat	P-value	M&A	no M&A	T stat	P-value
(-1,0)	0.38%*** (2.464)	0.13% (0.675)	2.0846**	0.0376	-0.94%*** (-6.538)	-1.91%*** (-6.399)	2.4366**	0.0151
(0,1)	0.31%** (1.900)	0.27%** (1.706)	1.7403*	0.0824	-1.43%*** (-9.909)	-1.87%*** (-5.636)	1.9569*	0.0508
(-1,1)	0.43%*** (2.423)	0.18% (0.910)	2.0220**	0.0437	-1.67%*** (-8.859)	-2.69%*** (-6.954)	2.3247**	0.0204
(-2,2)	0.67%*** (2.953)	0.37% (0.961)	2.0240**	0.0435	-2.45%*** (-9.267)	-3.27%*** (-7.343)	2.0049**	0.0454
(-5,5)	1.37%*** (2.817)	0.69%** (2.001)	1.088	0.2771	-3.21%*** (-8.313)	-4.13%*** (-6.450)	1.9560*	0.0509
Number of obs.	511	239			636	278		

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively, using a generic one-tail test.

Table 6. Event Study Results for Mergers and Acquisitions Announcement Date

This table shows the event study results for the cumulative abnormal return around mergers and acquisitions announcement day by market model and market adjusted model, separately. Day 0 is the mergers and acquisitions announcement day. The event windows include 2-day, 3-day, 5-day, 11-day and 21-day. The numbers of patell Z-test are reported in parentheses.

	3 Years before		3 Years after		5 Years before		5 Years after	
<i>Panel A: Value weighted by market model</i>								
Days relative to the event day	UPG	DNG	UPG	DNG	UPG	DNG	UPG	DNG
(-1,0)	0.50%*** (4.551)	-0.22%*** (-2.944)	0.19%** (2.239)	0.13% (0.374)	0.54%*** (5.462)	-0.10%*** (-2.581)	0.16%*** (2.919)	0.07% (0.361)
(0,1)	0.81%*** (7.527)	0.23%* (1.287)	0.45%*** (5.015)	0.81%*** (4.251)	0.92%*** (9.750)	0.33%*** (2.927)	0.42%*** (5.652)	0.63%*** (4.976)
(-1,1)	0.82%*** (6.284)	0.09% (-0.383)	0.35%*** (3.214)	0.57%*** (2.407)	0.93%*** (8.067)	0.22% (0.769)	0.35%*** (4.127)	0.44%*** (2.746)
(-2,2)	0.62%*** (4.086)	-0.19%** (-1.964)	0.33%*** (2.561)	0.69%** (2.134)	0.87%*** (6.261)	0.05% (-0.651)	0.36%*** (3.539)	0.46%** (2.143)
(-5,5)	0.64%*** (2.879)	-0.66%*** (-3.506)	0.22% (0.632)	0.74%** (2.322)	0.79%*** (4.031)	-0.36%*** (-2.942)	0.31%* (1.593)	0.53%*** (2.466)
Number of obs.	993	1337	1274	676	1564	2143	1750	1107
<i>Panel B: Value weighted by market adjusted returns</i>								
Days relative to the event day	UPG	DNG	UPG	DNG	UPG	DNG	UPG	DNG
(-1,0)	0.69%*** (6.025)	-0.09%** (-1.986)	0.33%*** (3.773)	0.14% (0.325)	0.72%*** (7.163)	0.01%* (-1.519)	0.31%*** (4.688)	0.12% (0.673)
(0,1)	1.01%*** (9.024)	0.32%** (2.009)	0.56%*** (6.021)	0.92%*** (4.711)	1.10%*** (11.425)	0.41%*** (3.698)	0.54%*** (7.021)	0.73%*** (5.559)
(-1,1)	1.10%*** (8.063)	0.25% (0.552)	0.53%*** (4.696)	0.65%*** (2.612)	1.19%*** (10.091)	0.35%** (1.762)	0.53%*** (5.910)	0.54%*** (3.259)
(-2,2)	1.09%*** (6.396)	0.01% (-0.934)	0.63%*** (4.588)	0.88%*** (2.730)	1.29%*** (8.820)	0.26% (0.693)	0.66%*** (5.940)	0.67%*** (3.122)
(-5,5)	1.67%*** (6.325)	-0.15%** (-1.781)	0.83%*** (3.477)	1.27%*** (3.508)	1.69%*** (7.734)	0.16% (-0.707)	0.90%*** (4.828)	1.06%*** (4.193)
Number of obs.	993	1337	1274	676	1564	2143	1750	1107

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively, using a generic one-tail test.

Table 7. Comparison of Variables for Acquirer Firms within 3 Years before and 5 Years before the Bond Rating Change

This sample concludes 1463 mergers and acquisitions announced by bond rating change companies within 3 years before and 2566 announced within 5 years before the bond rating change from 1985 to 2013. The table displays the estimate of the mean of variables of the upgrade and downgrade bond rating change acquirer companies within three years and five years before the bond rating change, standard deviation are shown in parentheses.

	UPG	DNG	T Stat	P-value
<i>Panel A. Acquirer companies within 3 years before the bond rating change</i>				
Relative deal size	0.0901 (0.3053)	0.1291 (0.6269)	1.54	0.1241
Firm size	3.4851 (0.6309)	3.4533 (0.6106)	-1.03	0.3018
Free cash flow	0.0176 (0.1203)	0.0109 (0.0951)	-1.27	0.2058
Tobin's q	1.5079 (0.5975)	1.6044 (0.8423)	2.61***	0.0091
Leverage	0.0819 (0.1115)	0.0891 (0.1131)	1.27	0.2031
Operating income growth	1.3186 (4.2730)	1.0686 (3.3895)	-1.32	0.1863
Stock price runup	-0.0529 (0.6831)	-0.1732 (0.6321)	-3.70***	0.0002
Number of obs.	724	919		
<i>Panel B. Acquirer companies within 5 years before the bond rating change</i>				
Relative deal size	0.1057 (0.4046)	0.1129 (0.5316)	0.38	0.7073
Firm size	3.4480 (0.6263)	3.4395 (0.5908)	-0.35	0.7265
Free cash flow	0.0169 (0.1105)	0.0160 (0.1012)	-0.22	0.8290
Tobin's q	1.5167 (0.6152)	1.5945 (0.7990)	2.70***	0.0070
Leverage	0.0838 (0.1113)	0.0937 (0.1173)	2.17**	0.0302
Operating income growth	1.3325 (4.0445)	1.0820 (2.9933)	-1.80*	0.0716
Stock price runup	-0.0503 (0.6665)	-0.1744 (0.8160)	-4.13***	<.0001
Number of obs.	1116	1450		

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively.

Table 8. Comparison of Variables for Target Firms

This table shows the evaluation of the mean of variables of the public target companies acquired by upgrade rating companies and downgrade rating companies within 3 years (Panel A and Panel B) and 5 years (Panel C and Panel D) before and after the announcement of bond rating change during 1985-2013, standard deviation are shown in parentheses.

	UPG	DNG	T Stat	P-value
<i>Panel A. Target companies within 3 years before the bond rating change</i>				
Relative deal size	0.4411 (0.7361)	0.8103 (1.7639)	1.57	0.1186
Firm size	2.6769 (0.6628)	2.5967 (0.6948)	-0.71	0.4811
Tobin's q	1.5137 (0.7613)	1.8257 (1.2645)	1.74*	0.0836
Premium 1 week prior to announcement	30.7677 (27.6382)	37.9522 (26.2657)	1.60	0.1112
Premium 4 week prior to announcement	37.6619 (35.8543)	44.2987 (37.4701)	1.08	0.2810
Number of obs.	64	82		
<i>Panel B. Target companies within 3 years after the bond rating change</i>				
Relative deal size	0.5218 (1.4561)	0.4976 (0.7659)	-0.10	0.9173
Firm size	2.6512 (0.7597)	2.9011 (0.6891)	1.84*	0.0674
Tobin's q	1.7252 (1.4265)	1.4589 (0.4846)	-1.21	0.2270
Premium 1 week prior to announcement	37.7365 (40.5922)	47.1004 (46.1907)	1.20	0.2342
Premium 4 week prior to announcement	39.5444 (42.1316)	62.8509 (77.2239)	2.24**	0.0269
Number of obs.	86	45		
<i>Panel C. Target companies within 5 years before the bond rating change</i>				
Relative deal size	0.5514 (0.9668)	0.6647 (1.5052)	0.63	0.5272
Firm size	2.6439 (0.6825)	2.4963 (0.7298)	-1.52	0.1304
Tobin's q	1.6625 (1.0860)	1.9100 (1.5119)	1.34	0.1818
Premium 1 week prior to announcement	29.6141 (27.2154)	36.6435 (29.9552)	1.78*	0.0764
Premium 4 week prior to announcement	36.9399 (34.9058)	41.2499 (37.2223)	0.87	0.3864
Number of obs.	92	127		
<i>Panel D. Target companies within 5 years after the bond rating change</i>				
Relative deal size	0.5070 (1.2861)	0.4405 (0.7449)	-0.39	0.6947
Firm size	2.6849 (0.7895)	2.9074 (0.7871)	1.86*	0.0639
Tobin's q	1.6827 (1.2585)	1.4838 (0.6370)	-1.22	0.2223
Premium 1 week prior to announcement	37.5278 (37.6956)	39.5861 (43.0598)	0.34	0.7325
Premium 4 week prior to announcement	40.9434 (39.4315)	50.4449 (67.0086)	1.22	0.2222
Number of obs.	119	69		

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively.

Table 9. Logistic Regression Analysis for Acquirer Companies within 3 years before Bond Rating Change

This sample consists of 1643 completed U.S. mergers and acquisitions made by acquirer companies within 3 years before their bond rating change from SDC during 1987-2013. The dependent variable is the dummy variable which equals to 1 when the acquirer companies have upgrade bond rating change and 0 otherwise. P-values are shown in parentheses. Variable definitions are in the Appendix.

Variables:					
Days relative to the event day	-1 to 0	0 to +1	-1 to +1	-2 to +2	-5 to +5
CAR	4.6570*** (0.0002)	3.4522*** (0.0020)	3.3422*** (0.0007)	2.4294*** (0.0032)	1.5932*** (0.0063)
<i>Deal Characteristics:</i>					
Public target	-0.2790 (0.5168)	-0.2966 (0.4913)	-0.2995 (0.4868)	-0.2994 (0.4872)	-0.2996 (0.4863)
Private target	-0.0175 (0.9655)	-0.0257 (0.9493)	-0.0220 (0.9566)	-0.0189 (0.9627)	-0.0157 (0.9689)
Subsidiary target	-0.0149 (0.9706)	-0.0276 (0.9456)	-0.0224 (0.9558)	-0.0189 (0.9627)	-0.0129 (0.9746)
Diversifying acquisition	-0.3865*** (0.0002)	-0.3844*** (0.0002)	-0.3887*** (0.0002)	-0.3871*** (0.0002)	-0.3887*** (0.0002)
High tech	-0.0551 (0.6715)	-0.0493 (0.7036)	-0.0477 (0.7129)	-0.0519 (0.6890)	-0.0534 (0.6803)
Relative deal size	-0.0003** (0.0473)	-0.0003* (0.0694)	-0.0003* (0.0618)	-0.0003* (0.0569)	-0.0003** (0.0488)
All-cash deal	0.0674 (0.5765)	0.0523 (0.6644)	0.0570 (0.6365)	0.0565 (0.6393)	0.0623 (0.6051)
Stock deal	0.5218*** (0.0007)	0.5256*** (0.0006)	0.5279*** (0.0006)	0.5332*** (0.0005)	0.5319*** (0.0005)
<i>Acquirer Characteristics:</i>					
Firm size	0.1324 (0.1357)	0.1213 (0.1713)	0.1318 (0.1383)	0.1170 (0.1857)	0.1105 (0.2107)
Free cash flow	1.2459** (0.0229)	1.2089** (0.0274)	1.2181** (0.0264)	1.2475** (0.0232)	1.2143** (0.0262)
Tobin's q	-0.3048*** (0.0001)	-0.3056*** (0.0001)	-0.3071*** (0.0001)	-0.3028*** (0.0001)	-0.2887*** (0.0003)
Leverage	-0.6837 (0.1633)	-0.7096 (0.1472)	-0.7180 (0.1423)	-0.7449 (0.1278)	-0.7583 (0.1213)
Operating income growth	0.0296** (0.0403)	0.0288** (0.0466)	0.0287** (0.0476)	0.0285** (0.0487)	0.0291** (0.0437)
Stock price runup	0.3186*** (0.0001)	0.3199*** (0.0001)	0.3194*** (0.0001)	0.3137*** (0.0002)	0.3209*** (0.0001)
Number of obs.	1643	1643	1643	1643	1643

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively.

Table 10. Logistic Regression Analysis for Acquirer Companies within 5 years before Bond Rating Change

This sample consists of 2566 completed U.S. mergers and acquisitions made by acquirer companies within 5 years before their bond rating change from SDC during 1985-2013. The dependent variable is the dummy variable which equals to 1 when the acquirer companies have upgrade bond rating change and 0 otherwise. P-values are shown in parentheses. Variable definitions are in the Appendix.

Variables:					
Days relative to the event day	-1 to 0	0 to +1	-1 to +1	-2 to +2	-5 to +5
CAR	3.7015*** (0.0001)	2.7453*** (0.0019)	2.6839*** (0.0006)	2.0771*** (0.0012)	1.2287*** (0.0070)
<i>Deal Characteristics:</i>					
Public target	-0.3323 (0.3285)	-0.3437 (0.3117)	-0.3442 (0.3115)	-0.3335 (0.3270)	-0.3453 (0.3092)
Private target	-0.2486 (0.4374)	-0.2565 (0.4225)	-0.2534 (0.4287)	-0.2424 (0.4490)	-0.2485 (0.4366)
Subsidiary target	-0.1958 (0.5409)	-0.2109 (0.5097)	-0.2046 (0.5229)	-0.1936 (0.5455)	-0.1994 (0.5326)
Diversifying acquisition	-0.2180*** (0.0085)	-0.2140*** (0.0098)	-0.2167*** (0.0089)	-0.2167*** (0.0089)	-0.2166*** (0.0089)
High tech	0.0840 (0.4227)	0.0891 (0.3947)	0.0893 (0.3934)	0.0854 (0.4150)	0.0877 (0.4021)
Relative deal size	-0.0001 (0.3752)	-0.0001 (0.4108)	-0.0001 (0.3840)	-0.0001 (0.3627)	-0.0001 (0.3309)
All-cash deal	0.0191 (0.8407)	0.0187 (0.8440)	0.0166 (0.8615)	0.0129 (0.8925)	0.0178 (0.8516)
Stock deal	0.3653*** (0.0025)	0.3767*** (0.0018)	0.3752*** (0.0018)	0.3742*** (0.0019)	0.3694*** (0.0022)
<i>Acquirer Characteristics:</i>					
Firm size	0.0381 (0.5963)	0.0274 (0.7022)	0.0356 (0.6207)	0.0264 (0.7123)	0.0205 (0.7745)
Free cash flow	0.5703 (0.1713)	0.5597 (0.1789)	0.5559 (0.1821)	0.5389 (0.1978)	0.5148 (0.2196)
Tobin's q	-0.2694*** ($<.0001$)	-0.2705*** ($<.0001$)	-0.2709*** ($<.0001$)	-0.2668*** ($<.0001$)	-0.2606*** ($<.0001$)
Leverage	-1.0400*** (0.0067)	-1.0176*** (0.0079)	-1.0359*** (0.0068)	-1.0327*** (0.0070)	-1.0522*** (0.0059)
Operating income growth	0.0288** (0.0181)	0.0280** (0.0219)	0.0280** (0.0220)	0.0276** (0.0237)	0.0281** (0.0214)
Stock price runup	0.2828*** ($<.0001$)	0.2851*** ($<.0001$)	0.2842*** ($<.0001$)	0.2850*** ($<.0001$)	0.2921*** ($<.0001$)
Number of obs.	2566	2566	2566	2566	2566

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively.

Table 11. Relation between Target Gain and Total and Acquirer Gain in Acquisitions Announced within 5 years before Bond Rating Change

Target gain is regressed against total gain in Panel A among “acquisitions announced by upgrade bond rating change companies within 5 years before the rating change” subsample and in Panel C among “acquisitions announced by downgrade bond rating change companies within 5 years before the rating change” subsample, meanwhile target gain is regressed against acquirer gain in Panel B among “acquisitions announced by upgrade bond rating change companies within 5 years before the rating change” subsample and in Panel D among “acquisitions announced by downgrade bond rating change companies within 5 years before the rating change” subsample during 1990-2012. Target gain is calculated by a variable window beginning five days before the announcement date of completed mergers and acquisitions and ending five days after. Acquirer gain is calculated by a window beginning five days before the announcement date of completed mergers and acquisitions by that acquirer and ending five days after. Total gain is the sum of target gain and acquirer gain. Coefficients are estimated for the whole sample and the subsample of negative total gains and positive total gains in each panel, and t-statistics are shown in parentheses.

Sample	Size	α	β	P-value
<i>Panel A. Target gain = $\alpha + \beta(\text{Total gain})$</i>				
Total sample	141	104.2838 (4.44)	0.0653*** (3.81)	0.0003
Negative total gains	62	39.8787 (2.38)	0.0061 (0.57)	0.5723
Positive total gains	79	95.6940 (2.27)	0.1384*** (3.68)	0.0004
<i>Panel B. Target gain = $\alpha + \beta(\text{Acquirer gain})$</i>				
Total sample	141	108.5312 (4.42)	0.0197 (1.03)	0.3068
Negative total gains	62	36.3119 (2.14)	-0.0008 (-0.08)	0.9380
Positive total gains	79	158.8211 (3.64)	0.0121 (0.27)	0.7845
<i>Panel C. Target gain = $\alpha + \beta(\text{Total gain})$</i>				
Total sample	188	154.2688 (6.66)	0.0192 (1.49)	0.1371
Negative total gains	83	80.0191 (2.12)	-0.0159 (-0.94)	0.3505
Positive total gains	105	160.1080 (4.66)	0.0600** (2.38)	0.0191
<i>Panel D. Target gain = $\alpha + \beta(\text{Acquirer gain})$</i>				
Total sample	188	149.4235 (6.02)	-0.0095 (-0.36)	0.7218
Negative total gains	83	55.0846 (1.48)	-0.0373** (-2.33)	0.0226
Positive total gains	105	201.1053 (5.68)	-0.0068 (-0.26)	0.7992

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively.

Table 12. Relation between Target Gain and Total and Acquirer Gain in Acquisitions Announced within 5 years after Bond Rating Change

Target gain is regressed against total gain in Panel A among “acquisitions announced by upgrade bond rating change companies within 5 years after the rating change” subsample and in Panel C among “acquisitions announced by downgrade bond rating change companies within 5 years after the rating change” subsample, meanwhile target gain is regressed against acquirer gain in Panel B among “acquisitions announced by upgrade bond rating change companies within 5 years after the rating change” subsample and in Panel D among “acquisitions announced by downgrade bond rating change companies within 5 years after the rating change” subsample during 1990-2012. Target gain is calculated from a variable window beginning five days before the announcement date of completed mergers and acquisitions and ending five days after. Acquirer gain is calculated from a window beginning five days before the announcement date of completed mergers and acquisitions by this acquirer and ending five days after. Total gain is the sum of target gain and acquirer gain. Coefficients are estimated for the whole sample and the subsample of negative total gains and positive total gains in each panel, and t-statistics are shown in parentheses.

Sample	Size	α	β	P-value
<i>Panel A. Target gain = $\alpha + \beta(\text{Total gain})$</i>				
Total sample	165	175.1274 (6.66)	-0.0027 (-0.36)	0.7205
Negative total gains	79	119.0200 (2.88)	-0.0211** (-2.26)	0.0264
Positive total gains	86	156.3853 (4.34)	0.0423*** (2.91)	0.0047
<i>Panel B. Target gain = $\alpha + \beta(\text{Acquirer gain})$</i>				
Total sample	165	171.3711 (6.54)	-0.0114 (-1.57)	0.1194
Negative total gains	79	106.2654 (2.61)	-0.0269*** (-3.03)	0.0033
Positive total gains	86	179.1884 (4.94)	0.0243 (1.56)	0.1226
<i>Panel C. Target gain = $\alpha + \beta(\text{Total gain})$</i>				
Total sample	110	113.4078 (3.36)	0.2010*** (10.73)	<.0001
Negative total gains	47	123.9905 (2.33)	0.2185*** (9.84)	<.0001
Positive total gains	63	155.6780 (2.98)	0.1339*** (3.01)	0.0038
<i>Panel D. Target gain = $\alpha + \beta(\text{Acquirer gain})$</i>				
Total sample	110	131.9588 (3.20)	0.1814*** (6.55)	<.0001
Negative total gains	47	122.9185 (1.80)	0.2348*** (6.69)	<.0001
Positive total gains	63	235.2509 (4.54)	-0.0056 (-0.11)	0.9138

***, **and * stand for statistical significance based on two-sided tests at the 1%, 5%, 10%-level, respectively.