Credit Ratings and Acquisitions

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Abstract

There is a curvilinear relation between credit ratings and acquisitions. Non-investment grade firms make more acquisitions as their ratings improve, consistent with the relaxation of financial constraints. However, this pattern reverses for investment grade firms, supporting the view that such firms want to preserve their rating and are concerned about acquisition-related downgrades. Abnormal returns first decrease and then increase as ratings improve. In support of these findings, acquisitions have a negative impact on future ratings only for highly-rated firms. These results indicate that the level of a firm's credit rating has a significant impact on the acquisition process.

Keywords: credit ratings, acquisition likelihood, acquisition announcement returns, downgrades

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Abstract

There is a curvilinear relation between credit ratings and acquisitions. Non-investment grade firms make more acquisitions as their ratings improve, consistent with the relaxation of financial constraints. However, this pattern reverses for investment grade firms, supporting the view that such firms want to preserve their rating and are concerned about acquisition-related downgrades. Abnormal returns first decrease and then increase as ratings improve. In support of these findings, acquisitions have a negative impact on future ratings only for highly-rated firms. These results indicate that the level of a firm's credit rating has a significant impact on the acquisition process.

1. Introduction

Credit rating agencies play an important role in global markets by evaluating the credit quality of debt issuers and reducing the information asymmetry between firms and investors, thereby allowing rated firms to access the public debt markets more easily. In fact, the lack of a rating is employed in a number of articles as a proxy for financial constraints (see, e.g., Whited, 1992; Almeida et al., 2004; Faulkender and Petersen, 2006; Denis and Sibilkov, 2010). In support of this view, Harford and Uysal (2014) show that being rated indeed relaxes financing constraints and has a positive effect on the likelihood of making acquisitions.[1]

Even among rated firms, however, there are several channels through which the rating level could influence acquisition behavior and associated returns, but these channels have not been studied in the literature. In this paper, we remedy this deficiency by conducting an in-depth investigation of the role of ratings in the acquisitions process. In particular, we examine whether the level of a firm's rating and previous rating changes affect acquisition activity and associated stock returns; we also study the impact of acquisition activity on subsequent rating changes. Understanding acquisition decisions and related wealth creation is of first order importance, given the tremendous reallocation of resources in these transactions. For example, worldwide, firms spent over $3.6 trillion on acquisitions during 2020.

Ratings can exert both a positive and a negative influence on firms' acquisition decisions. On the one hand, as discussed above, rated firms are less likely to be capital constrained, providing them with more flexibility to exhaust their investment opportunity set. However, even if a firm has obtained a rating, differences in the level of the rating are likely to also influence acquisition decisions. Firms with low, non-investment-grade, ratings are still likely to be capital constrained (see, e.g., Campello et al., 2010), preventing them from making all potential acquisitions. As ratings improve, constraints are

[1] See also Sufi (2009), who examines the introduction of syndicated bank loan ratings by Moody's and S&P and finds that rated firms increase debt, asset growth, and cash acquisitions.

likely to relax, and we expect these firms to engage in more acquisitions as a result. We call this argument the *financial constraints hypothesis*.

On the other hand, firms may be reluctant to make acquisitions if such transactions lead to a decline in their ratings when the actual or perceived cost associated with a ratings downgrade is substantial. Work on acquisitions documents that leverage and the associated default risk increase, on average, following acquisitions (see, e.g., Bessembinder et al., 2009; Billett et al., 2004; Furfine and Rosen, 2011), which is likely to put downward pressure on ratings.[2] This effect is expected to be more acute at the top end of the investment grade ratings spectrum, because this is where the rating migration probabilities and the likelihood of a downgrade are higher compared to firms with low investment grade ratings (see Altman, 1998; Cornaggia, et al., 2017; Standard and Poor's, 2021). At lower ratings levels, on the other hand, leverage is already substantial and acquisitions are therefore less likely to put pressure on ratings. For example, Standard and Poor's (2021) reports that during 1981-2020, over 9% of all AAA firms globally were downgraded to AA within one year. For A-rated firms, the probability of a downgrade to BBB within one year is only 5%.

There are several reasons why firms and their managers may perceive a downgrade to be costly (see also Almeida et al., 2017, for a discussion). First, downgrades are associated with a negative stock price response (see, e.g., Holthausen and Leftwich, 1986; Hand et al., 1992; and Henry et al., 2015) and negative subsequent stock returns (see Dichev and Piotroski, 2001). Second, higher ratings may improve contracting with customers and other parties, and improve access to the commercial paper market. Klapper et al. (2012), for example, show that the most creditworthy buyers receive trade contracts with the longest maturities.[3] Acquisitions, if associated with downgrades, could jeopardize these contracting relations. Third, there could be direct costs associated with downgrades if bond

[2] According to a S&P study by Arden and McGovern (2013), circa half of the U.S. rated companies that had completed major acquisitions (transaction values of more than $5 billion) since 2000 had a lower rating by 2013. Among the factors explaining the decrease in rating, the authors emphasize the overestimation of synergies, failure in post-merger integration, and increase in leverage.

[3] See Kisgen (2006) for a discussion of the relation between commercial paper access and credit ratings and Standard and Poor's (2008) for a discussion of other contracting benefits associated with higher ratings.

contracts contain ratings triggers that lead to increases in coupon payments following a downgrade (see, e.g., Bhanot and Mello, 2006; Kisgen, 2006; Manso et al., 2010; Kraft, 2015). Fourth, rating agencies also serve as monitors (e.g., Boot et al., 2006). As such, a firm's rating may be perceived as a measure of managerial quality and a downgrade interpreted as a signal that this quality has declined. Fifth, as pointed out by Graham and Harvey (2001), firms may value higher ratings because it allows them to retain financial flexibility in the future or because they derive utility from having a higher rating *per se*. They also report that managers are particularly concerned about their credit rating when deciding on the level of debt, and that this concern is even stronger for firms with investment grade ratings.[4] Sixth, high ratings could also just be a reflection of overly conservative management willing to forego acquisition opportunities, even if they are deemed value increasing because there is (too much) downside risk. In fact, S&P recognizes this possibility when discussing their ratings criteria. They argue that: "[…] managing for a very high rating can sometimes be inconsistent with the company's ultimate best interests, if it means being overly conservative and forgoing opportunities" (Standard and Poor's, 2008, p. 36).

In sum, if a firm's decision making is aimed at maintaining the current rating − whatever the forces that have led the firm to adopt that particular rating as the preferred one − then firms may well refrain from taking any action that could jeopardize their rating, and this effect is likely to be stronger for firms with higher ratings. As stated above, the ratings of highly-rated firms are much more sensitive to changes in corporate policies such as leverage and risk than the ratings of low-rated firms, which will put increased pressure on the ratings of highly-rated firms that make acquisitions. In addition, Liu and Shivdasani (2019) find that highly-rated firms have debt levels closer to downgrade thresholds compared to low-rated firms, which implies that they have less flexibility to make acquisitions without

[4] While it is not clear that the credit rating, by itself, should carry substantial weight in capital structure decisions after controlling for all variables related to credit ratings, such as bankruptcy costs and the volatility of earnings, Graham and Harvey (2001) find that it does.

being downgraded. These arguments imply that firms with higher ratings are expected to be less acquisitive than firms with lower ratings. We call this argument the *managing for ratings hypothesis*.[5]

Additionally, we expect both the financial constraints and managing for ratings hypotheses to be more germane for cash-financed acquisitions than for stock-financed acquisitions. Financially constrained firms still have the option to employ their shares as a form of payment even if they are unable to raise additional debt, and stock financed acquisitions are less likely to put pressure on the ratings of highly-rated firms.

We investigate these arguments using a sample of 2,890 U.S. firms with a credit rating over the period from 1989 to 2018 (26,639 firm-year observations) that conducted 6,331 acquisitions from 1990 to 2019. We report several novel results on the role of ratings in the acquisition process and the effect of acquisitions on subsequent ratings changes. The relation between credit ratings and acquisitiveness that we uncover is curvilinear, where acquisition likelihood first increases and then decreases as ratings improve. This pattern is broadly in line with the arguments made above. On the one hand, at low levels of debt ratings, and consistent with the financial constraints hypothesis, the likelihood of making an acquisition and the amount spent on acquisitions both increase as debt ratings improve. The negative relation between acquisitiveness and ratings at higher ratings levels, on the other hand, supports the managing for ratings argument. This argument also implies that the downward pressure on credit ratings caused by acquisitions is more acute at the top end of the ratings spectrum, thereby reducing the willingness of managers to take any action that could adversely affect the firm's rating. An examination of rating changes following acquisitions confirms that this is indeed the case: highly-rated firms are much more likely to be downgraded after making acquisitions than low-rated acquiring firms or firms that do not make acquisitions at all.

[5] The following example illustrates this conjecture. Imagine two firms, firm X with a rating of AA+, and firm Y with a rating of BBB+. Both firms care equally about their rating and do not want to take actions that increase the likelihood of a downgrade. Firm X has much less flexibility in the types of assets it can add to the firm and the amount it can borrow while maintaining its rating than firm Y, because ratings are more sensitive to risk changes for higher-rated firms and because the added risk of the acquired assets is less likely to increase the overall risk of firm Y compared to firm X. As a result, under the managing for rating hypothesis, firm X is expected to be less acquisitive than firm Y.

We conduct a variety of tests to ensure that our finding of a curvilinear relation between acquisitiveness and ratings is robust and not due to omitted variable bias or reverse causality. In particular, we add controls for a variety of firm and industry characteristics that have been found in prior work to affect a firm's propensity to acquire without affecting our findings. Controlling for prior acquisitiveness and governance also leaves our findings unaffected. To ensure that our results are not due the lack of available targets for the largest firms, which also have high ratings, we estimate models for large and small firms separately, and models in which both the largest and smallest deciles of firms are removed. Our findings persist. They also persists when we split the sample by growth opportunities (proxied by the market-to-book ratio). We further find that our results hold after lagging ratings by one more year, thereby attenuating concerns about reverse causality, and when including firm random effects. Our results also persist after controlling for the firm's predicted rating based on ratings models employed in the extant literature, which indicates that it is the firm's rating itself that affects acquisitions and not omitted variables that are correlated with the rating. In addition, we conduct specification tests suggested by Oster (2019) to rule out the possibility that our results are due to omitted variable bias. Finally, we rely on an instrumental variables approach to address potential endogeneity more directly. We instrument for the credit rating using the industry average rating level (as in Karampatsas, Petmezas, and Travlos, 2014) and a dummy variable identifying firms listed on the NYSE (Faulkender and Petersen, 2006; Harford and Uysal, 2014). Our main findings persist, with similar economic and statistical significance as in our baseline models.

To explore our interpretation of these results in more detail, we conduct several additional tests. First, we show that our findings are mainly driven by cash-financed acquisitions, which indicates that financial constraints and concerns about ratings downgrades matter less for stock-financed transactions.

Second, we show that lagged rating actions also affect acquisition decisions. Prior research documents momentum in ratings, such that a downgrade tends to be followed by another one (see, e.g., Altman and Kao, 1992; Lando and Skødeberg, 2002). Firms take this phenomenon into account and

adjust their acquisitions downwards if they have recently been downgraded. Moreover, consistent with the managing for ratings argument, firms that have recently been downgraded have likely moved away from their target rating and their decisions are aimed at restoring their rating to their preferred level. This result is in line with Kisgen's (2009) finding that firms reduce leverage after being downgraded. The effect of past upgrades on acquisitions is positive; because of ratings momentum, upgraded firms have extra acquisition capacity and are therefore less concerned about subsequent downgrades. Importantly, the impact of ratings itself remains unchanged after controlling for lagged rating actions.

Third, we study whether the stock price response associated with acquisition announcements is consistent with the curvilinear relation between acquisitions and ratings and find this to be the case. The pattern of abnormal returns follows the mirror image of the pattern of acquisitiveness. Starting from the lowest rating levels, acquirer returns first decrease as ratings improve, suggesting that increases in ratings allow firms to further exhaust their acquisition opportunity set. As acquisitiveness declines in the investment grade range, however, the associated announcement returns increase, consistent with firms pursuing only their highest NPV projects.

Finally, we explore whether mergers indeed put pressure on debt ratings. We start by documenting that highly-rated firms are more likely to be downgraded after making acquisitions than otherwise, consistent with their reluctance to make acquisitions (i.e., the managing for ratings hypothesis). For firms with low ratings, on the other hand, the results are reversed: acquisitions are less likely to be associated with future downgrades. This increased likelihood of being downgraded after an acquisition for highly-rated firms explains why they are much more reluctant to make acquisitions in the first place.

Our paper adds to the growing literature showing the real effects of ratings on corporate decisions. Kisgen (2006, 2009), Jung et al. (2013), Alissa et al. (2013) and Begley (2015) all demonstrate that firms are concerned about their credit rating levels and adjust their corporate policies to attain or maintain specific rating targets. In general, these papers focus on firms that are close to an upgrade or

a downgrade and show that such firms adjust capital structure, accounting practices, R&D, and Selling, General, and Administrative expenses to obtain an upgrade or avoid a downgrade.[6] The results in these papers generally hold for all firms across the ratings spectrum; for example, AA firms close to a downgrade behave similarly to BBB firms close to a downgrade. Our findings illustrate a fundamentally *different* impact of ratings on acquisition decisions, which depends on where the firm is in the ratings spectrum. While the underlying mechanism (at least for investment grade firms) is the same as the one highlighted in earlier work, i.e., firms are worried about being downgraded, the consequences depend on the firm's current rating, such that firms with higher investment grade ratings are less acquisitive than firms with lower investment grade ratings. The AA firms mentioned in the above example are thus much less likely to make acquisitions compared to the BBB firms. Documenting these differences in behavior across the ratings spectrum is one of the contributions of this paper.[7]

At the lower end of the rating scale, our evidence is also related to the literature that investigates how credit supply frictions affect corporate investment (see, e.g., Leary, 2009; Lemmon and Roberts, 2010; Chernenko and Sunderam, 2012; Becker and Ivashina, 2014; and Harford and Uysal, 2014). Closest to our work is Harford and Uysal (2014), who compare the acquisition behavior of rated versus unrated firms. They find that rated firms are more likely to make acquisitions, and the announcement returns, while positive, are lower than those of unrated acquiring firms. Our evidence suggests that even within the subset of rated firms, there is still considerable cross-sectional variation in acquisition behavior, and a substantial fraction of this behavior cannot be explained by financial constraint arguments. In addition, we also study how acquisitions affect subsequent downgrades.

Our work also provides additional evidence on the monitoring role of credit rating agencies (see Boot et al., 2006) and the determinants of ratings by showing that merger activity has a negative

[6] Kisgen (2019) studies firms that were affected by a change in leverage adjustments made by Moody's in 2006. Firms that benefited from these adjustments increase leverage subsequently, and exhibit higher asset growth, while firms that were negatively affected reduced leverage.
[7] For theoretical work on firms' investment responses to ratings, see Manso (2013) and Goldstein and Huang (2020).

influence on ratings for firms with the highest ratings and a positive influence on firms with the lowest ratings.

Finally, this paper makes a contribution to the literature on the factors that affect mergers and acquisitions (M&A) by uncovering a new factor that has an independent influence on firm acquisition decisions.

2. Sample Description

We start with all U.S. listed firms covered by Compustat that have a Standard and Poor's credit rating available in any given year over the period 1989 to 2018. Following previous studies (see, e.g., Hovakimian et al., 2001; Harford and Uysal, 2014), we exclude financial firms (SIC codes 6000-6999) and regulated utilities (SIC codes 4900-4999) from our sample. Firms with a rating of D (default) or SD (selective default) are also excluded from our analysis as in Alissa et al. (2013) and Alp (2013). Our sample includes 2,890 unique firms for a total of 26,639 firm/year observations.

For each firm in the sample, we obtain all the completed transactions listed in the Thomson Financial SDC Mergers and Acquisitions Database as a merger, acquisition of majority interest, asset acquisition or acquisition of certain assets over the period 1990 to 2019. Thus, while the acquirers in our sample are public firms, the targets can be public, private, or subsidiaries of other firms. There is a one-year lag between the sample period of the credit rating sample and the M&A sample because we relate acquisition activity in a specific year to the firm's credit rating at the end of the previous year. We also require deals to have a non-missing transaction value. To focus on control transactions and to exclude acquisitions of a partial or remaining interest in the target, we require that the acquirer owns less than 50% of target shares before the announcement and seeks to own more than 90% after the acquisition is completed. Furthermore, to make sure that the sample includes only meaningful transactions from the acquirer's perspective, we limit the sample to deals with transaction values over $1 million and in excess of 1% of the market value of the acquirer's equity at the end of the month

before the acquisition is announced.[8] Applying these restrictions yields a sample of 6,331 acquisitions. These transactions are conducted by 1,473 of the 2,890 rated firms in our sample. The remaining 1,417 firms do not make any meaningful acquisitions over the sample period.

Table 1 provides an overview of the sample; each firm-year is one observation. The majority of the firms in our sample have a rating between BB– and BBB+ (55.3%), 20.4% of the firms have a rating between A– and AA+, 23.0% below BB–, and only 1.2% of our sample firms have a AAA rating. Fifty one percent of the sample firms do not attain an investment grade rating (BBB− or above). This rating distribution is consistent with the prior literature (see, e.g., Alissa et al., 2013 and Baghai et al., 2014). Average firm size, measured as the book value of total assets in constant 2000 dollars, declines as ratings worsen up to the B+ category after which there is a small increase. Column (4) reports on the number of acquisitions made by the firms and column (5) presents the average size of the deals in constant 2000 dollars. Firms with the highest (above AA-) and lowest ratings (below B-) appear to be the least acquisitive, but the AAA companies stand out in terms of the average size of their acquisitions. This is not surprising, given that they are much bigger than the other firms.

[Please insert Table 1 about here]

Of particular interest for our analyses are the measures of acquisition likelihood and acquisition intensity displayed in columns (6) and (7). Acquisition likelihood is a dummy variable set equal to one if a particular firm makes at least one acquisition in a given year, and zero otherwise, while acquisition intensity is set equal to the sum of the value of all acquisitions made during a particular year, scaled by the book value of assets at the end of the previous year. We winsorize acquisition intensity at its 99th percentile to remove the influence of extreme observations. Eighteen percent of the firms in our sample make at least one acquisition during a year, amounting to 3.74% of book assets. Note that both acquisition likelihood and intensity show an interesting curvilinear pattern, where firms make more acquisitions as ratings decline up to a certain point, after which a further drop in ratings is associated

[8] Our findings are similar when we do not impose the 1% cutoff.

with fewer acquisitions. For example, the chance that an AAA firm makes an acquisition is only 13%, compared to over 21% for A rated firms. Firms with a B− rating are almost as likely to make acquisitions as AAA firms. A similar same pattern emerges for acquisition intensity. In the next section, we examine these patterns more formally, after controlling for a large number of other factors.

3. **Results**

3.1. Credit Rating Levels and Firm Acquisitiveness

While the univariate statistics presented in Table 1 suggest a curvilinear relation between ratings and acquisitiveness, it is important to control for other determinants of M&A activity. This is what we do in Table 3 of the paper. Summary statistics on the control variables employed in these analyses are reported in Table 2. Detailed variable definitions are provided in Appendix A.

[Please insert Table 2 about here]

We first estimate probit models to explain the likelihood of making at least one acquisition during a year as a function of the firm's debt rating at the end of the previous year and various controls that are also measured at the end of the previous year. As is common in the literature, we first translate the ratings variable into a numerical scale, which ranges from 1 for firms with a C rating to 21 for the highest rated firms (AAA).

In the first two probit models displayed in Panel A of Table 3, we include industry (48 Fama-French industries) and year fixed effects, as previous research suggests that there are patterns across industry and time in the level of acquisitions (see, e.g., Mitchell and Mulherin (1996) and Harford (2005)). To ease the interpretation, we report marginal effects instead of regression coefficients. These can be interpreted as the average change in the dependent variable across all observations when the explanatory variable of interest is increased by one. Standard errors in all specifications are clustered at the firm level.

[Please insert Table 3 about here]

As expected given the univariate statistics, the simple linear model presented in column (1) does not yield a significant relation between ratings and acquisition likelihood. In column (2), the specification includes the square of the rating as an additional independent variable; this estimation yields the curvilinear pattern that was apparent in the univariate statistics, indicating that this pattern is not due to differences in the level of acquisitions across time and industry. The probability of making an acquisition first increases and then decreases as ratings improve, with a maximum at about the BBB level (the inflection point of the quadratic regression). These findings are in line with our predictions. Firms with poor ratings are unable to take all their acquisition opportunities, and as their ratings improve so does acquisitiveness, consistent with the financial constraints hypothesis. Investment-grade firms instead refrain from acquisitions as their ratings increase because they value their rating and fear being downgraded when making acquisitions, a pattern which is consistent with the managing for ratings hypothesis.[9]

At this point, these findings are only suggestive, since controlling for industry and time alone is likely insufficient to capture all the variation in acquisitiveness that is not related to credit ratings. We therefore augment our regression specification with additional industry-level and firm-level controls related to acquisition activity as suggested by prior work. All the control variables are measured at the end of the fiscal year prior to the year of the acquisition announcement.

At the industry level, we control for the liquidity of the M&A market (Schlingemann et al., 2002), and industry concentration (Uysal, 2011). M&A liquidity is computed as the sum of all acquisitions in the firms's three-digit SIC code industry in a given year, divided by the sum of the book value of assets of all Compustat firms with the same three-digit SIC code in the same year. For industry concentration, we employ the Herfindahl index based on the level of sales in the firm's three-digit SIC code industry.

[9] We further saturate the model with year*industry fixed effects, which allows for the pattern of mergers over time to vary across industries (see, e.g., Ahern and Harford, 2014). The concern with this approach is that due to the large number of fixed effects, we suffer from the incidental parameters problems, leading to inconsistent estimates (Greene, 2004). We therefore do not tabulate these results, but note that the coefficient estimates and their significance in this specification are very similar to those of the regression reported in column (2). In addition, we have also estimated linear probability models with year*industry fixed effects and our results also persist in these specifications.

At the firm level, we control for investment opportunities, potential misvaluation, and a number of other factors that capture financial constraints. We use past stock price performance and the market-to-book ratio to control for investment opportunities and misvaluation as in Harford and Uysal (2014). Stock price performance is measured as the market-adjusted return in the prior calendar year, and the market-to-book ratio is computed as (book assets – book equity + market equity) / book assets. To capture financial constraints, we include leverage (total interest-bearing debt to assets), cash holdings (cash to assets), size (log of total assets in constant 2000 dollars), and age (number of prior years with Compustat data availability). We also control for profitability, measured as EBITDA to total assets. Except for age, Harford and Uysal (2014) employ similar controls. Many of these firm-specific variables also affect credit ratings (see, e.g., Jorion et al., 2009 and Baghai et al., 2014). Thus, any rating effect that persists captures the independent effect of credit ratings beyond these determinants. All of the control variables are winsorized at the 1st and 99th percentiles, except for age and size.

The probit model with these additional controls is presented in column (3) of Panel A of Table 3. The magnitude of the rating's importance is similar to the more parsimonious models. The results of the control variables are also interesting. Consistent with prior work, firms are more acquisitive when their industries experience higher M&A volume, when they are older, performed well in the previous year, and have less debt. The effect of size on acquisition likelihood is negative, which is opposite to the result reported by Harford and Uysal (2014), who study rated and unrated firms, but consistent with Baghai et al. (2014), who examine rated firms only.[10, 11]

To further examine the role of ratings in the acquisition process, we include the distance-to-default measure based on Merton's model (1974) as an additional control variable (see Hillegeist, et al., 2004; Gropp et al., 2006; Bharath and Shumway, 2008; and Auvray and Brossard, 2012). This measure

[10] We also perform a VIF (variance inflation factor) test for multicollinearity which indicates that the correlation between the explanatory variables does not materially affect our estimates.

[11] In unreported models we also include the square of the control variables to ensure that the credit rating is not proxying for non-linear effects of the control variables. Adding these squared terms has little effect on our inferences.

captures how many standard deviations the value of the firm's assets is removed from the face value of its debt. Since one of the primary roles of credit ratings is to measure default risk, we would expect a substantial correlation between a firm's credit rating and distance-to-default, and this is indeed the case in our sample with a correlation of 0.61.[12] If the impact of credit ratings on acquisitions is due to this default risk channel, we would expect the influence of ratings on acquisition likelihood to decrease once distance-to-default is controlled for. Column (4) of Panel A of Table 3 contains the results of this augmented specification. There is only a small decline in the magnitude of the coefficient on the ratings term, which demonstrates that the effect we uncover is different from a pure default risk story.

The economic importance of the ratings effect is also sizeable. For example, increasing the rating from CCC to B leads to an increase in acquisition likelihood by 6.2 percentage points, while increasing the rating from A to AA lowers acquisition probability by 6.1 percentage points (setting all other variables equal to their sample means). These changes are substantial given that, on average, only 18% of the sample firms make one or more acquisitions in a given year.

The coefficient on distance-to-default itself is positive in this specification, suggesting that more solvent firms make more acquisitions. Also note that in this specification, market-to-book has a negative impact on acquisition likelihood. Though surprising, this result is consistent with Harford and Uysal (2014), who compare acquisitions of rated and unrated firms.

In column (5) we include an indicator variable set equal to one if the firm made an acquisition in the previous year. Some firms may decide to grow through acquisitions, while others prefer internal growth, and we want to ensure that firms do not have an inherent acquisitiveness trait that is not captured by the control variables. In support of the notion that acquisitiveness is path dependent, we find that firms that made an acquisition in the prior year are 14 percentage points more likely to make an acquisition again during the current year. Importantly, while the inclusion of this control has some

[12] We again conduct a VIF test to confirm that multicollinearity does not affect our results.

influence on the economic importance of credit ratings, its effect remains sizeable.[13] For example increasing ratings from CCC to B leads to an increase in acquisition likelihood of 5 percentage points, while increasing ratings from A to AA reduces the probability of making an acquisition by 4.3 percentage points (setting all other variables equal to their sample mean). This result also indicates that credit ratings are not proxying for past acquisitiveness.

In column (6) we investigate whether firms around the investment grade cutoff (firms rated BB+ and BBB–) cut back on acquisitions. The increased cost in debt associated with a downgrade is most salient around the investment grade cutoff and is not always related to actual changes in credit quality. Chen et al. (2014), for example, find that when a series of non-investment grade bonds were mechanically relabeled investment grade as a result of a Lehman Brothers index redefinition, yields on these bonds declined by 21 basis points. Moreover, Chernenko and Sunderam (2012) show that investment in firms with a BB+ rating becomes sensitive to high-yield fund flows compared to investment in observationally equivalent firms with a BBB– rating, causing temporary distortions in capital spending. If mergers put pressure on the ratings of firms around this cutoff, then they may well cut back on acquisitions; firms with the lowest investment grade ratings would be reluctant to make acquisitions in the fear of a downgrade leading to a substantial increase in the cost of debt, while firms with the highest non-investment grade ratings would refrain from making acquisitions in order not to jeopardize the possibility of an upgrade in the future. Interestingly, we find no evidence that firms at the investment-grade cusp curtail their acquisition behavior.[14,15]

In Panel B of Table 3, we repeat the previous analyses using acquisition intensity as the dependent variable in a Tobit specification censored at zero (see also Harford and Uysal (2014) for a similar

[13] In unreported analyses, we control also for acquisitions made in the past five years, and our findings are insensitive to this alteration.

[14] We have also re-estimated this model using separate dummies for BBB– and for BB+ ratings. Both dummies are not statistically significant.

[15] The use of a quadratic specification in our analyses is guided by the hypotheses we propose. However, we have also estimated a non-parametric cubic spline specification with five knots. The relation between credit ratings and acquisitions obtained from this estimation is very similar to the quadratic specification.

approach) and report the unconditional marginal effects.[16] These specifications allow us to examine whether our findings regarding the likelihood of making an acquisition also translate into the amount spent on acquisitions. This is indeed the case; the coefficients in the tobit models show the same pattern as in the probit models, generally with similar levels of statistical significance. The economic significance is also similar in magnitude. For example, based on the specification reported in model (6), increasing the rating from CCC to B leads to an increase in acquisitiveness of 1.7 percentage points, which is substantial, given the sample average of 3.74% (see Table 1). Increasing the rating from A to AA, on the other hand, is associated with a decline of 1.9 percentage points in acquisitiveness.

To provide further evidence on the merits of our hypotheses, we repeat the analyses of model (6) of both Panels of Table 3 for the subsamples of cash and stock acquisitions separately. This split is relevant because listed firms have the option of using their shares as a means of payment when cash is not available; as such, the financial constraints argument is likely more relevant for cash acquisitions than for stock acquisitions.[17] Similarly, using shares to pay for an acquisition will likely put less pressure on the ratings of highly-rated companies (a conjecture we will verify in subsequent tests). As such, there should be less reluctance on the part of highly-rated firms to make such acquisitions. These arguments combined imply that the curvilinear relation between acquisition likelihood/intensity and credit ratings should be more pronounced when we focus on cash financed acquisitions.

We present these results in Table 4. All the regressions include the same industry and firm controls as well as industry and year dummies used in model (6) of Table 3, but the coefficients on these control variables are not reported for sake of brevity. Transactions are classified as cash (stock)

[16] Note that it is not possible to interpret the regression coefficients of a tobit model in the same way as OLS coefficients. The coefficient of the tobit model captures the marginal effect on the latent variable. To interpret the economic significance, we need to multiply the marginal effect with the probability that an observation becomes uncensored (implying that it becomes positive in our models) (see McDonald and Moffitt, 1980). This is the effect we report in the table.

[17] Note that the financial constraints argument continues to apply to stock-financed acquisitions if firms deem their shares to be undervalued. In addition to undervaluation, there are also other possible reasons why using shares may not always be an option. For example, large shareholders in the acquirer may not wish to be diluted, the firm may not wish to share the value gains from the acquisition with the target, or the acquirer is worried about arbitrageurs exerting downward pressure on its stock price.

acquisitions if more than half of the payment is in cash (stock). Transactions that do not disclose the form of payment or that mainly use forms of payment other than cash or stock are excluded from this analysis. Probit models of acquisition likelihood are presented in Panel A and tobit models of acquisition intensity in Panel B. The first column of both Panels reports the results for cash acquisitions. These models are broadly in line with the full sample results presented in model (6) of both Panels in Table 3, where acquisitions first increase and then decrease as ratings improve. The economic importance of the result also remains significant; for example, increasing ratings from CCC to B is associated with an increased likelihood of making cash-financed acquisitions of 4.2 percentage points, while increasing ratings from A to AA is associated with a decline in acquisition likelihood of 3.8 percentage points.[18] For stock-financed acquisitions, on the other hand, there is no relation between ratings and acquisitiveness. These findings provide further support for our hypotheses.

[Please insert Table 4 about here]

3.2. Robustness Checks

Our specifications so far ignored the panel structure of our data, except for the adjustment made to the standard errors. In model (1) of Table 5, we estimate random effects probit (Panel A) and tobit models (Panel B) that allow for random differences in acquisition likelihood and intensity across firms. We prefer this specification above a fixed effects model because credit rating levels have a relatively small *within*-firm variation and a significantly larger *between*-firm variation, (see Bae and Goyal (2009) for a similar discussion in the case of the International Country Risk Guide property rights index, and Zhou (2001) in the case of managerial ownership). In particular, the cross-sectional variation in ratings is 3 times larger than their time-series variation. Random effects make use of both sources of variation

[18] For cash-financed acquisitions, it is also possible to compute acquisitiveness using aggregate firm data from Compustat (data item AQC), although this measure does not allow us to apply the same data filters as we applied for the SDC-based sample. Our findings persist when we employ this alternative measure of the amount spent on acquisitions (unreported).

(time series and cross sectional), and explicitly control for the effect of unobservable firm heterogeneity on acquisition likelihood. Therefore, if the estimated effects of credit ratings on acquisitiveness presented in Table 3 are due to firm effects, the estimates should decline when we include random effects. We also opt for a random effects model because the estimates from both probit and tobit models that include firm fixed effects are inconsistent due to the incidental parameters problem (Greene, 2004).

[Please insert Table 5 about here]

The reported models include all controls as in model (6) of Table 3. The probit and tobit models reported in column (1) of both panels of Table 5 show that the inclusion of random effects increases the explanatory power in our models, since the contribution of the firm-level residual variance to the total residual variance (ρ) is statistically significant at conventional levels. Importantly, while controlling for firm random effects is relevant in explaining acquisitiveness, the coefficients on both the rating and its squared term are similar in magnitude and significance to those reported in model (6) of Table 3. Thus, controlling for the panel structure of our data does not alter our findings.

We also verify that our results are due to the credit rating itself and not to other variables associated with the credit rating. To do so, we include the firm's predicted credit rating and its squared term as additional explanatory variables (see Wooldridge (2015) for a discussion of this approach and Harford and Uysal (2014) for an application in the context of obtaining a rating). The predicted rating is based on a panel regression model estimated over the sample period (1989-2018) using the same explanatory variables as employed in the prior literature (see, e.g., Jorion et al. (2009) and Baghai et al. (2014)) and, as such, it contains all the information from these variables that is deemed important in predicting the firm's rating. Appendix B contains the full list of explanatory variables employed as well as the regression model. The results from adding the predicted rating and its squared term to the acquisition model are displayed in Column (2) of Table 5; the probit model is displayed in Panel A, and the tobit model in Panel B. Both models indicate that the predicted rating has an influence on acquisition behavior, but the effect of the actual rating, while weaker than in Table 3, remains substantial. For

example, the probit model indicates that increasing the rating from CCC to B increases acquisition likelihood by 2.7 percentage points, while an increase from A to AA is associated with a 3.1 percentage point decline. These results indicate that it is the firm's rating *per se* that affects acquisition likelihood, and not another variable that can be used to explain the rating.

As a further test to validate the robustness of our results to an omitted variable bias, we employ the methodology proposed by Oster (2019), who developed a technique to assess the robustness of treatment effects to the inclusion of unobserved confounders. Following her approach, we estimate the bias-adjusted effect of credit ratings on acquisitiveness under different assumptions about the importance of the unobservable relative to the observable variables (the importance can vary from 0 to 1), and compare them to the effects reported in model (6) of both panels of Table 3 (not reported in a table). In all the cases, the coefficients of the rating and its squared term move further away from zero (CR is more positive and CR^2 is more negative), and the set of bias-adjusted ratings coefficients does not contain a zero rating effect within its intervals. These results further attest to the robustness of our findings.

Our final test to ascertain the robustness of our findings employs an instrumental variables approach, in which we instrument the credit rating using the industry median rating level (as in Karampatsas, Petmezas, and Travlos, 2014) and a dummy variable identifying firms listed on the NYSE (Faulkender and Petersen, 2006; Harford and Uysal, 2014). The models reported in Table 6 indicate that the curvilinear relation between both measures of acquisitiveness and credit ratings persists, with similar economic and statistical significance as in Table 3.[19]

[Please insert Table 6 about here]

[19] Note that in the IV models, we do not include the BBB+/BBB- dummy as an explanatory variable because we do not have an instrument for this variable.

3.3. Alternative Interpretations

Our interpretation of the results presented in Tables 3 through 5 is that rating levels have a substantial independent impact on acquisition decisions. In this subsection, we rule out a number of alternative interpretations for these findings.

One alternative interpretation for our findings is that the lack of acquisitiveness at the higher end of the ratings spectrum is due to the lack of acquisition opportunities. As documented in Table 1, highly-rated firms are much larger than the average firm in the sample. As such, the number of potential targets that meet the 1% market value equity cutoff for the acquisition to be included in our analysis may well be reduced. In addition, it is possible that highly rated firms have excellent internal investment opportunities, reducing the need to seek external growth opportunities. We already control for size and for the firm's investment opportunities with the inclusion of the market-to-book ratio in our baseline specifications, and their inclusion does not materially affect the importance of the ratings effect in Table 3. This result casts doubt on this alternative interpretation. To further disprove it, and also to better account for the role of investment opportunities in shaping acquisition decisions, we re-estimate our regression models, allowing the effect of the rating to depend on the firm's size and market-to-book ratio. To do so, we re-estimate our main model separately for firms below and above the median size and market-to-book ratio. Irrespective of the proxy used, Table 7 documents a curvilinear relationship between credit ratings and acquisitions for both groups of firms, suggesting that the potential lack of acquisition opportunities for highly-rated firms or their desire to grow internally cannot explain our findings.[20]

[Please insert Table 7 about here]

Another interpretation is that agencies assign ratings to companies in anticipation of future acquisitiveness, such that the causality between ratings and acquisitions is reversed. Such an

[20] We have also re-estimated our main specifications after excluding the smallest and largest 10% of the firms in our sample and our findings persist (unreported).

interpretation is wrought with problems, however, due to the non-linear nature of the effect we uncover. Essentially, rating agencies would have to assign a higher rating in anticipation of acquisitions by low-rated companies and relatively low ratings in anticipation of acquisitions by highly-rated companies. Such actions do not seem very plausible. Nevertheless, we conduct two further tests to rule out this interpretation. First, we lag our measure of credit ratings by an additional year and find similar patterns as in Tables 3 through 5 (unreported). This makes a reverse causality story less likely because agencies would have to assign higher (lower) ratings to non-investment grade (investment grade) firms in year *t* in anticipation of acquisition activity in year *t+2*. Second, in Section 4, we report that rating agencies change their ratings in response to acquisitions; changing ratings both in anticipation of and again in response to acquisitions does not seem very plausible, especially given that the actual likelihood of making acquisitions in the sample is only 18%. Changing a firm's rating today based on a rather small unconditional probability of doing a deal in the future seems very unlikely, and would reward or punish firms for transactions that they most likely will not undertake.

Next, we examine whether the negative relation between acquisitiveness and ratings for highly-rated firms is related to the quality of the firm's corporate governance. Standard and Poor's indicates explicitly that corporate governance attributes are taken into account when evaluating the credit risk of a firm (Standard and Poor's, 2011), an argument that is also supported by prior research (see, e.g., Bhojraj and Sengupta, 2003; Ashbaugh-Skaife et al., 2006). Thus, firms with better ratings could have better governance and since some acquisitions destroy shareholder wealth, it is possible that better-governed firms simply undertake fewer acquisitions because they only undertake acquisitions that create value.

We conduct two tests to address this possibility. First, we divide the sample into acquisitions with positive and negative announcement returns and repeat our tests on each subset. If better-rated firms make fewer poor acquisitions, we should observe a negative relation between credit ratings and acquisitions for the subset of acquisitions with negative announcement returns, but not for acquisitions

that are well received by the market. Of course, this relation should only hold for investment grade firms for which the relation between acquisitions and ratings is downward sloping in the first place. We find no significant differences, however, between good and bad acquisitions in the regression coefficients (not reported in a table). Second, we include two proxies for corporate governance directly in the acquisition regressions: (a) board independence, measured as the fraction of directors that are outsiders, and obtained from the Institutional Shareholder Services database (available for less than half of our sample firms), and (b) the number of institutional investors that are blockholders in the firm, where a blockholder is defined as an investor owning more than 5% of the shares; these data are obtained from Thomson Reuters 13-f filings. Inclusion of these measures does not affect our main findings (not reported in a table). These results combined do not support the governance argument.

A final alternative interpretation for the downward sloping part of the relation between acquisitions and ratings relates to the cost of capital of the potential acquirers. Firms with very high ratings may not be taking advantage of the tax shields associated with debt financing, which could lead to a higher weighted average cost of capital, thereby reducing the attractiveness of any type of investment. As such, firms with higher ratings would invest less in capex and R&D, and they would also make fewer acquisitions. To examine the merits of this explanation, we study whether there is a relation between credit ratings and non-acquisition related investments, computed as (capital expenditures + R&D) / lagged assets, but find no significant relation (not reported in a table). This does not support the cost of capital argument.

3.4. Past Rating Changes and Firm Acquisitiveness

In this section, we study the impact of past rating changes on acquisition activity. This is relevant because prior work has shown that credit rating changes exhibit positive serial autocorrelation (see, e.g., Altman and Kao, 1992; Lando and Skødeberg, 2002). That is, a past downgrade (upgrade) tends to be followed by another downgrade (upgrade). If past credit rating changes serve as a good signal for

upcoming rating shifts, they may also influence firms' M&A decisions. In particular, we expect firms that have been downgraded recently to curtail their acquisition activities. This effect applies at both ends of the ratings scale. At the top end, firms that attach value to ratings *per se* will do their utmost to avoid additional downgrades, and reducing acquisitiveness could be one of the actions these firms can take. At the bottom end, expectations of additional downgrades could already serve to constrain recently downgraded firms from taking on all their acquisition opportunities.[21]

A related reason for firms to limit acquisitions after being downgraded is that such companies may deem that they are no longer at the rating level that is optimal for them, and want to take actions to move back to their 'ideal' rating level. In other words, since these firms are no longer at their 'optimal' rating level, they may behave differently from firms with the same rating that have not been downgraded recently.[22] This argument is similar in spirit to Kisgen's (2009) finding that downgraded firms reduce leverage in subsequent years with the view of being upgraded again.

Firms may become more acquisitive after recent upgrades. Low-rated firms that received a recent upgrade may be more willing to take on acquisitions (relative to firms with the same rating that have not been upgraded recently), given that expected additional upgrades would further relieve financial constraints and the acquisition is less likely to put downward pressure on their ratings. For highly-rated firms, a recent upgrade could also have a positive effect on acquisitions since the ratings momentum would reduce the likelihood of an acquisition-related downgrade.

In Table 8, we study the impact of recent upgrades and downgrades on acquisition activity. We measure lagged upgrades and downgrades in the year before the acquisition and present both probit (Panel A) and tobit (Panel B) models for the entire sample as well as separate models for investment

[21] See Bongaerts and Schlingemann (2020) for evidence that recently downgraded firms are more likely to engage in asset sales to relax credit constraints.

[22] The following example illustrates this argument. Suppose two firms have an A rating. Firm *X*, which has had this rating for a while, deems this rating to be optimal, and knows that the rating allows it to make a certain number of acquisitions in a given year without being downgraded. Firm *Y*, on the other hand, has recently been downgraded to an A rating from an A+ rating. This new rating is not deemed optimal for the firm, and it wants to get back to a rating of A+. In principle, this firm could make the same level of acquisitions as firm *X*. However, because it wants to get upgraded, it curtails its acquisition behavior and makes fewer acquisitions than firm *X*.

grade and non-investment grade firms. The table reports the marginal effects for the probit specifications and the unconditional marginal effects for the tobit models. The results indicate that firms cut acquisition activity dramatically if they have been downgraded recently, and increase their acquisitiveness slightly following a recent upgrade. For the sample as a whole, firms that have been downgraded recently are 8.7 percentage points less likely to make acquisitions (Panel A), which is substantial given the average acquisition likelihood of 18 percentage points. They also reduce acquisition intensity by almost 2.7 percentage points (Panel B), which is high relative to the overall acquisition rate of 3.7 percentage points. After being recently upgraded, firms increase their acquisition likelihood and intensity by 1.7 and 0.5 percent points, respectively. Columns (2) and (3) of both panels illustrate that the impact is similar for both investment grade and non-investment grade firms, but the positive impact of recent upgrades is only significant for highly rated firms.[23] Also note that in all the specifications reported in Table 8, the relation between credit ratings and acquisitions documented in Table 3 persists: the relation is positive for non-investment grade firms, negative for investment grade firms, and curvilinear for the sample as a whole.[24]

[Please insert Table 8 about here]

3.5. Abnormal Returns

In this section, we study the relation between the abnormal returns associated with acquisition announcements and prior credit ratings. If the positive relation between credit ratings and M&A activity at lower levels of ratings is indeed due to the easing of credit constraints, then this interpretation also has implications for the relation between announcement returns and ratings. Specifically, we expect

[23] We have also repeated the models in columns (2) and (3) after including the squared credit rating. These models confirm the curvilinear nature of the relation between credit ratings and acquisitions, while the effects of recent downgrades and upgrades remain unchanged from those reported in Table 8 (unreported).

[24] We have investigated how long the upgrade and downgrade effects last by including additional lags of the upgrade/downgrade dummies, and find that the downgrade effect lasts three years, after which downgraded firms behave like other firms with the same, lower, rating; the upgrade effect lasts for two years and there is some evidence of a reversal in the third year (unreported).

returns to decline as ratings improve for firms with non-investment grade ratings because these companies are able to take on more marginal acquisition opportunities. At upper echelons of the ratings scale, however, the prediction is reversed; if such firms are particularly averse to acquisitions, they should only take the very best opportunities, and we would expect announcement returns to increase as ratings improve.

To compute abnormal returns, we subtract the daily return on the market from the return earned by the acquiring firm (see, e.g., Fuller et al., 2002; Moeller et al., 2004, 2005). We use the value-weighted CRSP index as a proxy for the market and cumulate abnormal returns over an event window of three days centered around the announcement date. To remove the influence of outliers, we winsorize abnormal returns at the 1st and 99th percentiles. Average returns for the entire sample are displayed in the last line of Table 2, where we report both 3-day and 5-day announcement returns. Consistent with the literature (see, e.g., Moeller et al., 2007), 3-day (5-day) returns are slightly positive at 83 (96) basis points, on average, with a median of 48 (66) basis points. Both are significantly different from zero with *p*-values of 0.00. Note that the announcement return we capture is the joint effect of the market's assessment of the quality of the acquisition, combined with the expected stock price effect of potential future rating changes due to the acquisition.

Table 9 contains various specifications of the 3-day abnormal return regression models.[25] Following the extant literature, we include a set of firm, industry, and deal characteristics as control variables together with year and industry dummies.[26] In the first three models, we only report results for the first acquisition made by a given firm during a year. As we will show in subsequent analyses, acquisitions affect future ratings; it is therefore not clear that the firm's rating is still the same when it makes additional acquisitions in a given year, and focusing on the first acquisition addresses this

[25] We obtain similar results with the 5-day abnormal return regression models (unreported).
[26] In unreported models, we also control for the following acquirer characteristics: leverage, market-to-book, and cash holdings. The coefficients on these variables are generally not significantly different from zero and we therefore omit them from the reported specifications.

measurement error. However, we show in columns (4) through (6) that our findings persist if we employ all acquisitions as well. Column (1) presents the results of a simple linear model, while in columns (2) and (3) we allow for non-linearity. Consistent with the financial constraints argument, the results in column (1) indicate that returns decline by 14 basis points per ratings notch increase. Increasing ratings by one standard deviation (3.62) thus lowers abnormal returns by 51 basis points, which is quite substantial compared to the sample average of 83 basis points. These findings suggest that the overall quality of firms' acquisitions declines as their ratings improve.

[Please insert Table 9 about here]

Column (2) shows the results of a quadratic specification, which illustrates that the impact of rating increases on announcement returns is much more dramatic at low rating levels, but tapers off at higher rating levels, and turns positive at a rating beyond A (the inflection point of the quadratic regression). These results are the mirror image of the findings on acquisitiveness: as firms become more acquisitive when ratings improve from the lowest levels, returns decline, and when the acquisition rate declines beyond a higher rating threshold, returns improve again. The negative relation between returns and ratings and the tapering off effect are what one would expect under the financial constraints interpretation: as ratings improve, the marginal relaxation of financial constraints is smaller. The improvement in returns beyond the inflection point estimated for acquisition activity is consistent with the commensurate reduction in the level of acquisitions and firms focusing on their best opportunities, as suggested by the managing for ratings argument.

In terms of economic importance, the effect of prior ratings on announcement returns is substantial given that bidders earn very low returns, on average. For example, increasing ratings from CCC to B is associated with a decline in announcement returns of -1.03 percentage points, while increasing ratings from AA to AAA improves returns by 0.19 percentage points.

In column (3), we include a dummy for firms around the investment grade threshold. The coefficient on this dummy is insignificant at conventional levels and does not have much of an effect

on the other regression coefficients. Likewise, splitting the dummy into BB+ and BBB rated firms does not yield significant results nor does it change the other regression coefficients materially.

In columns (4) through (6), we repeat the specifications in columns (1) through (3), but now use all acquisitions that take place during the year, rather than just the first one. In general, while the effects are somewhat attenuated compared to the models based on the first acquisition only, the role of ratings remains important both statistically and economically.

Overall, the findings from our event study support our interpretation that the ratings capture financial constraints at low rating levels. At high rating levels, they support the managing for ratings notion, i.e., managers are reluctant to make many acquisitions and focus only on the most promising opportunities.

Our maintained assumption is that acquisitions put pressure on the ratings of firms at the higher end of the investment grade spectrum, which deters these firms from M&A transactions. In the next section, we explore this conjecture in detail.

4. The Impact of Acquisitions on Future Credit Ratings

Mergers and acquisitions are known to increase acquirers' default risk and leverage levels (see, e.g., Billett et al., 2004; Bessembinder et al., 2009; Furfine and Rosen, 2011). Such transactions may therefore put downward pressure on acquirers' credit ratings in the post-merger period, especially for firms with little debt to begin with.

To assess whether this is indeed the case, we document the likelihood of downgrades after acquisitions for all the rating categories, and compare it to the same likelihood for non-acquiring firms with the same rating. To determine whether a firm that made an acquisition in year t is downgraded subsequently, we compare its rating at the end of t+1 to the rating at the end of t-1. For non-acquiring firms, we make the same comparison over a two-year window.

Our findings are displayed in Panel A of Table 10. For ease of presentation, we group several ratings categories together. For example, all firms rated AAA, AA, and A are combined. The results show an interesting pattern. Highly-rated firms are more likely to be downgraded after they make acquisitions. For example, for firms rated A or higher, the likelihood of being downgraded is around 6 percentage points higher when they make an acquisition. For non-investment grade firms, the pattern reverses. For example, B and BB firms have a 17% chance of being downgraded when they make an acquisition, but a 22% chance if they do not. These results explain why highly-rated firms are reluctant to make acquisitions if they wish to maintain their rating, providing additional support for the managing for ratings hypothesis. Note that we do not claim that these downgrades are undeserved; the acquisition may well increase the default risk of the acquirer. We merely argue that if highly-rated firms value their current rating, they will be reluctant to make acquisitions that increase the risk of a downgrade, and, as illustrated in Panel A of Table 10, this risk increases as ratings improve. At the bottom of Panel A, we also report the downgrade probabilities for firms around the investment grade cutoff. Note that BBB– firms are actually less likely to be downgraded after making acquisitions while there is no significant change for BB+ rated firms. These findings also explain why we do not find any reluctance on the part of these firms to make acquisitions as they do not negatively affect their rating.

[Please insert Table 10 about here]

To shed further light on these findings, we study cash and stock acquisitions separately. The results presented previously in Table 4 indicate that ratings have little influence on stock-financed acquisitions. Here we study whether this is the case because such acquisitions do not lead to subsequent downgrades for highly-rated firms. Panel B of Table 10 reports the findings. Firms that do not disclose the form of payment or that mainly use forms of payment other than cash or stock are excluded from this analysis. Consistent with our arguments, the effect of acquisitions on subsequent downgrades is mainly due to cash-financed transactions. For highly rated firms, cash-financed acquisitions lead to a substantial increase in the likelihood of being downgraded. For example, 29% of firms rated A and

higher that make cash-financed acquisitions are downgraded afterwards, compared to only 22% of firms which do not acquire. It is therefore not surprising that firms with high ratings are more reluctant to make cash-funded acquisitions if they want to preserve their rating. Interestingly, for BBB-rated firms, acquisitions have no significant impact on the likelihood of being downgraded, and for non-investment grade firms, cash-financed acquisitions reduce the probability of a downgrade.

Conversely, making stock-financed acquisitions has no marked impact on the likelihood of being downgraded for firms rated BBB or higher. For firms with lower ratings, there is some evidence that stock-financed acquisitions reduce the likelihood of a downgrade.

We also verify that our prior results hold when we control for the stock price reaction associated with the acquisition announcements (not reported in a table). Not surprisingly, the likelihood of being downgraded after an acquisition is higher when the stock market reaction around the announcement is negative. However, we continue to find that highly-rated firms that make cash-financed acquisitions are more likely to get downgraded compared to firms that make no acquisitions, even if the stock price reaction around the acquisition announcement is positive.

5. Conclusion

This paper documents a curvilinear relation between credit rating levels and acquisitions. At low rating levels, in line with the financial constraints hypothesis, increases in firm ratings lead to more acquisitions, accompanied by lower announcement returns; at high ratings, consistent with the managing for ratings hypothesis, additional rating increases reduce acquisitiveness and improve acquisition returns. Also consistent with our hypotheses, and offering an explanation for the above findings, we report that acquisitions increase the likelihood of a subsequent downgrade for highly-rated firms; firms with low ratings, on the contrary, are less likely to see their ratings decrease after making an acquisition. These findings combined are mainly due to cash-financed transactions.

From this work, we draw several conclusions. First, credit ratings have an independent effect on acquisition decisions since we control for a large number of characteristics associated with acquisitiveness in our models. Second, this effect is not uniform across the ratings distributions, which is in contrast to prior work illustrating that firms across the ratings spectrum behave similarly when they are close to a ratings threshold. We show that highly-rated firms shy away from acquisitions to avoid being downgraded, but firms with low ratings do not, because acquisitions do not exert downward pressure on their ratings. Third, the reluctance of highly-rated firms to make acquisitions suggests that these firms attach particular value to their rating and may well be foregoing good investment opportunities. Studying the benefits associated with higher ratings and measuring the precise cost associated with the reluctance to make acquisitions requires further study.

Appendix A: Variable Definitions

Dependent Variables

Acquisition likelihood: Binary variable that takes the value of 1 if the firm announced at least one acquisition in year *t*, 0 otherwise. The variable is created using data from Thomson Financial SDC.

Acquisition intensity: The sum of the deal values of all completed acquisitions announced in year *t* scaled by the firm's total assets in year *t-1*. Deal values are from Thomson Financial SDC, assets are from COMPUSTAT. Only transactions larger than 1% of market equity are included in the sample.

Acquirer CAR: Cumulative abnormal return for the acquiring firm over the 3-day (-1, +1) and 5-day (-2, +2) event window around the announcement day. The abnormal return is computed as the market-adjusted return using the value-weighted CRSP index as a proxy for the market.

Firm Variables

Credit rating level (CR): Continuous variable for rated firms from COMPUSTAT which takes the value from 1 (C rating) to 21 (AAA rating). The ratings are Standard and Poor's ratings.

Predicted CR: The predicted credit rating based on the regression model reported in Appendix B.

Distance-to-Default: A measure of default risk, based on the structural model of Merton (1974). Distance to default (*DD*) is the difference between the asset value of the firm (*V*) and the face value of its debt (*F*), divided by the standard deviation of the firm's asset value (σ_V). We use an iterative procedure by solving a system of two nonlinear equations to estimate asset value and volatility. In this system, equity (*E*) is priced as a European call option on the value of the firm's assets with time to maturity (*T*) equal to one year. Following Vassalou and Xing (2004), *F* corresponds to debt in current liabilities plus one-half of long-term debt since this approach takes into account the fact that long-term debt might not be due until after the horizon of the DD estimation. As initial values for asset value and asset volatility, we use $V = E + F$ and $\sigma_V = \sigma_E * (E/E+F)$ where *E* is the market value of equity at the end of each calendar year and σ_E is the annualized standard deviation of daily stock returns from the prior year. Distance to default is computed as:

$$DD = \frac{ln(V/F) + 0.06 + R_{bill} - \frac{1}{2}\sigma_V^2}{\sigma_V},$$

where R_{bill} is the Treasury bill rate, and 0.06 is an empirical proxy for the equity premium following Campbell, Hilscher, and Szilagyi (2008).

Size: Firm total assets at the fiscal year-end from COMPUSTAT (in US$ millions) deflated using the CPI index with base year 2000. The regressions use the natural log of this variable.

Profitability: Earnings before interest, taxes, depreciation and amortization (EBITDA) divided by total assets.

Cash holdings: Cash holdings divided by total assets.

Age: Number of years the firm has been covered by COMPUSTAT.

Excess stock return: Market adjusted return (using the value-weighted CRSP index as benchmark).

Market-to-book: Market value of the firm (Total assets − book value of equity + market value of equity) divided by total assets.

Leverage: Total financial debt (long-term debt plus debt in current liabilities) divided by total assets.

Capex: Capital expenditures divided by total assets.

Interest coverage: EBITDA over interest expenses.

Debt/EBITDA: Long-term and short-term debt divided by EBITDA.

Negative Debt/EBITDA: Indicator variable set equal to 1 if Debt/EBITDA is negative and 0 otherwise.

Convertible: Convertible debt divided by total assets.

Subordinated: Subordinated debt divided by total assets.

PPE: Net property, plant and equipment divided by total assets.

Volatility: The volatility of profitability, computed using the current year's data as well as the four previous years'. At least two years of data are required in its computation.

StDevRet: The annualized standard deviation of daily stock returns for a given year.

Lagged upgrade: A binary variable that takes the value of 1 if a firm has been upgraded at least once in the prior year, 0 otherwise.

Lagged downgrade: A binary variable that takes the value of 1 if a firm has been downgraded at least once in the prior year, 0 otherwise.

Cash Flow Operations: Operating cash flow divided by total assets.

Industry Variables

M&A liquidity: Sum of acquisitions made in a given year and three-digit SIC code industry, divided by the sum of total assets of all COMPUSTAT firms with the same three-digit SIC code.

Herfindahl index: Sum of squares of the market shares of all firms in a given year and three-digit SIC industry, where market share is defined as sales of the firm divided by the sum of the sales in the industry.

Acquisition Characteristics

Deal value: Value of the transaction from SDC in constant (year 2000) US$ million.

Relative size: Ratio of the deal value and the market capitalization of the acquiring firm 4 weeks prior to the acquisition announcement.

Horizontal: Binary variable that takes the value of 1 if the target firm operates in the same 3-digit SIC code industry as the acquirer, 0 otherwise.

Public: Binary variable that takes the value of 1 if the target firm is a public firm, 0 otherwise.

Cash: Binary variable that takes the value of 1 for deals where the method of payment is 100% cash, 0 otherwise.

Cross-border: Binary variable that takes the value of 1 for acquisitions of non-US target firms, 0 otherwise.

Tender: Binary variable that takes the value of 1 for tender offers, 0 otherwise.

Hostile: Binary variable that takes the value of 1 for deals defined as "hostile" or "unsolicited" by SDC, 0 otherwise.

Appendix B: Credit Rating Model

This table presents the coefficients of an OLS regression of credit rating levels for all U.S. publicly listed firms with available credit ratings over the period 1989-2018. The dependent variable is the credit rating level. Variable definitions are in Appendix A. The model includes year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and Fama-French 48 industry classification dummies, respectively. The *t*-statistics reported in parentheses are adjusted for heteroskedasticity and firm clustering. ***and ** denote statistical significance at the 1% and 5% levels, respectively.

Size	1.137***
	(35.43)
Profitability	3.742***
	(5.45)
CFO	3.429***
	(8.37)
Cash holdings	-0.982***
	(-2.88)
Interest coverage	0.018***
	(6.96)
Market-to-book	0.491***
	(11.84)
StDevRet	-4.547***
	(-27.55)
Leverage	-2.320***
	(-12.13)
Debt/EBITDA	-0.045***
	(-5.86)
Neg. Debt/EBITDA	0.392*
	(1.92)
Convertible	-2.134***
	(-5.13)
Subordinated	-1.667***
	(-6.35)
Volatility	-6.195***
	(-6.89)
Capex	-0.829
	(-1.30)
PPE	0.165
	(0.74)
Year dummies	Yes
Industry dummies	Yes
Adjusted R^2	0.753
Observations	23,123

References

Ahern, Kenneth, and Jarrad Harford, 2014, The importance of industy links in merger waves, Journal of Finance 69, 527–576.

Alissa, Walid, Samuel B. Bonsall IV, Kevin Koharki, and Michael W. Penn Jr, 2013, Firms' use of accounting discretion to influence their credit ratings, Journal of Accounting and Economics 55, 129–147.

Almeida, Heitor, Murillo Campello, and Michael S. Weisbach, 2004, The cash flow sensitivity of cash, Journal of Finance 59, 1777–1804.

Almeida, Heitor, Igor Cunha, Migueal A. Ferreira, and Felipe Restrepo, 2017, The real effects of credit ratings: The sovereign ceiling channel, Journal of Finance 72, 249-290.

Alp, Aysun, 2013, Structural shifts in credit rating standards, Journal of Finance 68, 2435–2470.

Altman, Edward I., 1998, The importance and subtlety of credit rating migration, Journal of Banking and Finance 22, 1231–1247.

Altman, Edward I., and Duen Li Kao, 1992, The implications of corporate bond ratings drift, Financial Analysts Journal 48, 64–75.

Arden, Allyn, and Christina McGovern, 2013, The credit cloud: Large U.S. takeovers are a bad omen for credit quality, RatingsDirect, Standard & Poor's Financial Services, September 19, 2013.

Ashbaugh-Skaife, Hollis, Daniel W. Collins, and Ryan LaFond, 2006, The effects of corporate governance on firms' credit ratings, Journal of Accounting and Economics 42, 203–243.

Auvray, Tristan, and Olivier Brossard, 2012, Too dispersed to monitor? Ownership dispersion, monitoring, and the prediction of bank distress, Journal of Money, Credit and Banking 44, 685-714.

Bae, Kee-Hong, and Vidhan Goyal, 2009, Creditor rights, enforcement, and bank loans, Journal of Finance 64, 823–860.

Baghai, Ramin, Henri Servaes, and Ane Tamayo, 2014, Have rating agencies become more conservative? Implications for capital structure and debt pricing, Journal of Finance 69, 1961–2005.

Becker, Bo, and Victoria Ivashina, 2014, Cyclicality of credit supply: Firm level evidence, Journal of Monetary Economics 62, 76–93.

Begley, Taylor, 2015, The real costs of corporate credit ratings, Working paper, London Business School.

Bessembinder, Hendrik, Kathleen M. Kahle, William F. Maxwell, and Danielle Xu, 2009, Measuring abnormal bond performance, Review of Financial Studies 22, 4219–4258.

Bhanot, Karan, and Antonio S. Mello, 2006, Should corporate debt include a rating trigger?, Journal of Financial Economics 79, 69–98.

Bharath, Sreedhar T., and Tyler Shumway, 2008, Forecasting default with the Merton distance to default, Review of Financial Studies 21, 1339–1369.

Bhojraj, Sanjeev, and Partha Sengupta, 2003, Effect of corporate governance on bond ratings and yields: The role of institutional investors and outside directors, Journal of Business 76, 455–475.

Billett, Matthew T., Tao-Hsien Dolly King, and David C. Mauer, 2004, Bondholder wealth effects in mergers and acquisitions: New evidence from the 1980s and 1990s, Journal of Finance 59, 107–135.

Bongaerts, Dion, and Frederik P. Schlingemann, 2020, The real effects of credit ratings: Evidence from corporate asset sales, Working paper, Erasmus University and University of Pittsburgh.

Boot, Arnoud, Todd T. Milbourn, and Anjolein Schmeits, 2006, Credit rating as coordination mechanisms, Review of Financial Studies 19, 81–118.

Campbell, John Y., Jens Hilscher, and Jan Szilagyi, 2008, In search of distress risk, Journal of Finance 63, 2899–2939.

Campello, Murillo, John R. Graham, and Campbell R. Harvey, 2010, The real effects of financial constraints: Evidence from a financial crisis, Journal of Financial Economics 97, 470–487.

Chen, Zhihua, Aziz A. Lookman, Norman Schürhoff, and Duane J. Seppi, 2014, Rating-based investment practices and bond market segmentation, Review of Asset Pricing Studies 4, 162–205.

Chernenko, Sergey, and Adi Sunderam, 2012, The real consequences of market segmentation, Review of Financial Studies 25, 2041–2069.

Cornaggia, Jess N., Kimberly J. Cornaggia, and John E. Hund, 2017, Credit ratings across asset classes: A long-term perspective, Review of Finance 21, 465–509.

Denis, David J., and Valeriy Sibilkov, 2010, Financial constraints, investment, and the value of cash holdings, Review of Financial Studies 23, 247–269.

Dichev, Ilia D., and Joseph D. Piotroski, 2001, The long-run stock returns following bond rating changes, Journal of Finance 56, 173–203.

Faulkender, Michael, and Mitchell A. Petersen, 2006, Does the source of capital affect capital structure? Review of Financial Studies 19, 45–79.

Fuller, Kathleen, Jeffry Netter, and Mike Stegemoller, 2002, What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions, Journal of Finance 57, 1763–1793.

Furfine, Craig H., and Richard J. Rosen, 2011, Mergers increase default risk, Journal of Corporate Finance 17, 832–849.

Goldstein, Itay, and Chong Huang, 2020, Credit rating inflation and firms' investments, Journal of Finance 75, 2929–2972.

Graham, John R., and Campbell R. Harvey, 2001, The theory and practice of corporate finance: Evidence from the field, Journal of Financial Economics 60, 187–243.

Greene, William, 2004, The behaviour of the maximum likelihood estimator of limited dependent variable models in the presence of fixed effects, The Econometrics Journal 7, 98–119.

Gropp, Reint, Jukka Vesala, and Giuseppe Vulpes, 2006, Equity and bond market signals as leading indicators of bank fragility, Journal of Money, Credit and Banking 38, 399-428.

Hand, John, Robert Holthausen, and Richard Leftwich, 1992, The effect of bond rating announcements on bond and stock prices, Journal of Finance 47, 733–752.

Harford, Jarrad, 2005, What drives merger waves? Journal of Financial Economics 77, 529–560.

Harford, Jarrad, and Vahap B. Uysal, 2014, Bond market access and investment, Journal of Financial Economics 112, 147–163.

Henry, Tyler R., Darren J. Kisgen, and Juan (Julie) Wu, 2015, Equity short selling and bond rating downgrades, Journal of Financial Intermediation 24, 89–111.

Hillegeist, Stephen A., Elizabeth K. Keating, Donald P. Cram, and Kyle G. Lundstedt, 2004, Assessing the Probability of Default, Review of Accounting Studies 9, 5–34.

Holthausen, Robert, and Richard Leftwich, 1986, The effect of bond rating changes on common stock prices, Journal of Financial Economics 17, 57–89.

Hovakimian, Armen, Tim Opler, and Sheridan Titman, 2001, The debt-equity choice, Journal of Financial and Quantitative Analysis 36, 1–24.

Jorion, Philippe, Charles Shi, and Sanjian Zhang, 2009, Tightening credit standards: the role of accounting quality, Review of Accounting Studies 14, 123–160.

Jung, Boochun, Naomi Soderstrom, and Yanhua Sunny Yang, 2013, Earnings smoothing activities of firms to manage credit ratings, Contemporary Accounting Research 30, 645–676.

Karampatsas, Nikolaos, Dimitris Petmezas, and Nickolaos G. Travlos, 2014, Credit ratings and the choice of payment method in mergers and acquisitions, Journal of Corporate Finance 25, 474-493.

Klapper, Leora, Luc Laeven, and Raghuram Rajan, 2012, Trade credit contracts, Review of Financial Studies 25, 838–867.

Kisgen, Darren J., 2006, Credit ratings and capital structure, Journal of Finance 61, 1035–1072.

Kisgen, Darren J., 2009, Do firms target credit ratings or leverage levels? Journal of Financial and Quantitative Analysis 44, 1323–1344.

Kisgen, Darren J., 2019, The impact of credit ratings on corporate behavior: Evidence from Moody's adjustments, Journal of Corporate Finance 58, 567–582.

Kraft, Pepa, 2015, Do rating agencies cater? Evidence from rating-based contracts, Journal of Accounting and Economics 59, 264–283.

Lando, David, and Torben M. Skødeberg, 2002, Analyzing rating transitions and rating drift with continuous observations, Journal of Banking and Finance 26, 423–444.

Leary, Mark T., 2009, Bank loan supply, lender choice, and corporate capital structure, Journal of Finance 64, 1143–1185.

Lemmon, Michael, and Michael R. Roberts, 2010, The response of corporate financing and investment to changes in the supply of credit, Journal of Financial and Quantitative Analysis 45, 555–587.

Liu, Tim, and Anil Shivdasani, 2019, Do credit ratings matter? Evidence from S&P's 2013 methodology revision, Working Paper, University of North Carolina at Chapel Hill.

Manso, Gustavo, 2013, Feedback effects of credit ratings, Journal of Financial Economics 109, 535–548.

Manso, Gustavo, Bruno Strulovici, and Alexei Tchistyi, 2010, Performance-sensitive debt, Review of Financial Studies 23, 1819–1854.

McDonald, John F., and Robert A. Moffitt, 1980, The uses of Tobit analysis, Review of Economics and Statistics 62, 318–321.

Merton, Robert C., 1974, On the pricing of corporate debt: The risk structure of interest rates, Journal of Finance 29, 449–470.

Mitchell, Mark L., and J. Harold Mulherin, 1996, The impact of industry shocks on takeover and restructuring activity, Journal of Financial Economics 41, 193–229.

Moeller, Sara B., Frederik P. Schlingemann, and René M. Stulz, 2004, Firm size and the gains from acquisitions, Journal of Financial Economics 73, 201–228.

Moeller, Sarah B., Frederik P. Schlingemann, and René M. Stulz, 2005, Wealth destruction on a massive scale? A study of acquiring-firm returns in the recent merger wave, Journal of Finance 60, 757–782.

Moeller, Sarah B., Frederik P. Schlingemann, and René M. Stulz, 2007, How do diversity of opinion and information asymmetry affect acquirer returns, Review of Financial Studies 20, 2047–2078.

Oster, Emily, 2019, Unobservable selection and coefficient stability: Theory and evidence, Journal of Business and Economics Statistics 37, 187–204.

Schlingemann, Frederik P., René M. Stulz, and Ralph A. Walkling, 2002, Divestitures and the liquidity of the market for corporate assets, Journal of Financial Economics 64, 117–144.

Standard and Poor's, 2008, Corporate rating criteria (Standard and Poor's, New York).

Standard and Poor's, 2021, RatingsDirect, general criteria: Principles of credit ratings (Standard and Poor's, New York).

Standard and Poor's, 2021, Default, transition, and recovery: 2020 Annual global corporate default study and rating transitions, (Standard and Poor's, New York).

Sufi, Amir, 2009, The real effects of debt certification: Evidence from the introduction of bank loan ratings, Review of Financial Studies 22, 1659–1691.

Uysal, Vahap B., 2011, Deviation from the target capital structure and acquisition choices, Journal of Financial Economics 102, 602–620.

Vassalou, Maria, and Yuhang Xing, 2004, Default risk in equity returns, Journal of Finance 59, 831–868.

Whited, Toni M., 1992, Debt, liquidity constraints, and corporate investment: Evidence from panel data, Journal of Finance 47, 1425–1460.

Wooldridge, Jeffrey M., 2015, Control function methods in applied econometrics, Journal of Human Resources 50, 420–445.

Zhou, Xianming, 2001, Understanding the determinants of managerial ownership and the link between ownership and performance: comment, Journal of Financial Economics 62, 559–571.

Table 1
Firm and Deal Characteristics by Rating Level

This table provides the rating distribution and reports statistics of firm and deal characteristics for each rating category for our sample of U.S. rated publicly listed firms making acquisitions over the period 1990-2019. *N* denotes the number of firm-year observations in the sample. The mean value of firm size (book assets) is presented in the third column. Column (4) presents the number of M&A deals and column (5) presents the mean deal value. Acquisition likelihood (column (6)) is the proportion of firms in our sample that conduct at least one acquisition exceeding 1% of the firm's market value of equity in a given year *t*. Acquisition intensity (column (7)) is the sum of all acquisition exceeding 1% of the firm's market value of equity completed by a firm in a given year divided by its total assets in year *t-1*. All dollar values are in millions and adjusted to 2000 dollars by the consumer price index (CPI).

Rating level	N	Firm Size	Number of Acquisitions	Deal Value	Acquisition Likelihood	Acquisition Intensity
(1)	(2)	(3)	(4)	(5)	(6)	(7)
AAA	330	169,893	48	10,824	13.03%	2.47%
AA+	139	106,132	20	2,486	13.67%	0.86%
AA	459	43,748	68	3,355	12.85%	1.83%
AA-	614	34,452	113	4,657	14.82%	2.98%
A+	956	22,843	227	2,288	18.31%	3.21%
A	1,760	21,254	466	1,704	21.48%	3.59%
A-	1,510	18,735	336	1,839	17.35%	3.67%
BBB+	2,091	15,085	447	1,375	17.36%	3.19%
BBB	2,849	10,817	713	851	19.48%	3.28%
BBB-	2,268	8,648	562	797	19.14%	3.52%
BB+	1,852	5,662	453	1,157	19.65%	4.40%
BB	2,551	3,738	665	375	19.40%	4.13%
BB-	3,121	2,663	870	402	19.64%	4.84%
B+	2,882	1,790	810	228	19.19%	4.97%
B	1,804	2,317	359	262	14.14%	3.37%
B-	903	1,880	129	291	11.18%	2.68%
Below B-	550	1,656	45	374	5.45%	1.12%
All levels	26,639	12,797	6,331	1,007	17.98%	3.74%

Table 2
Summary Statistics

This table presents descriptive statistics for the universe of U.S. rated listed firms over the period 1989-2018. Variable definitions are in Appendix A. The table reports the number of observations, mean, median and standard deviation of the corresponding variables. All dollar values are in millions and adjusted to 2000 dollars by the consumer price index (CPI). The last rows contain the abnormal announcement return for those firms that make acquisitions over the period 1990-2019.

	N	Mean	Median	Std. Dev.
Credit rating level	26,639	11.54	11.00	3.62
Acquisition likelihood	26,639	0.180	0.000	0.384
Acquisition intensity	26,639	0.037	0.000	0.14
Distance-to-default	26,181	7.190	6.259	4.521
Size ($ million)	26,608	10,521	2,474	29,777
Profitability	26,543	0.135	0.130	0.077
Cash holdings	26,595	0.093	0.056	0.104
Age	26,639	26.29	22.00	17.80
Excess stock return	25,669	0.028	-0.020	0.462
Market-to-book	26,401	1.715	1.446	0.898
Leverage	26,566	0.356	0.322	0.212
M&A liquidity	26,639	0.028	0.010	0.051
Herfindahl index	26,639	0.171	0.128	0.150
Acquirer CAR (-1, +1)	6,234	0.83%	0.48%	5.84%
Acquirer CAR (-2, +2)	6,234	0.96%	0.66%	6.60%

Table 3
Credit Rating Levels and Acquisitions

This table presents the effect of credit rating levels on acquisitions announced over the period 1990-2019 for all U.S. publicly listed firms with available credit ratings over the period 1989-2018. Panel A presents marginal effects of probit specifications and Panel B unconditional marginal effects of tobit specifications. The dependent variable in the probit models (Panel A) takes the value of 1 if the firm announced at least one acquisition exceeding 1% of the market value of its equity in year *t*, and 0 otherwise. The dependent variable in the tobit models (Panel B) is the ratio of the sum of all acquisitions exceeding 1% of market equity announced by a firm in year *t*, divided by total assets at the end of year *t*–1. The explanatory variables are lagged by one year with respect to the dependent variable. Variable definitions are in Appendix A. All models include year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and Fama-French 48 industry classification dummies, respectively. CR stands for credit rating level. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and acquirer clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3 (continued)

Panel A. Probit Models

	(1)	(2)	(3)	(4)	(5)	(6)
CR	0.0017	0.0415***	0.0414***	0.0393***	0.0311***	0.0326***
	(1.57)	(6.74)	(6.14)	(6.06)	(5.34)	(5.31)
CR^2		-0.0016***	-0.0015***	-0.0017***	-0.0013***	-0.0014***
		(-6.44)	(-5.66)	(-6.22)	(-5.68)	(-5.62)
BB+<=CR<=BBB-						-0.0073
						(-0.91)
Acquisition likelihood $_{t-1}$					0.1436***	0.1435***
					(21.15)	(21.15)
Distance-to-default				0.0096***	0.0092***	0.0092***
				(7.81)	(8.14)	(8.14)
Ln (Size)			-0.0225***	-0.0205***	-0.0187***	-0.0186***
			(-5.74)	(-5.21)	(-5.34)	(-5.33)
Profitability			0.1014**	0.0664	0.1197***	0.1199***
			(1.97)	(1.29)	(2.48)	(2.49)
Cash holdings			-0.0564	-0.0422	-0.0244	-0.0241
			(-1.47)	(-1.09)	(-0.68)	(-0.67)
Age			0.0010***	0.0009***	0.0008***	0.0008***
			(3.98)	(3.56)	(3.93)	(3.93)
Excess stock return			0.0495***	0.0494***	0.0406***	0.0406***
			(9.21)	(9.04)	(7.04)	(7.04)
Market-to-book			-0.0002	-0.0107**	-0.0108***	-0.0109***
			(-0.03)	(-2.27)	(-2.41)	(-2.42)
Leverage			-0.0450**	0.0106	-0.0004	-0.0011
			(-2.19)	(0.50)	(-0.03)	(-0.06)
M&A liquidity			0.2498***	0.2462***	0.0738	0.0737
			(4.73)	(4.65)	(1.38)	(1.38)
Herfindahl index			-0.0116	-0.0121	-0.0148	-0.0144
			(-0.40)	(-0.42)	(-0.60)	(-0.58)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ind. dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.028	0.032	0.043	0.048	0.077	0.077
Observations	26,639	26,639	25,433	25,197	23,002	23,002

Table 3 (continued)

Panel B. Tobit Models

	(1)	(2)	(3)	(4)	(5)	(6)
CR	0.0000	0.0120***	0.0122***	0.0115***	0.0108***	0.0113***
	(-0.13)	(6.80)	(6.31)	(6.08)	(5.80)	(5.74)
CR^2		-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0005***
		(-6.77)	(-5.87)	(-6.23)	(-6.02)	(-5.93)
BB+<=CR<=BBB-						-0.0022
						(-0.89)
Acquisition Intensity $_{t-1}$					0.0421***	0.0421***
					(8.50)	(8.50)
Distance-to-default				0.0025***	0.0027***	0.0027***
				(7.22)	(7.74)	(7.73)
Ln (Size)			-0.0082***	-0.0076***	-0.0074***	-0.0073***
			(-7.21)	(-6.71)	(-6.55)	(-6.54)
Profitability			0.0297**	0.0205	0.0326**	0.0327**
			(1.94)	(1.33)	(2.09)	(2.10)
Cash holdings			-0.0142	-0.0109	-0.0152	-0.0152
			(-1.30)	(-0.99)	(-1.36)	(-1.36)
Age			0.0002***	0.0002***	0.0002***	0.0002***
			(2.85)	(2.46)	(2.84)	(2.84)
Excess stock return			0.0168***	0.0167***	0.0132***	0.0132***
			(9.90)	(9.68)	(7.57)	(7.57)
Market-to-book			0.0030**	0.0004	-0.0005	-0.0005
			(2.12)	(0.30)	(-0.30)	(-0.31)
Leverage			-0.0135**	0.0013	0.0013	0.0011
			(-2.22)	(0.20)	(0.21)	(0.18)
M&A liquidity			0.0586***	0.0580***	0.0251	0.0250
			(3.80)	(3.76)	(1.59)	(1.59)
Herfindahl index			-0.0062	-0.0067	-0.0070	-0.0068
			(-0.75)	(-0.81)	(-0.87)	(-0.85)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ind. dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.033	0.038	0.055	0.060	0.065	0.065
Observations	26,639	26,639	25,433	25,197	23,002	23,002

Table 4
Credit Rating Levels and Cash versus Stock Acquisitions

This table presents the effect of credit rating levels on cash and stock acquisitions announced over the period 1990-2019 for all U.S. listed firms with available credit ratings over the period 1989-2018. In the probit models (Panel A), the dependent variable takes the value of 1 if the firm announced at least one cash (stock) financed acquisition in year *t* exceeding 1% of the market value of its equity, and 0 otherwise. The dependent variable in the tobit models (Panel B) is the deal value of cash (stock) acquisitions exceeding 1% of market equity announced by a firm in year *t*, divided by total assets at the end of year *t*–1. A transaction is classified as a cash (stock) transaction if at least 50% of the payment is in cash (stock). Panel A presents marginal effects of probit specifications and Panel B unconditional marginal effects of tobit specifications. Variable definitions are in Appendix A. The control variables are the same as in model (6) of Panels A and B of Table 3. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and acquirer clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Probit Models

	(1) Cash	(2) Stock
CR	0.0260***	0.0013
	(5.06)	(0.82)
CR^2	-0.0011***	-0.0001*
	(-5.23)	(-1.77)
BB+<=CR<=BBB-	-0.009	-0.003
	(-1.26)	(-1.19)
Control variables	Yes	Yes
Year dummies	Yes	Yes
Ind. dummies	Yes	Yes
Pseudo R^2	0.085	0.118
Observations	21,471	19,424

Panel B. Tobit Models

	(1) Cash	(2) Stock
CR	0.0057***	0.0006
	(5.41)	(0.89)
CR^2	-0.0002***	-0.00005*
	(-5.56)	(-1.82)
BB+<=CR<=BBB-	-0.0020	-0.0009
	(-1.45)	(-0.84)
Control Variables	Yes	Yes
Year dummies	Yes	Yes
Ind. dummies	Yes	Yes
Pseudo R^2	0.097	0.118
Observations	21,471	19,424

Table 5
Credit Rating Levels and Acquisitions: Augmented Models

This table presents the effect of credit rating levels on acquisitions announced over the period 1990-2019 for all U.S. listed firms with available credit ratings over the period 1989-2018. Panel A presents marginal effects of probit specifications and Panel B unconditional marginal effects of tobit specifications. The dependent variable in the probit models (Panel A) takes the value of 1 if the firm announced at least one acquisition exceeding 1% of the market value of its equity in year *t*, and 0 otherwise. The dependent variable in the tobit models (Panel B) is the ratio of the sum of all acquisitions exceeding 1% of market equity announced by a firm in year *t*, divided by total assets at the end of year *t*–1. Model (1) of Panels A and B is estimated using a random effects model; ρ refers to the proportion of total variance contributed by the panel-level variance component and compares the pooled estimators with the panel estimators. Model (2) includes the Predicted credit rating (CR) and its square based on the regression model reported in Appendix B. Variable definitions are in Appendix A. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and acquirer clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Probit Models

	(1)	(2)
CR	0.0357***	0.0177**
	(5.90)	(2.28)
CR^2	-0.0014***	-0.0008***
	(-5.83)	(-2.47)
Predicted CR		0.0286***
		(3.45)
Predicted CR^2		-0.0010***
		(-2.79)
Control variables	Yes	Yes
Year dummies	Yes	Yes
Ind. Dummies	Yes	Yes
Firm random effects	Yes	No
ρ	0.2069***	-
Pseudo R^2	0.168	0.078
Observations	23,002	22,362

Table 5 (continued)

Panel B. Tobit Models

	(1)	(2)
CR	0.0134***	0.0064***
	(6.83)	(2.55)
CR^2	-0.0005***	-0.0003***
	(-6.55)	(-2.66)
Predicted CR		0.0102***
		(3.78)
Predicted CR^2		-0.0004***
		(-3.01)
Control Variables	Yes	Yes
Year dummies	Yes	Yes
Ind. Dummies	Yes	Yes
Firm random effects	Yes	No
ρ	0.2527***	-
Pseudo R^2	0.187	0.063
Observations	23,002	22,362

Table 6
Credit Rating Levels and Acquisitions: Instrumental Variable (IV) Analysis

This table presents an instrumental variable (IV) analysis for the effect of credit rating levels on acquisitions announced over the period 1990-2019 for all U.S. listed firms with available credit ratings over the period 1989-2018. In the first stage regression (not reported for brevity), the instruments are the industry average credit rating level of firms in the same 3-digit SIC industry group at the fiscal year-end immediately prior to the acquisition announcement, and a dummy variable equal to one if the firm is listed on the NYSE. Column (1) presents marginal effects of a probit specification and Panel B unconditional marginal effects of a tobit specification. The dependent variable in the probit model takes the value of 1 if the firm announced at least one acquisition exceeding 1% of the market value of its equity in year *t*, and 0 otherwise. The dependent variable in the tobit model is the ratio of the sum of all acquisitions exceeding 1% of market equity announced by a firm in year *t*, divided by total assets at the end of year *t*–1. The control variables are the same as in model (5) of Panels A and B of Table 3. Variable definitions are in Appendix A. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and acquirer clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Probit	(2) Tobit
CR	0.0367**	0.0137***
	(2.51)	(2.94)
CR^2	-0.0017***	-0.0006***
	(-6.20)	(-6.41)
Year dummies	Yes	Yes
Ind. dummies	Yes	Yes
Pseudo R^2	0.077	0.065
Observations	23,002	23,002

Table 7
Credit Rating Levels and Acquisitions by Firm Size and Market-to-Book

This table presents the effect of credit rating levels on acquisitions announced over the period 1990-2019 for all U.S. publicly listed firms with available credit ratings over the period 1989-2018, for subsamples of small and large firms, based on the sample median assets (Panel A) and firms with high and low market-to-book ratios, based on the sample median (Panel B). Columns (1) and (3) presents marginal effects of probit specifications, and columns (2) and (4) unconditional marginal effects of tobit specifications. The dependent variable in the probit models takes the value of 1 if the firm announced at least one acquisition exceeding 1% of the market value of its equity in year *t*, and 0 otherwise. The dependent variable in the tobit models is the ratio of the sum of all acquisitions exceeding 1% of market equity announced by a firm in year *t*, divided by total assets at the end of year *t*–1. The explanatory variables are lagged by one year with respect to the dependent variable. All specifications include all control variables (as in column (6) of Table 3) and year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and Fama-French 48 industry classification dummies, respectively. CR stands for credit rating level. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and acquirer clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Small vs. Large Firms

	Small Firms		Large Firms	
	(1) Probit	(2) Tobit	(3) Probit	(4) Tobit
CR	0.0623***	0.0238***	0.0122*	0.0038*
	(6.61)	(7.30)	(1.73)	(1.96)
CR^2	-0.0026***	-0.0010***	-0.0007**	-0.0002***
	(-6.36)	(-7.06)	(-2.58)	(-2.84)
Control variables	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Ind. dummies	Yes	Yes	Yes	Yes
Pseudo R^2	0.087	0.074	0.086	0.081
Observations	10,736	10,736	12,266	12,266

Panel B. Firms with Low vs. High Market-to-Book Ratio

	Low Market-to-Book		High Market-to-Book	
	(1) Probit	(2) Tobit	(3) Probit	(4) Tobit
CR	0.0280***	0.0087***	0.0306***	0.0107***
	(2.93)	(3.47)	(3.81)	(3.49)
CR^2	-0.0014***	-0.0004***	-0.0013***	-0.0004***
	(-3.29)	(-3.71)	(-4.32)	(-3.77)
Control variables	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Ind. dummies	Yes	Yes	Yes	Yes
Pseudo R^2	0.093	0.092	0.070	0.051
Observations	11,497	11,497	11,505	11,505

Table 8
Prior Credit Rating Changes and Acquisitiveness

This table reports the effect of past rating actions on acquisition likelihood and intensity, controlling for the credit rating level and its squared term. In the probit models (Panel A), the dependent variable takes the value of 1 if the firm announced at least one acquisition in year *t* exceeding 1% of the market value of its equity, and 0 otherwise. The dependent variable in the tobit models (Panel B) is the sum of all acquisitions exceeding 1% of market equity announced by a firm in year *t*, divided by total assets at the end of year *t*–1. The reported estimates are marginal effects for probit and unconditional marginal effects for tobit models. Column (1) is based on the full sample, and columns (2) and (3) focus on subsamples based on credit rating levels as reported in the heading of the corresponding column. The explanatory variables are lagged by one year with respect to the dependent variable. Variable definitions are in Appendix A. All specifications include all control variables (as in column (5) of Table 3) and year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and Fama-French 48 industry classification dummies, respectively. CR stands for credit rating level. The *z*-statistics reported in parentheses are adjusted for heteroskedasticity and acquirer clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Probit Models

	(1) All	(2) Non-investment grade	(3) Investment grade
CR	0.0278***	0.0092***	-0.0107***
	(4.52)	(2.48)	(-3.09)
CR^2	-0.0012***		
	(-4.99)		
Lagged upgrade	0.0168**	0.0083	0.0272**
	(2.20)	(0.89)	(2.23)
Lagged downgrade	-0.0874***	-0.0885***	-0.0763***
	(-9.63)	(-7.36)	(-5.65)
Control variables	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Ind. dummies	Yes	Yes	Yes
Pseudo R^2	0.082	0.093	0.086
Observations	23,002	11,182	11,820

Panel B. Tobit Models

	(1) All	(2) Non-investment grade	(3) Investment grade
CR	0.0098***	0.0043***	-0.0029***
	(4.99)	(3.26)	(-2.05)
CR^2	-0.0004***		
	(-5.32)		
Lagged upgrade	0.0053**	0.0040	0.0063**
	(2.31)	(1.23)	(1.94)
Lagged downgrade	-0.0267***	-0.0285***	-0.0218***
	(-9.58)	(-6.93)	(-5.85)
Control variables	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Ind. dummies	Yes	Yes	Yes
Pseudo R^2	0.071	0.084	0.079
Observations	23,002	11,182	11,820

Table 9
The Effect of Credit Ratings on Acquirer CARs

This table presents the estimates of OLS regressions of acquirer 3-day cumulative abnormal returns (CARs) around the acquisition announcement on credit rating levels and control variables. The dependent variable is expressed as a percentage. In columns (1) through (3) the sample includes only the first transaction in a given year, while in columns (4) through (6) the sample includes all transactions. Variable definitions are in Appendix A. All models include year and industry fixed effects, whose coefficients are suppressed and are based on calendar year and Fama-French 48 industry classification dummies, respectively. The *t*-statistics reported in parentheses are adjusted for heteroskedasticity. CR stands for credit rating level. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	First Transaction in a Year			All Transactions		
	(1)	(2)	(3)	(4)	(5)	(6)
CR	-0.140***	-0.509***	-0.474**	-0.122***	-0.369**	-0.376**
	(-3.63)	(-2.63)	(-2.54)	(-3.75)	(-2.24)	(-2.38)
CR^2		0.015**	0.014*		0.010*	0.010*
		(2.07)	(1.82)		(1.64)	(1.64)
BB+<=CR<=BBB-			-0.137			0.028
			(-0.54)			(0.13)
Ln (Deal Value)	-0.063	-0.064	-0.061	-0.015	-0.015	-0016
	(-0.71)	(-0.72)	(-0.74)	(-0.20)	(-0.20)	(-0.22)
Relative size	2.251***	2.237***	2.238***	2.137***	2.132***	2.131***
	(5.52)	(5.51)	(9.11)	(5.82)	(5.82)	(9.74)
Horizontal	0.203	0.199	0.198	0.327**	0.327**	0.327**
	(1.10)	(1.08)	(1.07)	(2.09)	(2.09)	(2.10)
Public	-2.720***	-2.727***	-2.727***	-2.632***	-2.636***	-2.635***
	(-9.05)	(-9.07)	(-10.66)	(-10.33)	(-10.34)	(-12.22)
Cash	0.552***	0.555***	0.553***	0.617***	0.621***	0.622***
	(3.06)	(3.08)	(2.92)	(4.09)	(4.12)	(3.93)
Cross border	-0.067	-0.063	-0.060	-0.051	-0.045	-0.045
	(-0.31)	(-0.29)	(-0.26)	(-0.78)	(-0.25)	(-0.24)
Tender	1.526***	1.535***	1.531***	1.357***	1.357***	1.358***
	(3.82)	(3.84)	(3.78)	(4.03)	(4.03)	(3.99)
Hostile	-0.630	-0.659	-0.657	-0.513	-0.537	-0.538
	(-0.95)	(-0.99)	(-0.80)	(-0.88)	(-0.91)	(-0.72)
M&A liquidity	0.799	0.807	0.816	-0.615	-0.600	-0.599
	(0.57)	(0.59)	(0.67)	(-0.56)	(-0.54)	(-0.54)
Herfindahl index	1.057*	1.120*	1.142	0.644	0.695	0.689
	(1.73)	(1.83)	(1.64)	(1.23)	(1.32)	(1.17)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.070	0.068	0.068	0.064	0.064	0.064
Observations	4,532	4,532	4,532	6,213	6,213	6,213

Table 10
Downgrades by Rating Category

Panel A reports the proportion of downgrades by rating category for acquiring and non-acquiring firms. Panel B reports the proportion of downgrades by rating category and form of payment. Acquiring firms refers to the sample of firms that made at least one acquisition in year *t*, and other firms is the sample of non-acquiring firms in the same year. *N* refers to the number of firms in the corresponding sample. A downgrade is defined as a decline in rating over a two-year period. For acquiring firms, the downgrade is measured over the period *t*-1 to *t*+1, where *t* is the year of the acquisition. Difference *p*-value in Panel A is the *p*-value of a *t*-test of the difference in proportions between the acquiring and non-acquiring firms. In Panel B, the *p*-value refers to a *t*-test of differences in proportions between various subsamples in the likelihood of being downgraded.

Panel A. Downgrades by Rating

Credit Rating Category	All Firms	Acquiring Firms	N Acquiring	Other Firms	N Other	Difference *p*-value
AAA – AA – A	23.36%	28.45%	956	22.22%	4,271	0.00
BBB	20.32%	18.94%	1,188	20.66%	4,825	0.00
BB – B	21.24%	16.83%	1,907	22.36%	7,492	0.00
Below B-	8.06%	10.00%	20	7.89%	228	0.74
BBB–	18.48%	15.00%	380	19.37%	1,492	0.05
BB+	22.04%	21.35%	305	24.59%	1,138	0.23

Table 10 (continued)

Panel B. Downgrades by Rating and Method of Payment Associated with the Acquisitions

Credit Rating Category	Cash Acquiring Firms	N Cash Acquiring	Stock Acquiring Firms	N Stock Acquiring	Other Firms	N Other	*p*-value difference Cash - Other	*p*-value difference Stock - Other
AAA – AA – A	28.60%	605	26.35%	148	22.22%	4,271	0.00	0.24
BBB	19.50%	744	19.85%	136	20.65%	4,827	0.46	0.82
BB – B	16.03%	1,166	17.14%	280	22.36%	7,492	0.00	0.04
Below B-	10.00%	10	16.67%	6	7.89%	228	0.81	0.43
BBB–	14.09%	227	7.32%	41	18.67%	1,719	0.06	0.05
BB+	23.63%	182	25.71%	35	21.35%	1,138	0.49	0.54