Bond Market Access and Investment*

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Abstract

Prior research has shown that differential access to debt markets significantly affects capital structure. In this paper, we examine the effect of access to debt markets on investment decisions by using debt ratings to indicate bond market access. We find that rated firms are more likely to undertake acquisitions than non-rated firms. This finding remains even after accounting for firm characteristics, for the probability of being rated, and in matched sample analysis as well as in sub-samples based on leverage, firm size, age and information opacity. Rated firms also pay higher premiums for their targets and receive less favorable market reaction to their acquisition announcements relative to non-rated firms. However, the average announcement returns to rated acquirers are non-negative. Collectively, these findings suggest that the lack of debt market access has a real effect on the ability to make investments as well the quality of these investments by creating underinvestment, rather than simply constraining overinvestment.

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1. Introduction

Faulkender and Petersen (2006) hypothesize and show that having access to public debt markets affects a firm's capital structure such that firms that have access to public debt markets have 50% higher leverage ratios relative to those that do not have access. In doing so, they draw attention to the differences in the cost of public and private debt. These credit supply-side differences matter such that firms with similar demand for credit will hold different amounts in their capital structures. In this paper, we build on their findings by asking how differential access to capital affects firms' investment decisions. By affecting investment decisions, public debt market access would then have a real value effect on firms.

A priori, it is not clear that differential debt market access would affect firms' investments. It is possible that firms without public debt access would shift to use equity financing instead, such that the source of funding effect is limited to the capital structure and does not affect investment policy. Absent such a shift, access to debt markets can influence investment decisions. Specifically, firms that exclusively borrow from private (informed) lenders (e.g., banks) can be rationed by the debt capacity of their lenders (Stiglitz and Weiss, 1981; Faulkender and Petersen, 2006). Therefore, constrained access to debt markets may lead to constrained investment, which manifests itself in fewer investments, but with the investments being more value-increasing and less costly (the financial constraints hypothesis).

However, an increase in debt access may come at a cost. Specifically, higher volume of dispersed, less-informed investors may lead to less effective monitoring relative to concentrated informed lenders. Thus, firms that have access to public debt markets have larger borrowing capacity with more discretion on their investments. These collectively predict that firms with bond ratings are more likely to make investments that are likely to be value-decreasing (the free cash flow hypothesis). Overall, both the financing constraints and free cash flow hypotheses predict significant effects of access to debt markets on a firm's ability to undertake investment and on the quality of those investments.

In this study, we examine the effects of access to the public debt markets on real investment activity by examining large, visible investments: acquisitions. Specifically, we examine whether having a bond rating, which facilitates access to bond markets, influences the likelihood of undertaking an acquisition and the size of that acquisition. We also explore the effect of a bond rating on the premiums paid for the target firm. Finally, we study the extent to which debt market access has implications for value creation through acquisitions.

Following Faulkender and Petersen's (2006) finding that qualified firms without a bond rating are the exception, we assume that lack of a bond rating is a supply-side effect rather than indicating lack of demand for a rating. However, we also consider the endogeneity of becoming rated. Most notably, having a rating is related to a firm's size and leverage. In addition to controlling for these factors in our analyses, we take further steps to disentangle the effect on acquisition decisions of having a rating. First, we examine the sub-sample of firms that do not have a rating two years prior to the acquisition and study

whether firms that obtain a rating subsequently have a higher likelihood of making an acquisition. Second, we replicate the acquisition decision analyses for the sub-sample of rated and non-rated firms matched by industry and size.[1] Third, we show that having a rating affects acquisition decisions even after controlling for the probability of being rated. Finally, we study the ability to make acquisitions across size, leverage and age quartiles as well as for sub-samples of information opacity. All of these analyses confirm bond market access' significant effects on acquisition decisions.

Specifically, we find that having a bond rating increases the likelihood of undertaking an acquisition by 5.2% (relative to a baseline of 12.6%) after controlling for market leverage and other determinants of making acquisitions. Thus, the source of funding does affect the ability to undertake investments. We also find that acquirers with bond ratings pay 3.3% higher premiums relative to non-rated acquirers. Consistent with the rated acquirers paying higher premiums, capital markets react more unfavorably to acquisition announcements by those acquirers. The announcement return is a sufficient statistic for the value implication as we find that there is also no long-run mean reversion in stock price for acquirers with a rating. On the contrary, in the long-run, non-rated acquirers perform very similarly to those with a rating.

These results are consistent with optimal constraints, meaning that financial constraints due to capital access keep managers from overinvesting (the free cash flow hypothesis). However, they are also in line with suboptimal constraints, such that the constraints reduce a manager's ability to undertake all positive NPV investments (the

[1] We obtain similar results when we match rated firms and non-rated firms by industry and market leverage.

financial constraints hypothesis). Under the latter hypothesis, financially constrained firms only take the highest NPV projects, so that their marginal project creates more value than the marginal project of unconstrained firms. In our final test, we attempt to disentangle the free cash flow and the financial constraints hypotheses. Although these two hypotheses both predict a difference in acquisition choices of rated firms *relative to* non-rated firms, the two hypotheses have different predictions for the *sign* of announcement returns. Specifically, the free cash flow hypothesis predicts that announcement returns to rated acquirers will be negative as these firms are more likely to make value-decreasing acquisitions that benefit managers personally. However, we do not find negative market reactions to rated acquirers on average either in the short or long run. Collectively, these findings suggest that the free cash flow hypothesis cannot explain the findings presented in this paper. We conclude that lack of public debt market access constrains firms to undertake only the best investments, rather than exhausting all positive NPV investments.

In additional robustness tests, we study whether the investment effect of a firm's access to debt markets is related to its degree of information opacity and life cycle. Specifically, firms that are informationally opaque are less likely to have a rating and are less likely to make an acquisition. Firms that are further into their life cycle are more likely to have a rating as they have a long track record. They are also more likely to make acquisitions due to low internal growth opportunities. We find a significant and positive effect of having a rating on the likelihood of making an acquisition for both sub-samples of informationally opaque and non-opaque firms. The effect of having a rating persists for the sub-sample of older firms and most notably for the sub-sample of young firms.

Collectively, these findings suggest that access to debt markets has a distinct effect on investment decisions.

Sufi (2009) examines firms with a syndicated bank loan rating and finds more *cash* acquisitions for rated firms. In addition to examining the full spectrum of acquisitions (i.e., all-cash, all-stock and hybrid acquisitions), we go further to understand the effect of a firm's rating on the quality of its investments, and hence the effect of the constraint imposed by differential access. In addition to documenting a significant effect of having a debt rating on the ability to undertake an acquisition, this study suggests that access to debt markets also influences the nature of a firm's investments.

This paper is also related to studies on the interdependence of financing and investment decisions. Specifically, Almazan et al. (2010) and Uysal (2011) show that excess leverage impairs a firm's ability to undertake acquisitions. We show that access to debt markets continues to play an important role even after controlling for leverage. Thus, this paper contributes to these studies by suggesting that overleveraged firms may still pursue acquisition opportunities if they have access to public debt markets.

This paper also contributes to studies on the interdependence of certification and corporate policies. Specifically, Stiglitz and Weiss (1981) argue that difficulty in verifying a firm's quality and its investment quality may impede its ability to raise capital for new projects. We contribute to this literature by showing that difficulty in verification of a firm's quality influences the average quality of its investment projects by constraining its ability to invest.

The paper is organized as follows: Section 2 provides details of sample selection and descriptive statistics of the data, Section 3 examines the empirical findings and Section 4 draws conclusions.

2. Sample Selection and Descriptive Statistics

In our study, we use firms covered in COMPUSTAT and CRSP from 1990 to 2007. Following previous studies (e.g., Hovakimian et al., 2001; Fama and French, 2002; Flannery and Rangan, 2005), we exclude financial firms (6000–6999) and regulated utilities (4900–4999). We also drop firms with sales of less than $10 million in 1990 dollars. For each firm in the sample, we obtain all of its completed domestic acquisitions listed in Securities Data Company's (SDC) Mergers and Acquisitions (M&A) database as a merger, acquisition of majority interest, asset acquisition, or acquisition of certain assets with transaction values greater than $1 million. We also follow Moeller et al. (2004) and drop acquisitions if the ratio of transaction value to total assets of the acquirer is less than 1 percent. After merging the M&A data with COMPUSTAT and CRSP datasets, we have 9,132 acquisitions that have non-missing dependent and independent variables. These acquisitions have an average transaction value of $420 million. Of these transactions, only 16.1% are all-stock offers, whereas 29.3% are all-cash and another 53.4% have a cash component. As most cash deals are financed with debt (Bharadwaj and Shivdasani, 2003; Harford et al., 2009), these findings provide preliminary evidence on the importance of access to debt markets in financing acquisitions.

Table 1 reports the descriptive statistics of firms in the sample. The average total assets of firms in the sample is $2.9 billion. 27.3% of the firms in our sample have a rating and the average market leverage is 0.378.[2] Table 1 also indicates that acquisitions play an important role: 12.6% of firms make at least one acquisition during the study period and the average annual transaction volume constitutes 3.7% of total assets.

[Insert Table 1 here]

3. Empirical Analyses

3.1 Ratings and Likelihood of Undertaking Acquisitions

This section presents evidence that relates a firm's long-term debt rating to its acquisition activity. Figure 1 shows the average incidence of *All*, *Firm*, and *Asset Acquirers* over years from 1990 to 2007. While the differences in acquisition likelihoods of rated and non-rated firms fluctuate over time, firms with debt ratings have higher acquisition probabilities relative to non-rated firms in all three acquisition categories. Panel A of Table 2, which reports the mean values for acquisition variables for firm-per-year by debt ratings, also presents evidence of the impact of having a debt rating on acquisition choices. For example, the unconditional probability of acquiring a target is 15.3% for the subsample of firms with a rating, whereas it is only 11.6% for the non-rated firms. The difference is 3.7% ($p<0.01$) and corresponds to 29.4% relative to the mean overall unconditional probability of being an acquirer (12.6%). The relation holds regardless of the

[2] Variable definitions are in Appendix I.

type of acquisition: firms with bond ratings are also more likely to acquire another firm (7.6% vs. 5.1%) and to acquire assets (9.3% vs. 7.6%) relative to non-rated firms. This relationship continues to hold for within- (8.2% vs. 6.1%) and cross-industry acquisitions (8.2% vs. 6.3%). Overall, these findings provide preliminary evidence supporting the view that access to debt markets enhances a firm's ability to undertake an acquisition.

[Insert Table 2 here]

Panel B of Table 2 reports the likelihood of undertaking an acquisition by *Rating* and *Market Leverage* quartiles. While the likelihood of undertaking an acquisition incrementally decreases with *Market Leverage*, firms with bond ratings have a higher probability of making an acquisition for each *Market Leverage* quartile. We continue to find higher acquisition frequencies for rated firms for all *Sales* quartiles in Panel C. Collectively, these findings indicate that leverage and firm size are unlikely to confound the effect of rating on the likelihood of undertaking an acquisition while also supporting our conjecture that access to debt markets influences acquisition decisions.

Next, we conduct a multivariate analysis including several factors that are not accounted for in the univariate analysis, but may potentially affect the likelihood of making an acquisition. Specifically, we add *EBITDA/TA* in our regressions, as better performing firms are more likely to undertake acquisitions (Roll, 1986; Harford, 1999). We also include the natural logarithm of sales to control for firm size as large firms are more likely

to make acquisitions (Almazan et al., 2010). Including a proxy for firm size also enables us to disentangle the effects of firm size and rating as large firms are more likely to have a rating and to undertake acquisitions. We also add *Market Leverage* in the regressions to separate the effects of leverage and having a rating. To account for potential effects of investment opportunities and misvaluation, we add *Stock Return* and *Market-to-Book* variables in multivariate analysis. Furthermore, the regressions include *Cash Holdings/TA*, as firms with large cash holdings are more likely to undertake acquisitions (Harford, 1999). Following Schlingemann et al. (2002), we also control for the liquidity of the market for corporate assets within an industry by including the *Industry M&A Liquidity* measure in our regressions. Industry concentration may also influence acquisition decisions: firms in a highly concentrated industry have fewer targets available for acquisitions within the industry, which may limit within-industry acquisitions, while enhancing the likelihood of cross-industry acquisitions. Therefore, the regressions include the *Herfindahl Index*. We also add year dummies in the analysis to account for macroeconomic changes in the time series.

Table 3 reports the probit analysis in odd-numbered models and the tobit analysis in even-numbered models. We report the marginal effects of the probit and tobit models at the mean values, as the coefficient estimates in these models are difficult to interpret. Following Petersen (2009), we estimate p-values in both probit and tobit models based on clustering by firm and time (year) to account for correlations among error terms within firm and within the year. Consistent with the evidence presented in the univariate analysis, both probit and tobit analyses show significant effects of rating on acquisition decisions.

Specifically, firms with debt ratings are 5.2% more likely to make an acquisition, an increase of 41% over the sample average (Model 1). The positive and significant effect of *Rating* continues to hold for both firm (2.6%) and asset acquisitions (3.3%) in Models 3 and 5, respectively. Having a rating also increases the size of acquisitions by 1.8%, an increase of 48.6% (Model 2). The positive and significant effect of *Rating* remains intact for both firm and asset acquisitions in Models 4 and 6, respectively. The presence of these statistically and economically significant results, even after controlling for firm characteristics such as acquirer *Sales* and *Market Leverage*, suggests that the influence of rating is not simply a reflection of firm size or of leverage. Nonetheless, we examine this issue more carefully in section 3.7. Collectively, these findings lend support to the assumption that firms mostly resort to capital markets in financing acquisitions; thereby, having access to debt markets plays an important role in their ability to undertake acquisitions.

[Insert Table 3 here]

The coefficient estimates for the control variables are largely consistent with previous studies. For example, the coefficient estimates for *Sales* are positive and significant, indicating that large firms are more likely to be acquirers (Cai and Vijh, 2007). We also confirm a result reported by Harford (1999) with our finding that *Cash Holdings/TA* increases the likelihood of undertaking an acquisition, suggesting that cash-rich firms are more likely to be acquirers. Furthermore, firms with higher *Stock Return* and *EBITDA/TA* are more likely to make acquisitions while *Market Leverage* is negatively associated with the likelihood of making an acquisition (Almazan et al., 2010). *Industry*

M&A Liquidity and *Herfindahl Index* have a positive and a negative effect, respectively, on the probability of making an acquisition (Uysal, 2011).

3.2 Rating and Premiums Paid to Target Firms

In this section, we examine whether having a debt rating influences premiums paid for the target firms, which are only available for the subsample of public firm acquisitions. To assess the premiums paid to target firms, we utilize an estimation procedure that is similar to that used by Schwert (1996). First, we estimate the normal returns to target shareholders from market model regressions for the target firms in a 200-day estimation window (-205, -6), where time zero is the announcement date. In these regressions, the market returns are the value-weighted index returns, including dividends, for the combined New York Stock Exchange, American Stock Exchange, and NASDAQ. Second, we calculate the abnormal returns as the deviation from the predicted target returns. We generate three measures for target premium. First, similar to Schwert (1996), we generate the cumulative abnormal returns to the target shareholders over the period starting one day before the announcement and one day before the effective date. Second, we alternatively use cumulative abnormal returns over two days prior to the announcement to two days after the announcement day (*Target CAR (-2,+2)*). As a third proxy, we use three day cumulative abnormal returns covering one day before and one day after the announcement day (*Target CAR (-1,+1)*).

Previous studies show that a number of factors influence the premiums paid for the target firms, including asymmetric information, competition for the target, growth

opportunities, agency problems, and stock overvaluation (Shleifer and Vishny, 2003). Therefore, the regressions include several acquirer (size, profitability, stock return, and market-to-book ratio), target (target's market-to-book ratio and organizational form), deal (dummy variables for within-industry acquisitions and multiple bidders), and industry characteristics (*Industry M&A Liquidity* and *Herfindahl Index*). Furthermore, we add year dummies in the regressions to account for macroeconomic changes in the time series.

Table 4 reports the positive and significant effects of *Rating* on the acquisition premium measures. Specifically, targets receive 6.9% higher premiums when their acquirers have a rating (Model 1). The positive and significant effect of *Rating* remains intact when we use *Target CAR(-2,+2)* and *Target CAR(-1,+1)* in Models 2 and 3, respectively. These findings are also consistent with the positive effect of *Rating* on the probability of completing acquisitions, as documented in Table 3. Collectively, these findings are in line with the view that constrained access to debt markets reduces firms' ability to undertake acquisitions and further limits them from bidding aggressively for the targets they do pursue.

Other variables also significantly influence acquisition premiums. Consistent with Bargeron et al., (2008), hostile offers are associated with larger premiums, while targets with higher *Market-to-Book* receive lower premiums. The coefficients for *Market Leverage* are also negative and significant in both Models 2 and 3, indicating that overleveraged firms pay lower premiums as in Uysal (2011). Overall, these findings are largely consistent with those reported in previous studies.

[Insert Table 4 here]

3.3 Does Having a Rating Affect Announcement Returns to Acquirers?

The previous sections show that having a debt rating influences both the ability to undertake acquisitions and the terms of the acquisitions. In this section, we study whether *Rating* has a significant effect on the quality of an acquisition by examining market reactions to acquisition announcements, given by *CAR*. We follow Fuller et al. (2002) and calculate *CAR* over a five-day event window (two days before and two days after the announcement date). The benchmark returns are the value-weighted index returns, including dividends, for the combined New York Stock Exchange, American Stock Exchange, and NASDAQ.

Table 5 presents mean *CAR* values for the whole sample and various subsamples. The mean *CARs* for firm and asset acquisitions are positive. These are consistent with Masulis et al. (2007) and Hege et al. (2009), who document positive mean *CAR*s for firm and asset acquisitions, respectively. In the sample of all acquisitions, the mean *CAR* to non-rated firms is 0.023 and is significantly different from zero at the 1% level. Furthermore, non-rated acquirers attain greater *CARs* than rated acquirers. These findings continue to be true for subsamples of firm and asset acquisitions. Finally, we find positive and higher *CARs* to non-rated acquirers in all payment method subsamples. These results also remain intact for all subsamples of leverage quartiles. Overall, these findings lend further support to the prediction that access to debt markets influences the quality of acquisitions undertaken.

[Insert Table 5 here]

The univariate evidence demonstrating a negative association between *Rating* and *CAR* does not account for several important factors that affect acquirer returns. For example, Moeller et al. (2004) show that firm size is negatively associated with announcement returns. In order to disentangle the effect of firm size, we include *Sales* in the multivariate regression. We also include *Market Leverage* to account for the effect of leverage on acquirer returns. Furthermore, we follow prior literature and control for acquirer, target, deal, and industry characteristics. Table 6 reports the coefficient estimates of regressions of *CAR* on *Rating*, annual dummies, and control variables. The models have an R^2 of 4.7% for all acquisitions, 6.6% for firm acquisitions, and 5.3% for asset acquisitions. These are comparable to *CAR* regressions in previous studies (e.g., Masulis et al., 2007; Moeller et al., 2004).

Table 6 reports significant and negative effects of *Rating* on *CAR*. Specifically, *CAR* to rated acquirers is 80 basis points lower than that to non-rated acquirers, a decrease of 44% over the sample average (Model 1). We continue to find negative and significant effects of *Rating* in firm (-0.010 in Model 3) and asset acquisitions (-0.007 in Model 5). The results are qualitatively similar when we use a three-day event window (one day before and one day after the announcement date) in the calculation of CAR (Models 2, 4 and 6). Collectively, these findings indicate that having access to debt markets affects the quality of acquisition choices. Specifically, managers of non-rated firms pursue acquisitions that create more value relative to those of managers of rated firms.

[Insert Table 6 here]

We confirm a result reported by Masulis et al. (2007) with our finding that *CAR* decreases with the *Market-to-Book* ratio. Furthermore, *CAR* is negatively associated with the public status of the target, as documented in Chang (1998) and Fuller et al. (2002). There is also a positive association between *CAR* and relative deal size, consistent with Asquith et al. (1983). Finally, *CAR* increases with *Market Leverage*, as in Maloney, McCormick and Mitchell (1993).

Although we document a strong negative association between *Rating* and *CAR*, we recognize that the *CAR* analysis in this section is built upon the premise that stock prices accurately and immediately reflect the impact of acquisitions on firm values. If investors make systematic errors in evaluating acquisitions at the announcement dates, then there will be (systematic) price reversals in the long run. This implies that portfolios of non-rated acquirers will underperform relative to portfolios of rated acquirers in the long run. To test this conjecture, we follow Moeller et al. (2004) and employ four factors from the Fama and French (1992) and Carhart (1997) models.[3] For each group of rated and non-rated firms, we construct equally weighted monthly portfolios of firms that made an acquisition in the past five years and calculate the net return on these portfolios, defined as the monthly portfolio return less the risk-free return. In order to assess the effects of *Rating* on the long-run abnormal acquirer returns, we use the intercept terms (*Alpha*) in the regressions of the net portfolio returns on the four factors.

Table 7 reports the intercept terms of the net returns regressions and indicates that portfolios of non-rated acquirers do not underperform relative to portfolios of rated

[3] These four factors are excess return on market (*MKT*), small-minus-big return (*SMB*), high-minus-low return (*HML*) and momentum (*UMD*).

acquirers in the long run in *All*, *Firm,* and *Asset Acquisitions*. Furthermore, the analyses in *All Cash*, *All Stock,* and *Combo* subsamples yield qualitatively similar results. The results also remain intact for the subsamples of leverage quartiles. As the results find no price reversals for non-rated acquirers in the long run, they validate the average positive market reaction to non-rated acquirers documented in Tables 5 and 6, substantiating the view that managers of non-rated firms pursue better acquisitions on average.

[Insert Table 7 here]

3.6 Are the Constraints Imposed on Non-Rated Firms Optimal?

Our findings of rated firms' high premiums, lower announcement returns, and high likelihood of undertaking acquisitions are consistent with the free cash flow hypothesis (Jensen, 1986), which suggests that managers of rated firms use easier access to capital to make acquisitions that benefit themselves personally. However, these findings are also consistent with the proposition that constrained access to debt markets impairs a firm's ability to undertake all positive NPV projects (financial constraints hypothesis). In this section, we examine whether the financial constraints are sub-optimal. The free cash flow hypothesis predicts that the sign of the average market reaction to acquisitions made by rated firms is negative. However, we do not find negative average market reactions to rated acquirers in the short run (Table 5) or in the long run (Table 7). Further, when we examine the distribution of CARs, we find that rated and unrated firms have a similar fraction of negative CARs, so it is not the case that rated firms have a positive average CAR, but

make more bad acquisitions on the margin. Collectively, this evidence suggests that the free cash flow hypothesis cannot explain the findings presented in this paper.

The results are most consistent with the hypothesis that firms without access to public debt markets are financially constrained, forcing them to limit their investment to the highest NPV projects. Because unconstrained firms can take all positive NPV projects, their marginal project will create less value than the marginal project of a constrained firm, reducing the average. This is reflected in the lower, but still positive, average announcement returns for rated firm acquisitions. Thus, the source of financing matters for investment.

3.7 Robustness

In previous sections, we have included firm and industry characteristics to disentangle the effect of having a rating. The implicit assumption in these analyses is that having a debt rating is exogenous to the firm—determined by supply constraints driven by market imperfections. This is consistent with the conclusion of Faulkender and Petersen (2006). They also point out that firms, like Apple, that could have a favorable public debt rating but do not, are the exception. Our main concern is that there are firm characteristics that simultaneously determine whether a firm has a debt rating and whether it acquires. We therefore focus most of our robustness effort on this issue. We are less concerned about reverse causality—that firms see acquisition possibilities and then make an effort to relax their financial constraints in order to make those acquisitions. Even if some firms are able to relax their financial constraints such that this is part of the explanation, it still means that

access to public debt markets affects the acquisitions a company can make. Furthermore, we are interested in the bidding and value-creation implications of access to public debt markets, rather than simply the act of acquiring.

It is certainly possible that factors influencing the decision to access the public debt markets may also influence acquisition decisions. To address this problem, we examine whether a change in rating status has an effect on the likelihood of undertaking an acquisition. Specifically, we restrict our subsample to firms that did not have a rating two years prior to acquisition (t-2) and study whether having a rating in the subsequent year (t-1) has a meaningful effect on acquisition decisions at t=0 relative to sub-sample of firms that did not have a rating at t-2 and t-1. Both probit and tobit analyses in Table 8 show significant effects of rating on acquisition decisions. In particular, firms with debt ratings are 6.3% more likely to make an acquisition (Model 1). The positive and significant effect of *Rating* continues to hold for both firm (3.3%) and asset acquisitions (4.2%) in Models 3 and 5, respectively. Having a rating also increases the size of acquisitions by 2.4% (Model 2). The effect of *Rating* remains significant for both firm and asset acquisitions in Models 4 and 6, respectively. Firms relax their financing constraints by becoming rated and this is reflected quickly in their investment policy. We now conduct tests to ensure that it is not simply the characteristics of rated firms that drive both getting rated and making an acquisition.

[Insert Table 8 here]

To further alleviate the concerns that our findings are driven by firm characteristics (e.g., firm size) that are correlated with *Rating Dummy*, we replicate our analyses for a sub-sample of rated firms with control non-rated firms matched by industry and size. For each rated firm, we choose a non-rated firm sharing the same 3-digit SIC with the closest value of *Sales*. To ensure a reasonable size match, we drop both sample and control firms if the difference in *Sales* between the sample and control firms exceeds 10 percent. This process generates a sub-sample of 5918 (2959 rated and 2959 non-rated firms). After verifying that sample and control firms are not statistically different in size, we replicate the probit and tobit analyses of acquisition decisions in this sub-sample in Table 9. We continue to find positive and significant effects of *Rating Dummy* on both the likelihood of undertaking an acquisition and the size of that acquisition in *All, Firm* and *Asset* acquisitions. In an unreported analysis, we continue to find a significant effect of *Rating* when we match rated and non-rated firms by industry and leverage. These findings confirm that having access to public debt markets has an effect on acquisition decisions, distinct from industry and size.

[Insert Table 9 here]

We further disentangle the effect of having a rating by examining the portion of rating that is not explained by industry and firm characteristics. Specifically, we use an approach analogous to the one in Faulkender and Petersen (2011) and use the residual probability of having a rating in our analysis while controlling for the probability of having a rating as well as for firm and industry characteristics. This approach allows us to disentangle the incremental effect of a debt rating on the likelihood of undertaking an

acquisition while holding the firm characteristics and the probability of having a rating constant.

Similar to Faulkender and Peterson (2011), who study the effect of capital repatriation under the American Jobs Creation Act of 2004, we are interested in the effect of access to capital on investment. As Faulkender and Peterson (2011) point out, it is critical to distinguish from those firms that could gain access, but do not, and those that do gain access. In their case, this was the distinction between firms with funds that could be repatriated, but did not repatriate, and those that actually repatriated the funds. In our case, the distinction is between those firms that qualify for a debt rating, but do not get one, and those that actually get a debt rating and the access to public debt markets that comes with it. The coefficient on predicted rating will capture the effect of qualifying for a rating on acquisition likelihood, while the coefficient on the residual will capture the effect of actually getting a rating on acquisition likelihood.

We estimate the predicted probability of having a debt rating (*Pr(Rating=1)*) by implementing a probit analysis in Appendix II while the residual probability (*Residual(Rating)*) is *Rating Dummy* minus the predicted probability. In addition to including control variables in Table 3, we add three measures that are suggested by Faulkender and Petersen (2006) in the probit model estimating the likelihood of having a debt rating. These constructs include whether the firm is included in the S&P 500 index (*S&P 500 Dummy*), whether it is listed on the NYSE (*NYSE Dummy*), and the ratio of rated firms in the firm's industry grouping (*Ratio of Rated Firms*). Consistent with Faulkender

and Petersen (2006), we find that all these measures have a significant and positive effect on the probability of having a rating.

Table 10 reports the marginal effects of the residual probability of rating for the probit analyses in odd-numbered models and the marginal effects of the tobit analyses in even-numbered models. Model 1 accounts for the predicted probability and reports a significant effect of the residual probability on the likelihood of undertaking an acquisition. The results remain intact when we add industry and firm characteristics in Model 3. The tobit analyses in Models 2 and 4 also show positive and significant effects of the residual probability on the size of acquisitions. We continue to find positive and significant effects of the residual probability for firm and asset acquisitions. Controlling for the characteristics of rated firms, the act of getting rated to access the public bond market significantly relaxes financing constraints and has a real effect on investment decisions.

[Insert Table 10 here]

We also conduct probit analyses for the sub-samples of size and leverage quartiles in Table 11. While *Rating Dummy* has positive and significant effects in all sales quartiles on the likelihood of making an acquisition, the effect is smallest in the sub-sample containing the largest sales quartile. Furthermore, the estimates for *Rating Dummy* are positive and significant in all but the lowest market leverage quartile and the effect is the smallest economically in this quartile as well. The smallest estimates of *Rating Dummy* in the largest sales and the smallest market leverage quartiles indicate that access to public debt markets least improve acquisition opportunities of large and underleveraged firms.

These large, underleveraged firms are arguably the small part of the population that forgoes the public debt markets by choice.

[Insert Table 11 here]

We also examine the role of a firm's degree of information opacity in our analysis. Specifically, firms that are informationally opaque are less likely to have a rating. We use two proxies to capture information opacity. First, we use lack of any analyst coverage, as analysts generate information for market participants (Womack, 1996; Hong and Kubik, 2003). In Table 12, we continue to find significant and positive effects for *Rating Dummy* on the acquisition probability for both sub-samples of covered and non-covered firms. Second, we replicate our analysis for institutional holdings quartiles, as a large presence of institutional holdings is likely to mitigate asymmetric information problems. Table 12 reports that *Rating Dummy* is positive and significant in all institutional holdings quartiles. These findings indicate that our results are not driven by differences in the information environment for rated and non-rated firms.

[Insert Table 12 here]

Finally, we examine whether the life cycle of firms influences our findings. Older, mature firms are more likely to have access to debt markets as they have a long track record (Petersen and Rajan, 1994, 2002). Thus, we replicate our analysis for age quartiles. While rated firms are more likely to make an acquisition in all age quartiles, the effect is largest for the sub-sample of young firms, suggesting that young firms benefit the most

from access to debt markets. Collectively, these results indicate that the effect of having a rating is distinct from that of leverage, firm size, degree of information opacity and life cycle, while substantiating our conclusion that access to debt markets influences investment decisions.

4. Conclusion

This paper contributes to studies on the effect of access to debt markets on corporate investment decisions by documenting the influence of having a debt rating on acquisition choices. The evidence presented in this paper demonstrates that having a debt rating affects both a firm's ability to undertake an acquisition and the quality of that acquisition. Specifically, we find that the likelihood of a firm undertaking an acquisition is higher for firms with debt ratings. Rated acquirers also pay higher premiums for their targets. Finally, they have lower stock price reactions to their acquisition announcements relative to those of non-rated acquirers while their average acquisition still does not destroy value. These findings collectively suggest that constrained access to debt markets induces managers to be more selective in their investments such that they cannot exhaust all positive NPV projects, providing evidence that the source of financing matters not only in financing decisions, but also in investing decisions.

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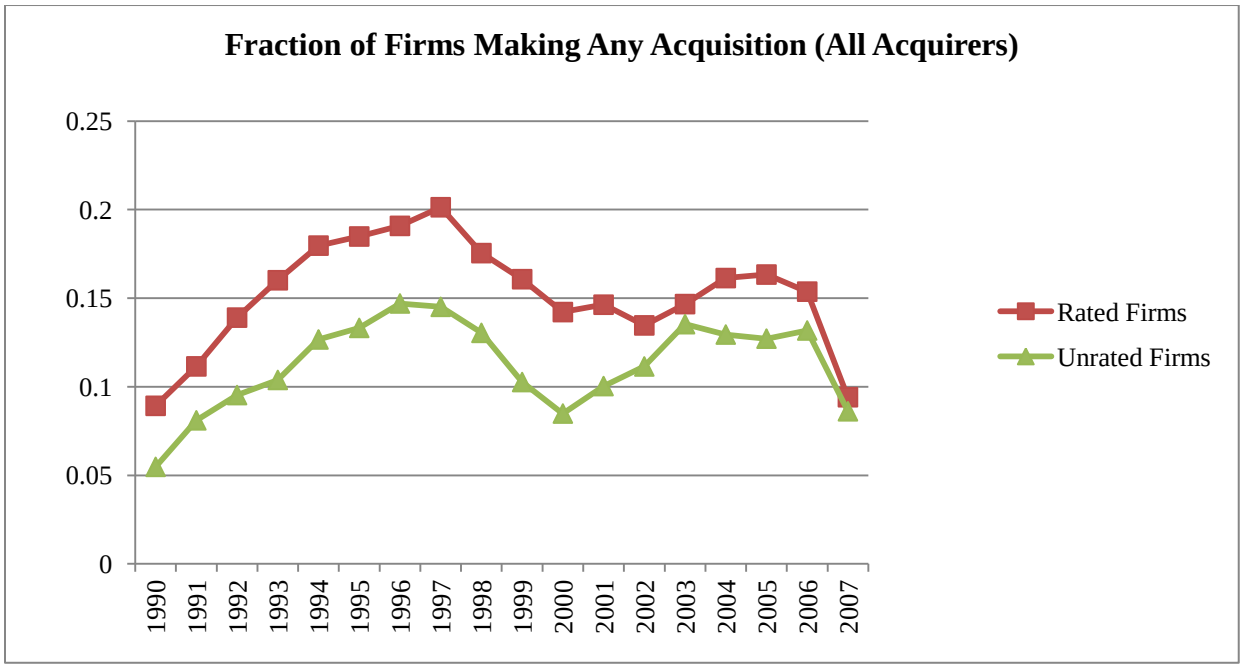
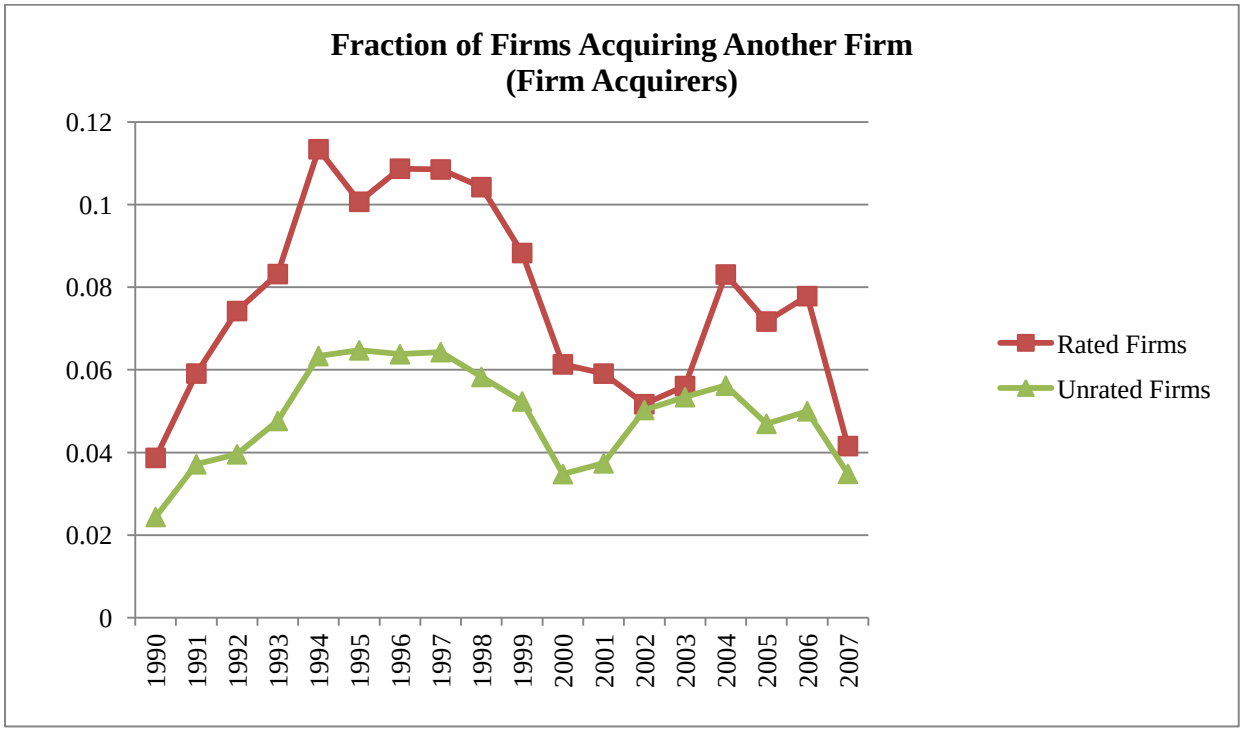
Figure 1. Ratio of Acquirers and Ratings, 1990-2007

The Figure shows the incidence of *All, Firm and Asset Acquirers* for rated and non-rated firms. The sample is based on 57,189 firm-years from COMPUSTAT between 1990 and 2007. *All Acquirers* is the proportion of firms that are listed as acquirers in acquisitions of majority interest, mergers, asset acquisitions or acquisitions of certain assets as defined in the SDC-M&A database. *Asset Acquirers* is the proportion of firms that are listed as acquirers in an asset acquisition or in an acquisition of certain assets as defined in the SDC-M&A database. *Firm Acquirers* is the proportion of firms that are listed as acquirers in an acquisition of majority interest or in a merger as defined in the SDC-M&A database.





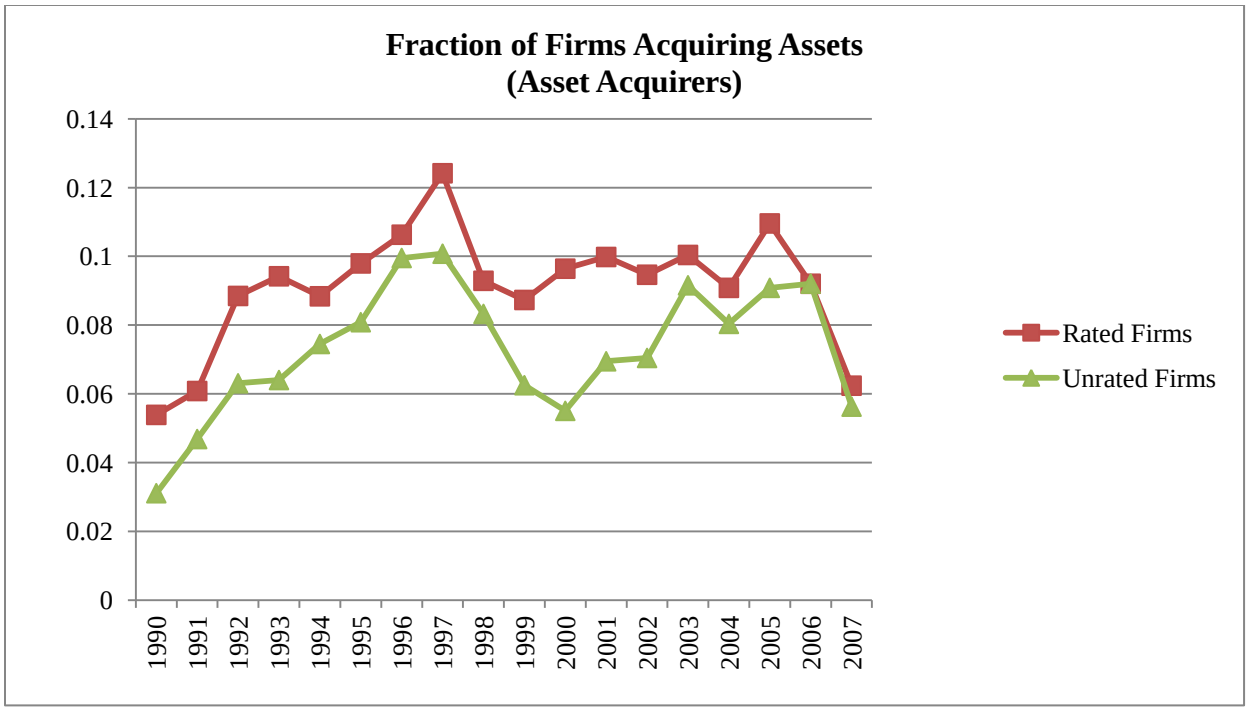

Fraction of Firms Acquiring Assets
(Asset Acquirers)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Rated Firms
Unrated Firms

Table 1. Summary Statistics

The table reports descriptive statistics for the sample. Panel A and Panel B report firm and deal characteristics, respectively. Variable definitions are in the Data Appendix.

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Assets ($ millions)	57,189	2896	15303	0.862	795337
Sales (Ln (Sales in $ millions))	57,189	5.472	1.866	2.389	10.291
Stock Return	57,189	0.166	0.685	-0.824	3.465
Market-to-Book	57,189	1.807	1.250	0.612	7.898
EBITDA/TA	57,189	0.128	0.144	-0.303	0.599
Market Leverage	57,189	0.378	0.243	0.023	0.952
Cash/TA	57,189	0.147	0.174	0.000	0.754
Rating Dummy	57,189	0.273	0.445	0	1
Acquisition	57,189	0.126	0.332	0	1
Firm Acquisition	57,189	0.058	0.233	0	1
Asset Acquisition	57,189	0.080	0.272	0	1
All Acquisitions Value/TA	57,189	0.037	0.152	0	1.085
Firm Acquisitions Value/TA	57,189	0.018	0.100	0	0.782
Asset Acquisitions Value/TA	57,189	0.013	0.061	0	0.448

Table 2. Acquisition Measures and Debt Ratings

Panel A reports means of acquisition variables of 57,189 firm-years recorded in the COMPUSTAT between 1990 and 2007. Panel B reports the ratio of acquirers sorted by rating and *Market Leverage* quartiles. Panel C reports the ratio of acquirers sorted by rating and *Sales* quartiles. Variable definitions are in the Data Appendix. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A. Acquisition Frequencies for Rated and Non-Rated Firms

	Whole Sample	Rated	Non-rated	Rated - Non-rated	
Acquirers	0.126	0.153	0.116	0.037	***
Firm Acquirers	0.058	0.076	0.051	0.025	***
Asset Acquirers	0.080	0.093	0.076	0.017	***
Within-Industry Acquirers	0.067	0.082	0.061	0.021	***
Cross-Industry Acquirers	0.068	0.082	0.063	0.019	***
Public Acquirers	0.026	0.049	0.018	0.031	***

Panel B. Frequencies of Acquirers for Market Leverage Quartiles

Market Leverage Quartiles	Whole Sample	Rated	Non-rated	Rated - Non-rated	
1 (Smallest)	0.165	0.212	0.159	0.053	***
2	0.150	0.200	0.132	0.068	***
3	0.124	0.166	0.101	0.065	***
4 (Largest)	0.066	0.090	0.052	0.038	***

Panel C. Ratio of Acquirers for Sales Quartiles

Sales Quartiles	Whole Sample	Rated	Non-rated	Rated - Non-rated	
1 (Smallest)	0.094	0.146	0.093	0.053	**
2	0.127	0.179	0.123	0.056	***
3	0.147	0.166	0.139	0.027	***
4 (Largest)	0.138	0.145	0.119	0.026	***

Table 3. Rating and Likelihood of Undertaking an Acquisition

The table presents marginal effects of probit analysis in odd-numbered models and marginal effects of tobit analysis in even-numbered models. The dependent variable in probit models takes the value of one if the firm undertakes an acquisition. In tobit analysis, the dependent variable is the ratio of the sum of acquisition value to the firm's total assets. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for standard errors clustered by firm and year. All models include year dummies. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	All Acquisitions		Firm Acquisitions		Asset Acquisitions	
	(1)	(2)	(3)	(4)	(5)	(6)
Rating Dummy	0.052***	0.018***	0.026***	0.009***	0.033**	0.006***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Sales	0.003*	-0.000	0.005***	0.001***	-0.002**	-0.001***
	(0.079)	(0.532)	(<.001)	(<.001)	(0.044)	(<.001)
Cash Holdings/TA	0.032**	0.010**	0.032***	0.010***	-0.006	-0.001
	(0.024)	(0.040)	(<.001)	(<.001)	(0.490)	(0.436)
Market Leverage	-0.149***	-0.048***	-0.073***	-0.024***	-0.092***	-0.016***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Stock Return	0.024***	0.010***	0.012***	0.004***	0.016***	0.003***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Market-to-Book	-0.003	0.001	0.003***	0.001***	-0.007***	-0.001***
	(0.187)	(0.482)	(0.019)	(<.001)	(<.001)	(<.001)
EBITDA/TA	0.143***	0.048***	0.036***	0.012***	0.121***	0.023***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Industry M&A Liquidity	0.249***	0.080***	0.114***	0.036***	0.171***	0.029***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Herfindahl Index	-0.037**	-0.013***	-0.024***	-0.008***	-0.020*	-0.003*
	(0.011)	(<.001)	(<.001)	(<.001)	(0.056)	(0.091)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	57189	57189	57189	57189	57189	57189
Pseudo R-square	0.047	0.052	0.059	0.062	0.035	0.047
P-Value	0.000	0.000	0.000	0.000	0.000	0.000

Table 4. Rating and Premiums Paid to Target Firms

The table reports regression estimates of the premium paid to target firms. The dependent variable in Model 1 is *Target Premium* estimated through cumulative abnormal returns to the target over the period covering one day before the announcement date to one day before the effective date of acquisition. The dependent variable in Models 2 is *Target CAR(-2,+2),* five-day cumulative abnormal returns to the target from two days before and two days after the announcement date. *Target CAR(-1,+1),* the three-day cumulative abnormal returns to the target from one day before to one day after the announcement date, is the dependent variable in Model 3. The p-values are based on standard errors corrected for heteroskedasticity and for clustering by firm. Variable definitions are in Appendix I. All models include year dummies. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

Table 4, continued

	Target Premium (1)	Target CAR (-2,*2) (2)	Target CAR (-1,*1) (3)
Rating Dummy	0.069**	0.034*	0.033*
	(0.046)	(0.080)	(0.079)
Market Leverage	0.018	-0.131**	-0.102*
	(0.891)	(0.023)	(0.074)
Cash Holdings/TA	0.122	0.026	0.027
	(0.244)	(0.674)	(0.656)
Sales	-0.014	0.006	0.004
	(0.249)	(0.229)	(0.385)
Market-to-Book	0.019	0.008	0.009
	(0.174)	(0.249)	(0.197)
EBITDA/TA	0.111	0.038	0.048
	(0.457)	(0.547)	(0.465)
Stock Return	-0.071***	-0.018*	-0.017
	(0.005)	(0.095)	(0.105)
Within-Industry Acquisition	-0.035	-0.012	-0.010
	(0.203)	(0.426)	(0.509)
All Cash	0.087***	0.097***	0.099***
	(0.001)	(<.001)	(<.001)
Competed	0.060	-0.052**	-0.045*
	(0.410)	(0.048)	(0.082)
Hostile	0.166**	0.105**	0.106**
	(0.037)	(0.028)	(0.026)
Industry M&A Liquidity	-0.281**	-0.168**	-0.176**
	(0.032)	(0.015)	(0.010)
Herfindahl Index	0.044	0.047	0.049
	(0.658)	(0.396)	(0.371)
Market-to-Book (Target Firm)	-0.032***	-0.022***	-0.021***
	(0.003)	(<.001)	(0.001)
Year FE	Yes	Yes	Yes
Observations	1216	1216	1216
R-squared	0.065	0.092	0.088

Table 5. Debt Ratings and Acquirer CAR

The table reports mean values for acquirer CAR(-2,+2) in the whole sample and various sub-samples. Variable definitions are in Appendix I. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	Whole Sample		Rated		Non-rated		Rated - Non-rated	
All Acquisitions	0.018	***	0.008	***	0.023	***	-0.015	***
Firm Acquisitions	0.010	***	-0.003		0.017	***	-0.020	***
Asset Acquisitions	0.023	***	0.016	***	0.026	***	-0.010	***
All Cash	0.016	***	0.010	***	0.019	***	-0.009	**
All Stock	0.011	***	-0.005		0.017	***	-0.022	***
Combo	0.021	***	0.010		0.027	***	-0.017	***
Market Leverage Quartile=1 (Lowest)	0.010	***	-0.001		0.012	***	-0.013	**
Market Leverage Quartile=2	0.017	***	0.003	*	0.025	***	-0.022	***
Market Leverage Quartile=3	0.021	***	0.008	***	0.032	***	-0.024	***
Market Leverage Quartile=4 (Largest)	0.035	***	0.023	***	0.047	***	-0.024	***

Table 6. CAR Regressions

The table reports coefficient estimates of acquirer returns. In odd-numbered models, acquirer returns are calculated over a five-day event window (two days before and two days after the announcement date) while they are calculated over a three-day event window (one day before and one day after the announcement date) in even-numbered models. The benchmark returns are the value-weighted index of returns including dividends for the combined New York Stock Exchange, American Stock Exchange and NASDAQ. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for heteroskedasticity and for clustering by firm. All regressions include year dummies. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6, continued

	All Acquisitions		Firm Acquisitions		Asset Acquisitions	
	(1)	(2)	(3)	(4)	(5)	(6)
Rating Dummy	-0.008***	-0.007***	-0.010**	-0.007*	-0.007**	-0.007**
	(0.003)	(0.002)	(0.023)	(0.054)	(0.035)	(0.010)
Market Leverage	0.035***	0.028***	0.031**	0.028**	0.037***	0.030***
	(<.001)	(<.001)	(0.027)	(0.041)	(0.001)	(0.003)
Cash Holdings/TA	-0.008	-0.008	-0.011	-0.008	-0.007	-0.010
	(0.370)	(0.290)	(0.383)	(0.491)	(0.587)	(0.397)
Sales	-0.001	-0.001	-0.003**	-0.002	0.000	-0.000
	(0.247)	(0.393)	(0.014)	(0.178)	(0.694)	(0.929)
Relative Size	0.009***	0.008***	-0.000	0.001	0.017***	0.015***
	(<.001)	(<.001)	(0.853)	(0.442)	(<.001)	(<.001)
Market-to-Book	-0.003***	-0.003***	-0.004**	-0.004***	-0.002	-0.001
	(0.010)	(0.004)	(0.028)	(0.006)	(0.334)	(0.495)
EBITDA/TA	-0.009	-0.009	0.003	0.001	-0.019	-0.019
	(0.413)	(0.345)	(0.860)	(0.946)	(0.210)	(0.173)
Stock Return	0.009***	0.007***	0.012***	0.010***	0.008***	0.006**
	(<.001)	(<.001)	(<.001)	(0.001)	(0.002)	(0.016)
Public Target	-0.041***	-0.039***	-0.038***	-0.034***	-0.028	-0.029
	(<.001)	(<.001)	(<.001)	(<.001)	(0.236)	(0.143)
Private Target	-0.002	-0.002	-0.005	-0.000	-0.002	-0.003
	(0.374)	(0.407)	(0.396)	(0.969)	(0.482)	(0.290)
Within-Industry Acquisition	-0.004	-0.003	-0.008**	-0.005*	-0.000	-0.002
	(0.129)	(0.121)	(0.026)	(0.093)	(0.907)	(0.553)
All Cash	0.003	0.005***	0.011***	0.012***	-0.003	-0.000
	(0.125)	(0.007)	(0.003)	(0.001)	(0.265)	(0.956)
Competed	-0.009	-0.010	-0.010	-0.011	0.009	0.002
	(0.460)	(0.280)	(0.374)	(0.260)	(0.811)	(0.905)
Hostile	-0.006	-0.008	0.004	-0.004	-0.178***	-0.043***
	(0.665)	(0.499)	(0.800)	(0.722)	(<.001)	(<.001)
Industry M&A Liquidity	0.001	0.001	0.024	0.007	-0.006	0.003
	(0.921)	(0.919)	(0.211)	(0.668)	(0.715)	(0.840)
Herfindahl Index	-0.000	-0.001	0.009	0.006	-0.006	-0.004
	(0.945)	(0.911)	(0.428)	(0.580)	(0.481)	(0.541)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9132	9132	3680	3680	5452	5452
R-squared	0.047	0.047	0.066	0.063	0.053	0.049

Table 7. Long-run Stock Price Performance

The table reports monthly abnormal returns over 5 years following the completion of an acquisition. The monthly abnormal return is the intercept term of the regression of monthly equally-weighted portfolio returns on four factors in Fama and French (1992) and Carhart (1997) models. The table indicates that there are no price reversals in the long-run. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels.

	Rated		Non-rated		Rated - Non-rated	
All Acquisitions	0.000		0.002	**	-0.002	
Firm Acquisitions	0.001		0.002		-0.001	
Asset Acquisitions	0.001		0.004	***	-0.003	*
All Cash	0.002		0.005	***	-0.003	
All Stock	0.001		0.001		0.000	
Combo	-0.001		0.002		-0.003	
Market Leverage Quartile=1 (Lowest)	0.003	*	0.004	**	-0.001	
Market Leverage Quartile=2	0.002		0.001		0.001	
Market Leverage Quartile=3	0.001		0.001		0.000	
Market Leverage Quartile=4 (Largest)	-0.003		0.005		0.008	**

Table 8. Acquisition Activity of Subsample of Non-rated Firms (t-2)
Table presents probit analysis in odd-numbered models and tobit analysis in even-numbered models for subsample of firms that did not have a rating at t-2. The dependent variable in probit models takes value one if the firm undertakes an acquisition, and tobit analysis estimates the ratio of sum of acquisition value to the firm's total assets. The estimates in probit models are marginal effects. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for standard errors clustered by firm and year. All models include year dummies. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	All Acquisitions		Firm Acquisitions		Asset Acquisitions	
	(1)	(2)	(3)	(4)	(5)	(6)
Rating Dummy	0.063***	0.024***	0.033***	0.012***	0.042***	0.009***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Sales	0.010***	0.002***	0.006***	0.002***	0.005***	0.000
	(<.001)	(0.003)	(<.001)	(<.001)	(0.001)	(0.220)
Cash Holdings/TA	0.047***	0.014***	0.032***	0.010***	0.009	0.001
	(0.006)	(0.015)	(<.001)	(<.001)	(0.418)	(0.503)
Market Leverage	-0.132***	-0.045***	-0.060***	-0.021***	-0.086***	-0.016***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Stock Return	0.024***	0.010***	0.012***	0.004***	0.016***	0.003***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Market-to-Book	-0.002	0.000	0.003**	0.001***	-0.006***	-0.001***
	(0.256)	(0.551)	(0.020)	(<.001)	(<.001)	(<.001)
EBITDA/TA	0.124***	0.044***	0.031***	0.010***	0.105***	0.022***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Industry M&A Liquidity	0.198***	0.066***	0.081***	0.027**	0.143***	0.026***
	(<.001)	(0.001)	(0.005)	(0.011)	(<.001)	(<.001)
Herfindahl Index	-0.041***	-0.014**	-0.018**	-0.006**	-0.032**	-0.006**
	(0.014)	(0.041)	(0.040)	(0.040)	(0.010)	(0.030)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	37654	37654	37654	37654	37654	37654
Pseudo R-square	0.049	0.053	0.056	0.058	0.040	0.050
P Value	0.000	0.000	0.000	0.000	0.000	0.000

Table 9. Matching by Industry and Size

Table presents probit analyses in odd-numbered models and tobit analyses in even-numbered models. The dependent variable in probit models takes value one if the firm undertakes an acquisition, and tobit analysis estimates the ratio of sum of acquisition value to the firm's total assets. The estimates in probit models are marginal effects. These analyses are conducted for the sub-sample of rated firms with a matching control group of non-rated firms. We generate the control group by matching industry (3-digit SIC) and Sales. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for standard errors clustered by firm and year. All models include year dummies. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	All Acquisitions		Firm Acquisitions		Asset Acquisitions	
	(1)	(2)	(3)	(4)	(5)	(6)
Rating Dummy	0.054***	0.016***	0.025***	0.008***	0.040***	0.006***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Sales	-0.013***	-0.006***	0.001	-0.000	-0.015***	-0.003***
	(0.006)	(<.001)	(0.733)	(0.822)	(<.001)	(<.001)
Cash Holdings/TA	0.020	0.003	0.074***	0.022***	-0.088***	-0.017***
	(0.662)	(0.844)	(0.008)	(0.006)	(0.010)	(0.004)
Market Leverage	-0.194***	-0.060***	-0.093***	-0.028***	-0.129***	-0.021***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Stock Return	0.020***	0.008***	0.012**	0.004***	0.016***	0.003***
	(0.030)	(0.011)	(0.007)	(0.005)	(0.015)	(0.008)
Market-to-Book	-0.001	0.002	0.004	0.002*	-0.005	-0.001
	(0.903)	(0.414)	(0.245)	(0.134)	(0.467)	(0.569)
EBITDA/TA	0.164***	0.047***	0.073***	0.020**	0.095***	0.016***
	(<.001)	(<.001)	(0.006)	(0.016)	(0.001)	(<.001)
Industry M&A Liquidity	0.472***	0.146***	0.219***	0.068***	0.319***	0.053***
	(<.001)	(<.001)	(0.001)	(0.003)	(<.001)	(<.001)
Herfindahl Index	0.035	0.015	0.018	0.008	0.010	0.002
	(0.464)	(0.280)	(0.591)	(0.392)	(0.760)	(0.642)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5918	5918	5918	5918	5918	5918
P-Value	0.000	0.000	0.000	0.000	0.000	0.000

Table 10. Residual Probability of Having a Rating

Table presents marginal effects of probit analyses in odd-numbered models and tobit analyses in even-numbered models and accounts for probability of having a rating. The dependent variable in probit models takes value one if the firm undertakes an acquisition, and tobit analysis estimates the ratio of sum of acquisition value to the firm's total assets. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for standard errors clustered by firm and year. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	All Acquisitions				Firm Acquisitions				Asset Acquisitions			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Residual(Rating)	0.061***	0.021***	0.063***	0.021***	0.028***	0.010***	0.029***	0.009***	0.042***	0.007***	0.042***	0.007***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Pr(Rating=1)	0.015	-0.001	-0.015	-0.002	0.023***	0.006***	-0.001	0.001	-0.007	-0.003***	-0.021	-0.002
	(0.105)	(0.781)	(0.364)	(0.767)	(<.001)	(0.005)	(0.922)	(0.826)	(0.259)	(0.002)	(0.101)	(0.265)
Sales			0.012***	0.002***			0.009***	0.002***			0.005**	0.000
			(<.001)	(0.007)			(<.001)	(<.001)			(0.011)	(0.517)
Cash Holdings/TA			0.029**	0.009*			0.031***	0.010***			-0.009	-0.002
			(0.041)	(0.062)			(<.001)	(<.001)			(0.321)	(0.294)
Market Leverage			-0.131***	-0.043***			-0.067***	-0.022***			-0.077***	-0.013***
			(<.001)	(<.001)			(<.001)	(<.001)			(<.001)	(<.001)
Stock Return			0.025***	0.010***			0.013***	0.004***			0.016***	0.003***
			(<.001)	(<.001)			(<.001)	(<.001)			(<.001)	(<.001)
Market-to-Book			-0.002	0.001			0.004***	0.002***			-0.006***	-0.001***
			(0.413)	(0.216)			(0.004)	(<.001)			(<.001)	(<.001)
EBITDA/TA			0.132***	0.045***			0.031***	0.010***			0.112***	0.022***
			(<.001)	(<.001)			(<.001)	(<.001)			(<.001)	(<.001)
Industry M&A Liquidity			0.274***	0.087***			0.123***	0.039***			0.192***	0.033***
			(<.001)	(<.001)			(<.001)	(<.001)			(<.001)	(<.001)
Herfindahl Index			-0.040***	-0.013***			-0.025***	-0.008***			-0.022**	-0.004*
			(0.006)	(0.009)			(<.001)	(<.001)			(0.030)	(0.058)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	57189	57189	57189	57189	57189	57189	57189	57189	57189	57189	57189	57189
P-Value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 11. Probit Analyses by Size and Market Leverage Quartiles

Table presents probit analyses for the sub-samples of Sale and Market Leverage Quartiles. The dependent variable takes value one if the firm undertakes an acquisition. The estimates in probit models are marginal effects. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for standard errors clustered by firm and year. All models include year dummies. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	Size Quartiles (1=Smallest, 4=Largest)				Market Leverage Quartiles (1=Smallest, 4=Largest)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Rating Dummy	0.065**	0.109***	0.063***	0.053***	0.016	0.045***	0.073***	0.040***
	(0.023)	(<.001)	(<.001)	(<.001)	(0.21)	(<.001)	(<.001)	(<.001)
Sales	0.030***	0.006	0.009	-0.016***	0.018***	0.004	-0.006*	-0.002
	(<.001)	(0.481)	(0.229)	(0.002)	(<.001)	(0.143)	(0.054)	(0.202)
Cash Holdings/TA	0.053***	0.038**	0.024	0.002	0.092***	0.012	0.011	0.047
	(0.001)	(0.042)	(0.472)	(0.964)	(<.001)	(0.645)	(0.760)	(0.110)
Market Leverage	-0.071***	-0.165***	-0.188***	-0.213***	-0.242**	-0.021	-0.175***	-0.169***
	(<.001)	(<.001)	(<.001)	(<.001)	(0.026)	(0.737)	(<.001)	(<.001)
Stock Return	0.023***	0.025***	0.028***	0.022**	0.031***	0.022***	0.019***	0.020***
	(<.001)	(<.001)	(<.001)	(0.032)	(<.001)	(0.002)	(0.001)	(<.001)
Market-to-Book	-0.002	-0.003	-0.000	-0.002	-0.003	0.007	0.009*	0.010***
	(0.394)	(0.329)	(0.930)	(0.763)	(0.376)	(0.215)	(0.085)	(0.003)
EBITDA/TA	0.074***	0.151***	0.128***	0.056	0.134***	0.187***	0.191***	0.100***
	(<.001)	(<.001)	(<.001)	(0.299)	(<.001)	(<.001)	(<.001)	(<.001)
Industry M&A Liquidity	0.122**	0.205**	0.370***	0.372***	0.211***	0.322***	0.263***	0.171***
	(0.021)	(0.002)	(<.001)	(<.001)	(0.007)	(<.001)	(<.001)	(<.001)
Herfindahl Index	-0.047*	-0.067***	-0.053*	0.016	-0.084**	-0.050*	-0.001	-0.021*
	(0.064)	(0.009)	(0.050)	(0.561)	(0.022)	(0.050)	(0.956)	(0.098)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14297	14297	14297	14298	14297	14298	14296	14298
P-Value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 12. Probit Analyses by Analyst Coverage, Institutional Holdings and Age Quartiles

Table presents probit analyses for the sub-samples of analyst coverage, institutional holdings and age quartiles. Quartiles 1 and 4 indicate smallest and largest quartiles, respectively. The dependent variable takes value one if the firm undertakes an acquisition. The estimates in probit models are marginal effects. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for standard errors clustered by firm and year. All models include year dummies. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	Analyst Coverage		Institutional Holding Quartiles				Age Quartiles			
	Covered	Non-Covered	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Rating Dummy	0.054***	0.034***	0.048***	0.036***	0.066***	0.046***	0.072***	0.041***	0.029***	0.059***
	(<.001)	(<.001)	(<.001)	(0.002)	(<.001)	(<.001)	(<.001)	(<.001)	(0.007)	(<.001)
Sales	0.004*	-0.003	-0.006***	-0.000	-0.001	0.003	-0.004	0.006**	0.006**	0.006**
	(0.076)	(0.112)	(0.005)	(0.957)	(0.782)	(0.449)	(0.167)	(0.019)	(0.012)	(0.030)
Cash Holdings/TA	0.036**	0.025*	0.017	0.004	0.034	0.063**	0.008	0.034*	0.043**	0.002
	(0.047)	(0.086)	(0.409)	(0.816)	(0.121)	(0.029)	(0.665)	(0.092)	(0.042)	(0.942)
Market Leverage	-0.214***	-0.061***	-0.114***	-0.070***	-0.126***	-0.253***	-0.173***	-0.166***	-0.125***	-0.136***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Stock Return	0.035***	0.020***	0.022***	0.025***	0.029***	0.035***	0.030***	0.023***	0.022***	0.021***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Market-to-Book	-0.011***	0.003	-0.003	0.000	-0.001	-0.012***	-0.001	-0.004	-0.006*	-0.008*
	(<.001)	(0.160)	(0.272)	(0.814)	(0.663)	(0.002)	(0.639)	(0.164)	(0.055)	(0.097)
EBITDA/TA	0.183***	0.114***	0.129***	0.108***	0.148***	0.144***	0.142***	0.158***	0.146***	0.163***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Industry M&A Liquidity	0.264***	0.182***	0.241***	0.172***	0.246***	0.305***	0.265***	0.290***	0.214***	0.236***
	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)	(<.001)
Herfindahl Index	-0.042**	-0.014	-0.011	-0.043**	-0.033	-0.055**	-0.035	-0.018	-0.059***	-0.036
	(0.043)	(0.313)	(0.646)	(0.019)	(0.169)	(0.043)	(0.182)	(0.449)	(0.008)	(0.102)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	29427	27762	14298	14297	14296	14298	14638	14353	14658	13540
P-Value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

APPENDIX I
Variable Definitions
(in alphabetical order)

- *(All) Acquisitions* refers to all domestic transactions in the U.S. for $1 million or more over a year listed in the SDC-M&A database as an acquisition of majority interest, merger, asset acquisition or acquisition of certain assets.
- *Acquisitions Value / TA* is the ratio of the total dollar volume of (*All) Acquisitions* made by the firm during a year to the firm's *Total Assets* (Item *AT*) at the beginning of the year.
- *All Cash* takes value one if the transaction is paid with all cash.
- *All Stock* refers to all-stock financed *All Acquisitions*.
- *Asset Acquisitions* refers to all domestic transactions in the U.S. for $1 million or more over a calendar year listed in the SDC-M&A database as an asset acquisition or acquisition of certain assets.
- *Asset Acquisitions Value / TA* is the ratio of the total dollar volume of *Asset Acquisitions* made by the firm during a year to the firm's *Total Assets* (Item *AT*) at the beginning of the year.
- *Acquirer* is a dummy variable that takes a value of one if the firm is identified as an acquirer in *All Acquisitions* by the SDC M&A database, and of zero otherwise.
- *Average Rated Firms* is the ratio of rated firms in the firm's industry grouping based on the three-digit SIC.
- *Book Debt* is *Total Assets* (Item *AT*) minus *Book Equity* (as defined below).
- *Book Equity* is defined as *Total Assets* (Item *AT*) minus liabilities (Item *LT*) plus balance sheet deferred taxes and investment tax credit (Item *TXDITC*) minus *Preferred Stock* (as defined below).
- *Book Leverage* is *Book Debt* over *Total Assets* (Item *AT*).
- *CAR* is the cumulative abnormal returns to bidders, which are calculated over a five-day event window (two days before and two days after the announcement date). The benchmark returns are the value-weighted index of returns including dividends for the combined New York Stock Exchange, American Stock Exchange and NASDAQ.
- *Cash Percentage* is the percentage of cash offered in the transaction.
- *Combo* takes value one if the transaction is paid with a mix of cash, equity and other considerations.
- *Competed* takes value one if there is more than one bidder.
- *Cross-Industry Acquisitions* refers to *All Acquisitions* in which the acquirer and the target do not belong to the same 3-digit SIC.
- *Cross-Industry Acquisitions Value / TA* is the ratio of the total dollar volume of *Cross-Industry Acquisitions* made by the firm during a year to the firm's *Total Assets* (Item *AT*) at the beginning of the year.

- *Cross-Industry Acquirer* is a dummy variable that takes a value of one if the firm is identified as an acquirer in a *Cross-Industry Acquisition*, and of zero otherwise.
- *EBITDA/TA* is operating income before depreciation (Item *OIBDP*) over *Total Assets* (Item *AT*).
- *Firm Acquisitions* refers to all domestic transactions in the U.S. for $1 million or more over a calendar year listed in the SDC-M&A database as an acquisition of majority interest or merger.
- *Firm Acquisitions Value / TA* is the ratio of the total dollar volume of *Firm Acquisitions* made by the firm during a year to *Total Assets* (Item *AT*) at the beginning of the year.
- *Herfindahl Index* is sum of the squares of the market shares of all firms sharing the same three-digit SIC, where market share is defined as sales of a firm (Item *Sale*) to sum of sales with the industry.
- *Industry M&A Liquidity* is sum of *Acquisitions Value* for each year and three-digit SIC code divided by the Total Assets (Item *AT*) of all COMPUSTAT firms in the same three-digit SIC and year.
- *Market Equity* is common shares outstanding (Item *CSHO*) times the stock price (Item *PRCC_F*).
- *Market Leverage* is *Book Debt* over *Market Value* (as defined below).
- *Market-to-Book* ratio is *Market Value* (as defined below) over *Total Assets* (Item *AT*).
- *Market Value* is defined as liabilities (Item *LT*) minus balance sheet deferred taxes and investment tax credit (Item *TXDITC*) plus *Preferred Stock* (as defined below) plus *Market Equity* (Item *CSHO* x Item *PRCC_F*).
- *NYSE Dummy* takes value of one if the firm is listed on the NYSE.
- *Pr (Rating=1)* is the predicted probability of having a rating based on the model in Appendix II.
- *Public Acquisitions* refers to *All Acquisitions* in which the target (as defined by the SDC M&A database) is a public firm.
- *Public Acquisitions Value / TA* is the ratio of the total dollar volume of *Public Acquisitions* made by the firm during a year to the firm's *Total Assets* (Item *AT*) at the beginning of the year.
- *Public Acquirer* is a dummy variable that takes a value of one if the firm is identified as an acquirer in *Public Acquisitions* by the SDC M&A database, and of zero otherwise.
- *Rating Dummy* takes value one if the firm has a debt rating.
- *Relative Size* is the natural logarithm of the ratio of *Transaction Value* to *Total Assets* of the acquirer at the end of the fiscal year prior to the acquisition announcement.
- *Residual (Rating)* is *Rating* minus the predicted probability of having a rating based on the model in Appendix II.
- *Sales* is the natural logarithm of sales (Item *SALE*) in 1990 dollars.
- *Stock Return* is the firm's annual stock return.
- *S&P 500 Dummy* takes value of one if the firm *is* included in the S&P 500 index.

- *Target CAR* is the cumulative abnormal returns to targets which are calculated over a five-day event window (two days before and two days after the announcement date). The market model uses the value-weighted index of returns including dividends for the combined New York Stock Exchange, American Stock Exchange and NASDAQ and is estimated over a 200 day estimation window (-205,-6)
- *Total Assets* (TA) is measured as the book value of assets (Item *AT*)
- *Transaction Value* is the total value of considerations paid by the acquirer, excluding fees and expenses.
- *Within-Industry Acquisitions* refers to *All Acquisitions* in which the acquirer and the target belong to the same 3-digit SIC.
- *Within-Industry Acquisitions Value / TA* is the ratio of the total dollar volume of *Within-Industry Acquisitions* made by the firm during a year to the firm's *Total Assets* (Item 6) at the beginning of the year.
- *Within-Industry Acquirer* is a dummy variable that takes a value of one if the firm is identified as an acquirer in a *Within-Industry Acquisition*, and of zero otherwise.

APPENDIX II
Probability of Having a Rating

Table presents marginal effects of probit analysis in which the dependent variable takes value one if the firm has a rating. Variable definitions are in Appendix I. The p-values are given in parenthesis and are adjusted for standard errors clustered by firm and year. ***, ** and * stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)
NYSE Dummy	0.103***
	(<.001)
S&P 500 Dummy	0.209***
	(<.001)
Average Rated Firms	0.499***
	(<.001)
Cash Holdings/TA	0.000
	(0.996)
Market Leverage	0.363***
	(<.001)
Sales	0.112***
	(<.001)
Stock Return	0.011**
	(0.045)
Market-to-Book	0.021***
	(<.001)
EBITDA/TA	-0.061*
	(0.064)
Industry M&A Liquidity	0.470***
	(<.001)
Herfindahl Index	-0.143***
	(<.001)
Observations	57189
Pseudo R-square	0.486
P Value	0.000